COMANCHE PEAK STEAM ELECTRIC STATION

ENVIRONMENTAL MONITORING PROGRAM

CONSTRUCTION PHASE

ANNUAL SUMMARY

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FOR TEXAS UTILITIES GENERATING COMPANY

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1.0 GENERAL

1.1 INTRODUCTION

After filing an Environmental Report (ER) with the Directorate of Licensing Regulatory, U.S. Nuclear Regulatory Commission (NRC), in 1974, Texas Utilities Generating Company (TUGCO) received a permit to proceed with construction of the Comanche Peak Steam Electric Station (CPSES) near Glen Rose, Texas. Conditions of the construction permit (CP) require TUGCO to establish an Environmental Monitoring Program for the construction phase. This program is scheduled to run concurrently with construction activities through 1981. This volume summarizes the first year of that program.

1.2 PURPOSE

Prior to construction and operation of the CPSES, 18-month terrestrial and one-year aquatic biological surveys were initiated to establish a comprehensive biological baseline inventory of the site environs. The purpose of this program was to study seasonal variations which influence density and/or diversity of organisms near the CPSES site.

The aquatic biological sampling program concentrated on three primary groups of organisms: 1) plankton, 2) benthic macroinvertebrates, and 3) fish. All groups were sampled monthly. The results of the baseline survey were used to develop the Construction Phase Monitoring Program.

The Construction Phase Monitoring Program has concentrated upon four primary groups of organisms; plankton, aquatic macrophytes, benthic macroinvertebrates, and fish. Investigations were conducted in areas where the greatest impact from construction was anticipated. During the baseline survey, critical periods during the yearly cycle and important parameters were identified. Therefore, the program developed for the CPSES Environmental Monitoring Program Construction Phase was designed to evaluate the aquatic fauna and flora during periods of environmental stress, migrations, and reproduction. By carefully timing the monitoring effort to coincide with these natural phenomena, the effects due to construction were obtained with limited samples. Table 1.2-1 presents dates and parameters sampled during the first year's monitoring. Figure 1.2-1 presents locations of biological and water quality sampling stations.

The winter sample was timed to evaluate construction effects on water quality and aquatic organisms (particularly fish) under low water temperature conditions. These data were summarized and submitted to Texas Utilities Generating Company (TUGCO) on March 21, 1975.

The spring sample was timed to coincide with mild water temperatures and the spring fish spawning period. These data were summarized and submitted to TUGCO on June 27, 1975.

This report constitutes a summary of data collected during the summer survey of the Construction Phase Monitoring Program conducted on

August 5, 1975. This information has been integrated with the winter and spring data to provide an in-depth ecological discussion of the effects of the CPSES after the first year of construction.

2.0 ECOLOGICAL SUMMARY

2.1 AQUATIC ECOLOGY

Squaw Creek, in the area of the CPSES, is an intermittent stream. Originating near Tolar, Texas, it flows in a general southeasterly direction across Hood and Somervell Counties for a distance of 37 km (23 mi) to its confluence with the Paluxy River. The Paluxy River, in turn, merges with the Brazos River a short distance from the mouth of Squaw Creek.

The volume of water in the creek is dependent on local climatic conditions. The flow in upper Squaw Creek is dependent on surface runoff, while the lower reaches derive its flow from surface runoff, vadose waters, and groundwater.

The creek is characterized by narrow riffles, shallow pools, and cascades (areas with current too slow to be classed as a riffle and too shallow to be classed as a pool). The riffle areas are narrow, with an average width of 1.5 m (5 ft), a depth of 5 cm (2 in), and a substrate of coarse gravel. The average pool has a width of 4.6 m (15 ft), maximum depth of 0.9 m (3 ft), and a substrate of bedrock covered by silt and herbaceous material. Substrate of the areas classed as cascades is bedrock with little rubble, gravel, or other fine materials. During summer months, the flow goes underground at certain points, causing an intermittent-type flow.

Seasonal temperatures in Squaw Creek range from freezing in winter to 35°C (95°F) in July and August. Water temperatures correspond closely with that of the atmosphere, except in areas which receive groundwater. Immediate areas of groundwater confluence can be as much as 6°C (10.8°F) cooler than the ambient air and water temperatures.

The following ecological summary discusses changes which have occurred in the aquatic biota of Squaw Creek during the first year of construction and integrates these biotic components to describe the creek ecosystem. Although an ecosystems' approach considers individual components of the system, its emphasis is upon their obligatory relationships, interdependence and causal relationships. In spite of its complexities, Odum (1959) suggests that an ecosystem, such as Squaw Creek, can be reduced to four basic units: 1) abiotic substances, 2) producer organisms, 3) consumer organisms, and 4) decomposer organisms. The abiotic substances are the basic inorganic and organic compounds of the environment which interact with the biotic components to produce an exchange of materials. Producers in Squaw Creek include the microscopic floating algae (phytoplankton) and the large rooted plants, referred to as aquatic macrophytes. Both are important in the production of basic food for the ecosystem. The consumers include primary consumers (herbivores), secondary and tertiary consumers (carnivores). Primary consumers feed directly on living plants or plant remains and include zooplankton, benthic macroinvertebrates and bottom-feeding fish. Secondary consumers feed on primary consumers and include some zooplankton and benthic macroinvertebrate species and most fish. Tertiary consumers feed on secondary consumers and include a few benthic macroinvertebrate species and fish. The ecological cycle is completed by the decomposers, principally aquatic bacteria and fungi. These organisms are distributed throughout the water column but are particularly abundant along the bottom where the bodies of animals and plants accumulate and in the photosynthetic zone. Organic detritus also is recycled by some of the higher life forms including benthic organisms and fish. These organisms are called detritivores. Figure 2.0-1 illustrates the relationships among the four basic constituents of the creek ecosystem by constructing a food web, an interlocking pattern of food chains indicative of the energy flow of an ecosystem.

Generally, phytoplankton is defined as the microscopic floating algae whose movements are more or less determined by the water currents (Odum, 1959). However, in most running water habitats, phytoplankton constituents are disloged attached benthic forms (Hynes, 1972). As stated previously, they are primary producers that have the capacity to convert solar energy into chemical energy for the aquatic ecosystem through the photosyntetic process. Thus, they occupy the first trophic level in the aquatic food web of Squaw Creek. Because of their direct dependence on the sun, fluctuations in phytoplankton populations are highly correlated with water temperatures and with seasonal changes in availability of light, although they also are influenced by current velocity, turbidity and nutrient concentrations.

Table 2.0-1 summarizes phytoplankton densities occurring at each sampling location during the winter, spring, and summer surveys while Table 2.0-2 presents the genera collected throughout the construction monitoring program. Field and laboratory procedures and detailed results are presented in Sections 3.3.1.2, 3.4.1.1.2, 3.4.1.2.2, 3.4.1.3.2 and Appendix A of this report.

Low phytoplankton densities were observed at all Squaw Creek locations sampled in winter when phytoplankton communities of temperate climates typically are at their minima (Hynes, 1972). Maximum numbers usually occur in summer. Table 2.0-1 illustrates that the highest density (2.10×10^5 phytoplankters/liter) occurring during summer was at Location A_5, just downstream from the construction site. However, this location was sampled only during summer. Further examination of Table 2.0-1 reveals that Locations A_2, A_3 and A_4 had lower densities during summer than during spring. This density decrease may possibly be due to the increase in grazers, such as copepods, which was experienced during the summer (Figure 2.0-2). Of the 32 genera collected during the construction monitoring program, those which dominated the samples included *Ankistrodesmus*, *Spirogyra*, *Cymbella*, *Navicula*, *Nitzschia*, *Rhoicosphenia* and *Synedra*.

Table 2.0-1 shows that diatoms were the dominant group during all three surveys. Diatoms typically dominate the plankton of rivers and streams, during the construction monitoring program they displayed the usual trend. As the seasons progressed, they represented increasingly higher percentages of phytoplankters collected, until attaining a maximum composition of over 98 percent of the phytoplankton collected at A_5 during summer. Over 79 percent of the phytoplankters at A_5 belonged to the genus *Synedra*, a benthic diatom frequently encountered in large numbers (Hynes, 1972). *Synedra* was extremely abundant at A_2 through A_4 during summer (see Table A-10 through A-12, Appendix A). This pattern is typical of phytoplankton community development in temperate climates.

Diatoms usually account for most plankton in flowing waters in winter, but increasing water temperatures encourage the development of Chlorophyta (green algae) and Cyanophyta (blue-green algae), which attain their maximum development in warm waters (Hynes, 1972). More genera of green and blue-green algae occurred in the summer samples than in the spring or winter samples, yet their percent composition was lower (see Tables A-4 through A-13, Appendix A). The factors inhibiting the development of green and blue-green forms have not been determined. Summer water temperatures which ranged from 24.5° to 34.0°C during sampling were sufficiently high to promote their development. Similarly, *in-situ* measurements of turbidity and transparency suggest abundant light for photosynthesis. As during the CPSES baseline survey, turbidity remained low and transparency remained high, during the first year of monitoring construction activities.

Fewer phytoplankton genera were reported during the construction monitoring program than during Ubelaker's (1974) baseline survey. However, his study represented a larger number of samples. Although phytoplankton densities during winter were extremely low, during spring and summer they were moderately high relative to other systems. Thus, they apparently are an abundant food source for organisms on higher trophic levels. However, the food value of a phytoplankton community cannot be determined solely by their numbers; it also is important to consider the community composition. Reed, et al (1975) found that diatoms are a poorer protein source than green algae since diatoms contain larger percentages of undigestible material, including oil droplets and silica.

Aquatic macrophytes also contribute to the primary productivity of an aquatic ecosystem. Such vegetation tends to occur in zones, which is well documented, and is influenced by water depth, flow and water quality. The outmost vegetation is composed of emergent plants that root in the substrate but have their photosynthetic surfaces above the water surface. The substrate is inundated for part of the growing season. A zone of floating-leaf vegetation occurs in areas of intermediate depths. Whether rooted in the substrate or free-floating, their leaves generally root on the water surface. The zone found in the deepest water is composed entirely of submerged or semisubmerged plants. Characteristically, these plants have long thin leaves and a caespitose growth habit (Sculthorpe, 1967).

Submergent and emergent life forms are found in Squaw Creek. The water flow probably prohibits the growth of floating-leaved plants in the creek. Aquatic macrophytes must have sufficient light and critical gases to carry on photosynthesis to survive in the aquatic environment. Light transparency of the water does not appear to be the critical factor limiting plant growth in Squaw Creek because the water is clear.

Submergents are probably the most important macrophytes within Squaw Creek because they are more abundant than emergents. They provide more habitat and cover for aquatic invertebrates and vertebrates (Table 2.0-3). Stonewort (*Chara* sp.), an algae, is an excellent producer of fish food especially for bass. It also has a softening effect on water by abstracting lime and carbon dioxide and depositing marl. Common hornwort (*Ceratophyllum demersum*) offers excellent shelter for young fish and supports insects which are valuable as fish food. Water-milfoil (*Myriophyllum heterophyllum*) offers shelter and is a valuable food producer supporting many insect species.

Emergent species offer excellent cover for small fish and support numerous insects when they occur in abundance. However, emergent species are not readily abundant in Squaw Creek. This lack of abundance is attributable to the lack of suitable substrate for growing medium caused by current in the riffle areas which is too fast to allow siltation. High water increases the velocity in Squaw Creek and it moves bottom stones, scouring the stream bed. It also will remove vegetation which is not securely rooted to the substrate. The pools above and below the riffles are catch basins of silt particles and organic material because the velocity of the current is reduced enough to allow part of the load to settle out.

Aquatic macrophytes may function as food or protection for fish; or they may support algae or small animals which are directly or indirectly food for game fish; or they may form habitat for the deposition of eggs. Aquatic macrophytes also aid the aquatic fauna by oxygenating the water. Consequently, these plants perform a valuable role in aquatic ecosystems such as Squaw Creek.

Primary production in Squaw Creek attributed to aquatic macrophytes ranges from 824 to 1113 g/m^2 of dry matter. Figure 2.0-3 shows a comparison of wet-dry weight production among stations between the spring and summer surveys. Using a conversion factor of 4 kcal/g of dry material (Kormondy, 1969), a range of 3296 to 4452 kcal/m^2/yr net primary productivity is obtained. These values represent the energy which is potentially available to primary consumers.

Stonewort *(Chara* sp.) is the only species of macrophyte found in Squaw Creek in sufficient quantity to evaluate production. This taxon is an algae and is usually the first species to become established in water bodies. Higher taxonomic forms increase as the organic matter and nutrient supply of the substrate increases. Water-milfoil and common hornwort are present in Squaw Creek but are very sparse. Thus, their value to the stream ecosystem is very minor. Emergent species do not contribute significantly to the ecological structure and function of Squaw Creek.

Zooplankton is defined as the animal portion of plankton consisting primarily of small crustaceans ranging from microns to millimeters in size. Their movements are more or less controlled by water currents. The occurrence of planktonic zooplankton species is subject to constant change and partially dependent upon local conditions including seasonal climatic variation as well as the physical characteristics of the region. Zooplankton, which functions as the primary herbivores and bacteriovores in a stream, serve as a food source for other invertebrates and vertebrates. Thus, they influence the abundance of other species throughout the food chain (Hynes, 1972; Miller and Kallendorf, 1973). Perhaps the most important factors affecting zooplankton distribution are water velocity, turbidity, and fluctuations in water temperature (Reid, 1961). Hynes (1972) concluded that most river or stream plankters must originate in still or gently flowing areas and be constantly, or frequently, supplied to the river or stream. Hynes (1971) in an earlier study suggested that plankton populations describe the past history of a certain volume of water by its species composition.

Table 2.0-4 summarizes zooplankton densities occurring at each sampling location during the winter, spring and summer surveys. Figure 2.0-2 presents mean zooplankton densities minus incidental organisms. Field and laboratory procedures and results are presented in Sections 3.3.1.4, 3.4.1.1.4, 3.4.1.2.4, 3.4.1.3.4 and Appendix A of this report.

Low densities of zooplankton were detected during the winter survey (Table A-17 through A-19, Appendix A). This is typical for temperate climates as a result of low water temperature, food availability and usual higher water runoff (Hynes, 1972). The highest and lowest densities were reported during the summer survey (Table A-23 through A-26, Appendix A).

Substrate characteristics are noted as one of the major factors controlling benthic populations (Hynes, 1972). Benthos depend on substrate for shelter from predation, as a food source (detritus or periphyton) and for attachment in the filter feeding forms (e.g., trichoptera). Numbers of benthos can vary widely from one type substrate to another. An example of this is provided by Pentelow (1938) in a study where the number of benthic organisms varied from 995 to 2,325 per square meter between two stations which differed primarily in that one contained some pebble mixed with sand and gravel. Mackenthum (1973) also found a variation in density between substrates in large rivers with sand having 20-40 individuals per square meter, while muddy sand substrate supported 50 - 500 individuals per square meter.

Spates (extremely high flows) are environmental factors which may dictate the type and limit the abundance of benthic macroinvertebrates. Duration and frequency of occurrence are factors which determine the effect a spate will have on the benthic community since temporary shelter can normally be found (Hynes, 1972).

Table 2.0-5 presents the mean density of each sampling location by sampling effort and sampling device used. By subdividing the mean density of each station by sampling device, it enables some comparison between riffle habitat (Box Sampler) and pool habitat (Ekman).

Evaluation of this table reveals the highest densities consistently to be in the riffle habitat. At first this appears to be in contradiction to the expected higher densities in the pool habitat (Hynes, 1972). Pool habitats are characterized by greater stability with respect to riffle habitat primarily due to a decrease in water turbulence and an increase in detritus accumulation. However, it is the opinion of Dames & Moore's biologists that the interaction of three primary factors are contributing to this reversal of expected densities. These factors are: 1) types of organisms occupying the habitats, 2) substrate differences between pools and riffles, and 3) spate protection afforded by the substrate of the riffle areas.

From Tables A-27 through A-46 (Appendix A) and Figures 2.0-4, 2.0-5, and 2.0-6, it is seen that aquatic insects, primarily Tricopterans (Caddisflies), Ephemeropterans (mayflies), Plecopterans (stone flies), and Chironomids (midges) are responsible for the dominant densities at each sampling location. Ross (1944) described the genus Helicopyche (Tricoptera), common in Squaw Creek samples, as a widely distributed species but confined to relatively clear and swift streams. These are the conditions which exist in the riffle habitats. Claassen (1931), in discussing distribution and habitats of Plecopterans, stipulated pure and well aerated, running, waters for Plecopteran habitats. Claassen continued his discussion with, "Most of the stone flies are very sensitive to polluting substances, and the absence of nymphs in permanent freshwater streams often is an indication of some type of pollution. Any substance which possesses toxic properties, or any organic which, in its oxidation process reduces the oxygen content of the water, may kill the entire stone fly fauna before the water becomes unbearable to much of the other aquatic life. Whereas it is not safe to assume that freshwater streams in which stone flies are absent are necessarily polluted, it is always safe to assume that wherever they are present, the waters are relatively clean." These stipulations and discussions of Plecopteran habitat agress with *in situ* and water quality analyses conducted during this program as well as Ubelaker's (1974) description of Squaw Creek as a clear, unpolluted stream.

Ephemeropterans, particularly *Baetis* sp., were commonly collected during all surveys during this program. *Baetis* sp. was described by Usinger (1956) as a rapid water form of mayfly. Preferred habitat for this species in Squaw Creek would be the riffle areas. This condition was confirmed by the larger numbers collected in riffle areas in contrast to the pool habitat.

Chironomids (Diptera) were consistently collected at all sampling locations and all sampling periods. Usually these organisms are predominantly found in sluggish moving water with silt substrate (Johannsen, 1969). However, during the Construction Phase Monitoring Program, densities were greatest in riffle habitats.

Substrates are radically different between riffle and pool habitats. Riffle habitats are predominantly bedrock or gravel bottom. Pool habitats, in comparison, are fine sand and mud. The gravel substrate provides a better substrate due to its heterogeneity and firmness for attachment. Sand or mud substrate is probably the poorest substrate for benthic organisms (Hynes, 1972). It presents several problems to benthic organisms, among them are walking over shifting sands and keeping the sand from covering their respiratory structures.

The gravel substrate offers better protection against spates of short duration. The substrate allows organisms to crawl between or under stones thereby protecting them from the direct scouring action of the turbulent water. Sand or mud substrate will not offer this protection due to its shifting characteristics during spates.

Fish are prominent in the trophy structure of Squaw Creek; being the largest and most conspicuous of the ecosystem's consumers. During the construction monitoring program, 18 species representing seven families and genera were collected. Table 2.0-6 lists their common and scientific names and includes the number of fish collected during each sampling period, their size range, and the percentage of the total catch (all periods) comprised by each species. Comparisons of these data with Forshage's (1972), Gallaway's (1972), and Ubelaker's (1974) baseline data are included in this discussion. Field and laboratory procedures and detailed results of each survey are presented in Sections 3.3.1.6, 3.4.1.1.6, 3.4.1.2.6, 3.4.1.3.6 and Appendix A of this report.

Food studies of the more important species collected during the monitoring program were performed to provide details of the ecological relationships in Squaw Creek. These findings can be compared during future studies to determine if feeding habits have changed. Extensive environmental changes in an area can lead directly or indirectly to changes in the feeding habits of fishes. However, changes in feeding habits are not necessarily detrimental, unless the organisms' feeding habits are very specialized. Food habits of fish vary with season, food availability, and life cycle stages. For example, the diet of most young fishes consists of microscopic plants and animals, including algae, protozoans, and crustaceans found on plants, in bottom material, or floating in the water column. As fish develop and attain sexual maturity, feeding adaptations develop and the diets of some species become very restricted, according to the niche that they occupy in the aquatic habitat. Some fish are herbivorous, including most of the smaller cyprinids while others are strictly carnivorous, such as bass. Most of the sunfishes and catfishes are omnivorous.

Although most fish prefer to feed on certain groups of organisms, they also are opportunistic to a certain extent and will utilize organisms that are available. Stomach content analyses performed during the monitoring program identified a wide variety of food item taxa, indicating that Squaw Creek fish are somewhat selective in their feeding habits, depending upon the niche they occupy in the aquatic ecosystem.

Because a given species may simultaneously occupy more than one trophic level in the aquatic food web, the following grouping of Squaw Creek fishes as primary, secondary or tertiary consumers or detritivores is admittedly arbitrary. The following discussion includes life history information on all species comprising at least 3 percent of the total catch for the monitoring program.

Those Squaw Creek fish species whose diet was basically herbivorous and, thus, can be classified as primary consumers included the bullhead minnow and the stoneroller. Only one bullhead minnow was collected during the survey, but 182 stonerollers were collected, comprising 12.4 percent of the total catch (Table 2.0-6). Of these, 179 were collected in summer, predominantly at Location A_1.

The stoneroller *(Campostoma anomalum)* occurs from southern North Dakota to Texas, east to the Appalachians and north to western New York. It usually inhabits clear streams with a gravel, rubble or exposed bedrock bottom. Permanent flow is not an essential habitat requirement for stonerollers because they live in pools throughout much of the year. Thus, Location A_1 appeared to offer excellent habitat for stonerollers because it consisted of a series of pools over a bed-rock substrate. The diet of the stoneroller usually consists of diatoms and blue-green algae, which they obtain by scraping the thin film of organic material from the substrate, and aquatic insect larvae. They consumed large amounts of flocculated detrital material during summer in Squaw Creek (Table A-59, Appendix A). Spawning occurs from late March to May, with maximum activity occurring when the water temperature reaches 18.3°C (65°F) (Carlander, 1969).

Most fish species collected in Squaw Creek can be categorized as secondary consumers including the blacktail shiner, mosquitofish, gray redhorse, black and yellow bullheads, bluegill, green, orangespotted and longear sunfishes, white crappie and orangethroat darters. The mosquitofish (*Gambusia affinis*) was the most abundant species collected during the survey, comprising 46.7 percent of the total. It was extremely abundant upstream at Locations A_1 and A_2. Blacktail shiners (*Notropis venustus*) were especially abundant at A_5 during summer; they comprised 9.0 percent of the total catch. The longear sunfish (*Lepomis megalotis*), green sunfish (*L. cyanellus*), and bluegill (*L. macrochirus*) were abundant centrarchids, and had the most diversified diets of all the fish collected (see Tables A-57 through A-59, Appendix

A). Longear sunfish composed 12.0 percent of the total catch, while green sunfish and bluegills accounted for 7.5 and 3.4 percent, respectively.

The mosquitofish occurs from southern Indiana and Illinois, south to Mexico and Florida and north to New Jersey and has been widely introduced in warm parts of the world for mosquito control. It inhabits quiet, often shallow pools and backwaters of small to moderate-sized creeks; being especially abundant among shoreline vegetation where insect larvae thrive. Mosquitofish also are known to feed on insect pupae, algae, and small fish. Spawning occurs from May to September at water temperatures of 22.2° to 23.9°C (72-75°F) (Carlander, 1969). The species is a livebearer often producing several broods a year (Miller and Robison, 1973).

The blacktail shiner occurs in the southern United States from Texas and Oklahoma north to Missouri and Illinois and east to Georgia and Florida. Although it generally prefers clear water, it apparently is tolerant of turbidity and varied bottom types. Miller and Robison (1973) found it most commonly in small to medium-sized streams with gravel bottoms and good flows. Little is known of its spawning habits, but it is probably a late spring and summer spawner (Miller and Robison, 1973).

One of the most brilliantly-colored freshwater fishes, the longear sunfish, is an abundant centrarchid from Michigan and Minnesota southward to South Carolina and Texas. It is common statewide in Texas except in the Rio Grande Valley area in southern Texas, where it is rare (Texas Parks and Wildlife Department, 1971). It is most successful in clear waters, preferring quiet pools in clear, hard-bottomed, low-gradient streams like Squaw Creek. Adults prefer a diet of aquatic and terrestrial insects, but will consume other invertebrates or even small fish. During spawming, longear sunfish build nests on gravel bars. After hatching, the young scatter and begin feeding on tiny insects (Texas Parks and Wildlife Department, 1971). They grow very slowly, attaining a maximum length of 127 to 152 mm (5-6 in). Thus, they are too small to be of interest to anglers, but they are highly prized as bait for trotlines for blue and flathead catfish.

The green sunfish is abundant in all suitable waters from central Ohio and Indiana to the Rio Grande. It is seldom found in lakes or large streams, but may become so abundant in smaller creeks, brooks and ponds that the population is stunted (Texas Parks and Wildlife Department, 1971). They can survive in habitats too small or temporary to support most other sunfish (Miller and Robison, 1973) and do not become distressed at water temperatures as high as 32.2°C (90°F) (McKechnie and Tharratt, 1966). Adults prefer dragonfly larvae, freshwater shrimp, fish and aquatic snails. McKechnie and Tharratt (1966) reported that green sunfish in California utilized mosquitofish, but none were found in the stomachs of green sunfish from Squaw Creek. Nesting occurs in colonies from May through early summer. Because of their relatively small size (usually less than 254 mm (10 in), they are considered a marginal food and game fish.

The bluegill originally ranged from southern Ontario through the Great Lakes and Mississippi drainages to Georgia, Texas and northeastern Mexico, but widespread introductions have greatly extended the range.

This concurs with their preference for protected areas with clear, quiet water, scattered beds of vegetation and substrates of sand or gravel. Bluegills feed mainly on zooplankton and aquatic insects, but other foods ingested include small fish, fish eggs, snails, small crayfish and amphipods. Because of differential maturity of fish or of eggs within a single fish, bluegills spawn over an extended time period, beginning when water temperatures reach 21.1°C (70°F) and continuing until fall. However, the peak of spawning activity is usually in May or early June. The fecundity averages approximately 18,000 eggs per female (Emig, 1966).

The tertiary consumers within the Squaw Creek trophic structure are the largemouth and spotted bass. Only three largemouth bass were collected during the monitoring program, but 44 spotted bass were collected. Of these, 31 were small specimens (56-106 mm) collected in summer, primarily at Locations A_0 through A_2. Sunfish, catfish and mosquitofish were the groups utilized by the tertiary consumers in Squaw Creek.

Spotted bass *(Micropterus punctulatus)* occur in the southcentral United States from Kansas and Texas in the west to Illinois and Pennsylvania in the north and south to Georgia and the Gulf States. Although they are fairly successful in some clear lakes, they are best adapted for relatively small, clear, spring-fed streams. However, they can tolerate turbid waters with silt bottoms better than smallmouth bass, and consequently are more widely distributed. Their preferred food is crayfish (Texas Parks and Wildlife Department, 1971), but they also consume insects and small fish. When water temperatures reach 10°C (50°F) in spring, spotted bass are stimulated to migrate upstream. Nests are built on mud bottoms and gravel bars and spawning begins when the temperature reaches 17.8°C (64°F). The eggs hatch within four to five days and 2,000 to 2,500 fry are produced per nest (McKechnie, 1966). Although they are not as large as largemouth bass, spotted bass are still considered first-class game fish.

Several of the species classified above as consumers also acted in the ecological role of detritivores feeding on fragments of bodies, feces, etc., decomposing on the bottom substrates. These species included stonerollers, black shiners, black and yellow bullheads, channel catfish, longear sunfish and spotted bass. Stomachs of stonerollers and blacktail shiners collected at Location A_5 in summer contained organic detritus clumped with silt-like particles. This appears to reflect the nearby construction activity, although more obvious construction effects such as increased turbidity have not been observed at A_5.

In addition to the current study, Squaw Creek fish populations have been studied in recent years by Gallaway (1972), Forshage (1972) and

Ubelaker (1974) who have reported totals of 11, 26, and 20 species, respectively. As mentioned previously, sampling during the construction monitoring program yielded 18 fish species. Mosquitofish dominated the total catch, comprising 46.7 percent, while stonerollers were second in abundance. Both Gallaway (1972) and Ubelaker (1974) found the blacktail shiner to be the most abundant species in their collections, but it comprised only 9.0 percent of the total catch during the current study and ranked fourth in abundance (Table 2.0-6). Forshage (1972) found the stoneroller to be dominant in his collections, which were made during July and August. Similarly, stonerollers were the most abundant species collected during the summer survey of the monitoring program.

None of the fish collected during the construction monitoring program or in prior investigations are listed by Miller (1972) as a threatened freshwater species in Texas. All species collected during the monitoring program had been previously recorded for Squaw Creek. Species reported during previous surveys, but not collected during the monitoring program include the carp (*Cyprinus carpio*), golden shiner (*Notemigonus crysoleucas*), fathead minnow (*Pimephales promelas*), plains killifish, (*Fundulus kansae*), brook silverside (*Labidesthes sicculus*), redear sunfish (*Lepomis microlophus*) and logperch (*Percina caprodes*). Forshage (1972) described the golden shiner, fathead minnow, brook silverside and logperch as rare in Squaw Creek; they may be again taken in future surveys. The absence of the other species probably reflects differences in sampling techniques for there is presently no water quality data which suggests that construction effects may have altered fish species composition.

Degradation of an aquatic environment may be marked by an invasion of rough fish species which have little forage or sport value, but which may have a competitive advantage over the more desirable fish. Carp, river carpsuckers, and black and yellow bullheads have been the only rough fish species reported in Squaw Creek during previous investigations (Forshage, 1972; Gallaway, 1972). According to Forshage (1972), large numbers of rough fish are not present in Squaw Creek because suitable habitat is lacking and because their migration from the Paluxy and Brazos Rivers is blocked by a small dam, approximately 1.5 meters (5 ft) high, 1.06 kilometers (0.7 mi) above the mouth of the creek. During the construction monitoring program, the rough fish species collected were the river carpsucker, gray redhorse and black and yellow bullheads. As a group, they comprised less than 2 percent of the total catch.

Ubelaker (1974) described Squaw Creek as a clear, unpolluted stream with diverse fish habitats which allow many species to coexist and to avoid the competitive exclusion that occurs in streams with less habitat diversity. The fisheries data suggest that, after a year of construction activity, Squaw Creek has retained its essential character.

Detrimental effects upon fish populations are manifested in numerous ways, particularly by increases in rough fish, decreases in forage and sport fish, slower growth rates and altered food habits. Consequently, it is recommended that future monitoring programs concentrate on these data and compare them to the results of the 1975 surveys.

2.2 TERRESTRIAL ECOLOGY

The objective of this section is to describe the faunal elements (birds, reptiles and amphibians, and invertebrates) of the terrestrial ecosystem of the CPSES site in Hood and Somervell Counties, Texas, during the initial construction phase of the proposed facility. This summary is based upon data and analyses which follow (Section 3.4.2).

In this section, we will describe the interrelationships between each of the community components which we studied and attempt to furnish a view of the existing terrestrial ecology of the relatively undisturbed portions of the site.

A brief description of the terrestrial sampling locations are presented in Section 3.2.2. Each of the sampling locations was chosen in a relatively undisturbed (as a result of construction) area of the site, and are presently outside the direct impact zone. The most serious impacts occurring in the sampling areas are noise and dust, resulting from traffic and the proximity of man. These impacts are attributable to construction-related activities.

Density and diversity of animal populations at the CPSES site are dependent upon the quality and quantity of available habitat provided by the various plant communities. Although no quantitative vegetation data are available for the sampling areas, the qualitative descriptions presented in Section 3.2.2 are suitable for use when interpreting terrestrial invertebrate and avifauna data. Reptile and amphibian data provide little additional insight into the community structure of the sampling areas because of the relatively small number of individuals observed.

The trophic-dynamic aspect of ecology will be utilized to present a conceptual view of the various biotic communities found on the site. Studies by Lindeman (1942), Golley (1960), and Odum (1968) have shown the trophic-dynamic approach to be a useful tool for describing the existing biotic components and their interdependence. It is beyond the scope of this study to describe the complete existing food web or quantify the energy flow between trophic levels.

The basis of the trophic pyramid is green plants (primary producers) which are capable of fixing solar energy and manufacturing food from simple inorganic substances. The energy stored by plants is available for use by herbivores (primary consumers) in the next trophic level. The chief terrestrial herbivores are insects, rodents, and hoofed animals. Many birds also are included in this category. Herbivores are in turn an energy source for carnivores (secondary consumers) through predator-prey relationships. Decomposers make up the final feeding group. They feed on the remains and wastes of organisms breaking them down into simpler compounds for use by photosynthetic plants.

Over 70 percent of the insect species collected were herbivores. Approximately 43 percent of the bird species and 16 percent of the reptiles and amphibians can also be classified as herbivores. Several of the birds and herpetiles also feed on meat when available and so alternate between trophic levels making them omnivores.

A majority of the species seen on each sampling area are discussed to present as full a picture as possible of the individual species occurring in the communities and their places in the community structure.

A large majority (72.3 percent) of the insects collected on Sampling Area 1 were herbivorous. Homopterans and orthopterans, orders of primarily herbivorous insects, were strongly represented here. This area is predominantly grassland, so it is understandable that a large portion of its inhabitants would be plant eaters. The high number of herbivorous insects support a lesser number of predator and parasite species of invertebrates and all supply an abundant food source for insect eating birds common to the area including the bobwhite *(Colinus virginianus)* and eastern meadowlark *(Sturnella magna)*. While the meadowlark is almost entirely insectivorous (secondary consumer), the bobwhite is usually considered a grainivore (primary consumer). However, when insects are plentiful, a large portion of the bobwhite's diet may be, and many times is, insects. Young bobwhites feed almost exclusively on grasshoppers, beetles and other insects during the summer. In contrast to the bobwhite, the mourning dove *(Zenaida macroura)* is a strict grainavore, feeding entirely on crop and weed seeds (Martin et al, 1951).

With the exception of the turkey vulture *(Cathartes aura)*, which is a carrion-feeder (tertiary consumer), all other birds observed on the grasslands area feed to some degree on grasshoppers, beetles, caterpillars and other insects (secondary consumers). Many feed on grass and weed seeds when available (primary consumers).

The mockingbird *(Mimus polyglottos)* is largely insectivorous during the spring and summer but changes its diet to fruits and seeds in the fall and winter. The brown-headed cowbird *(Molothrus ater)* feeds mainly on grasshoppers but includes weed seeds in its diet when insects are not available. The scissor-tailed flycatcher *(Muscirora forficata)*, as one might expect, feeds primarily on flying insects and the open grasslands of Area 1 afford an excellent feeding area for this species (Peterson, 1961).

The lark sparrow *(Chondestes grammacus)* is considered a ground feeder of open upland areas. Its diet consists of grasshoppers and weed seeds. The field sparrow *(Spizella pusilla)* and clay-colored sparrow *(S. pallida)* also feed on grasshoppers and weed seeds. Therefore, it is quite apparent that while a few of the residents of the grassland community are either strictly primary consumers (mourning dove) or secondary consumers (scissor-tailed flycatcher). Most of the birds found there alternate between plant and animal diets depending on the availability and seasonal abundance of these food items.

On the open grassy slopes, birds of prey such as the American kestrel *(Falco sparverius)* will feed on insects and sometimes birds such as the meadowlark or bobwhite, making it a tertiary consumer.

The herpetofaunal species which occur in the grassland community are basically secondary consumers although the ornate box turtle *(Terrapene ornata ornata)* feeds on succulent vegetation, grasses, and fruits in addition to invertebrates (Conant, 1958).

Two lizard species were observed in the grasslands; the Eastern collard lizard *(Crotaphytus collaris collaris)* and the Texas earless lizard *(Holbrookia texana texana)*. These species occurred primarily in areas of rock piles and limestone ledges which offer abundant sunning spots as well as hiding places. Creation of new rock piles due to construction activities on the CPSES site has probably enabled these species to increase their population sizes in the local area beyond what might normally occur there. These species are insectivores making them secondary consumers.

Four species of snakes were observed on the grasslands of the CPSES site. The eastern yellow-bellied racer *(Coluber constrictor flaviventris)* and western coachwhip *(Masticophis flagellum testaceus)* have similar habits and occur in the same habitat. Both are agile and swift and generally aggressive when cornered. They prefer open grassland habitats where they feed on a varied diet which may include arthropods, amphibians and reptiles, birds, and small mammals (Smith, 1961).

The Texas rat snake *(Elaphe obsoleta lindheimeri)* is probably the most commonly occurring nonpoisonous snake found on the terrestrial portions of the CPSES site. This species is found in a variety of habitats and feeds on rodents and young birds.

The western diamondback rattlesnake *(Crotalus atrox)* was the only venomous snake observed on the CPSES site. The limestone outcroppings of the site are favored habitat of the rattlesnake but disturbances related to construction activities may have driven the snakes out of their dens. Rodents account for a large portion of the rattlesnake diet and this species may play an important role in controlling small mammal populations in localized areas.

Sampling Area 2 is a juniper woodlands community. The junipers add another dimension to this habitat in the way of an increased litter material and the obvious addition of a shrub stratum. This caused a shift in species and individual numbers among the various invertebrate trophic levels. The overall percentage of herbivores dropped (from 72.3 percent in Area 1 to an average of 65.7 percent in Area 2) and an increase in detrivores and predator-parasites was noted. Because new species of terrestrial invertebrates were found in an increased number of niches, a corresponding increase in the number of species of insectivorous birds was noted (Tables 2.0-7; 2.0-8 and Figure 2.2-1).

The yellow-billed cuckoo *(Coccyzus americanus)* and the Nashville warbler *(Vermivora ruticapilla)* are generally considered to be wholly insectivorous. The hairy woodpecker *(Dendrocopos villosus)* and the ladder-backed woodpecker *(D. scalaris)* subsist primarily on wood boring beetle larvae, adult beetles, ants and caterpillars but do occasionally eat fleshy fruits. The rock wren *(Salpinctes obsoletus)* is another species that feeds mostly on insects and spiders. The bushtit *(Psaltriparus minimus)* is especially at home in the juniper woodland habitat because it feeds mostly on various insects and arachnids found on foliage or twigs of woody plants such as juniper. The Carolina chickadee *(Parus carolinensis)* depends on insect eggs as its principal source of nourishment during the winter. It also feeds heavily on adult insects during the summer and includes some plant materials in its diet year-round (Peterson, 1947).

Several species found in the juniper woodlands depend heavily on fruits and seeds. These include the cardinal *(Cardinalis cardinalis)* which is generally considered a woodland species and feeds on a very diversified plant diet supplemented with caterpillars, grasshoppers, and other insects. The painted bunting *(Passerina ciris)* has a diet consisting mainly of bristlegrass *(Setaria* sp.*)* seeds but may include insects during the summer. A great crested flycatcher *(Myiarchus crinitus)* was observed on the site. This species is frequently seen on the very tops of trees in wooded areas and feeds primarily on insects.

Because the juniper woodlands contain some grassy openings, species such as the field and lark sparrows and the bobwhite occur. Several other species observed on the grassland site also occurred in the junpier woodlands. This tends to show the variability of habitat usage in many avian species (Martin, et al, 1951).

The Texas spiny lizard *(Sceloporus olivaceus)* was the only herpetofaunal species observed in the juniper woodland. This species is regarded as essentially being arboreal. They are usually seen in mesquite, cottonwood or cedar *(Juniperus* sp.*)* trees. They are secondary consumers and feed on insects; primarily ants, wasps and bees.

The riparian woodlands along Squaw Creek were the site of Sampling Area 3. In this area, a grassland layer, a shrub layer, an additional tree layer and an additional component, i.e., the physical presence of Squaw Creek were present. This combination added two dimensions which were not present on either of the other two sampling areas. The percentage of herbivorous invertebrates was significantly reduced coupled with a marked increase in the number of detritivores and members of the predator-parasite group. The addition of trees added to the amount of litter material present on the ground and Squaw Creek added aquatic groups that enter the terrestrial food web, i.e., aquatic invertebrates and fish. Many of the herbivorous insects found in the grass and "tree" strata in this area are aquatic organisms during part of their life cycle. When they emerge from the aquatic environment, they provide a food supply for many insect-feeding terrestrial animals.

Several species associated with the grassland habitat were present in Area 3. These include the bobwhite, meadowlark, and lark sparrow. Other species generally found in woodlands were the Carolina chickadee, cardinal, painted bunting and tufted titmouse. These species were found in the woody vegetation lining the banks of much of Squaw Creek. Species found on this area which are directly dependent on aquatic or semiaquatic habitats are the green heron *(Butorides virescens)*, spotted sandpiper *(Actitis macularia)* and belted kingfisher *(Megaceryle alcyon)*. The green heron and belted kingfisher feed on fish and amphibians while the sandpiper feeds largely on aquatic invertebrates found in Squaw Creek. The rough-winged swallow *(Stelgidopteryx ruficollis)* prefers a riparian habitat such as the one afforded by Squaw Creek and is almost entirely insectivorous capturing its prey on the wing. This species was present only during the spring as it overwinters in this area and returns north during the late spring. The killdeer *(Charadrius vociferus)* is a bird of open, nonvegetated areas and was observed on the shores and sandbars of Squaw Creek and in the construction areas. It feeds primarily on insects and includes large amounts of aquatic invertebrates in its diet (Martin, et al, 1951).

The most diverse herpetofaunal population of the CPSES site occurs along Squaw Creek. Three species of turtles were observed in and along the creek; the common snapping turtle *(Chelydra serpentina serpentina)*, Texas slider *(Pseudemus concinna texana)* and the Texas softshell. All three species prefer permanent bodies of water such as streams and rivers. These turtles feed on various small aquatic invertebrates, fish and carrion. The snapping turtle also may include reptiles, birds, and small mammals as well as surprisingly large quantities of vegetation in its diet (Conant, 1958).

Three of the seven species of snakes found on the site were observed in the area of Squaw Creek. The diamond-backed water snake (*Natrix rhombifera rhombifera*) and blotched water snake (*N. erythrogaster transversa*) were observed in the day and at night Western ribbon snakes (*Thamnophis sauritus proximus*) were found along the creek bank. While this species is not aquatic like the water snakes, it is considered semiaquatic and takes to the water quite readily. The water snakes feed on salamanders, frogs, and small fishes.

One toad species and three frog species occur along Squaw Creek. The Gulf Coast toad (*Bufo valliceps*) commonly feeds at night and remains hidden during the day. These toads feed on insects and spiders and have been recognized as being of economic importance because they sometimes eat as much as two-thirds of their body weight in a single night (Conant, 1958).

Blanchard's cricket frogs (*Acris crepitans blanchardi*) were abundant along Squaw Creek as evidenced by their loud chorusing activities. Members of this species prefer muddy, beach-like edges of shallow streams and ponds. This habitat was readily available along Squaw Creek.

Bullfrogs (*Rana catesbeiana*) occur along the banks of Squaw Creek in areas of thick vegetation and debris accumulation. This large frog prefers a habitat containing permanent deep water. The bullfrog is an opportunistic predator and feeds on anything it can swallow. Its diet consists of both terrestrial and aquatic arthropods, small invertebrates as well as small turtles, snakes and birds.

The Rio Grande leopard frog *(Rana pipens berlandieri)* is generally found in both permanent and temporary aquatic habitats and may wander great distances from water. This species feeds primarily on nonaquatic insects such as beetles, grasshoppers, crickets, worms and snails.

From Sampling Area 1, through Area 2 to Area 3, the communities become more diverse and more complex with a greater number of different species. The trophic structure and energetics of these various community types all function in the same manner, however. Individuals live and die, due to predator-prey relationships or to competition. Those species which are efficient competitors survive to reproduce and endure. Those which cannot effectively compete for limited resources are eliminated and replaced by those that can. The system remains in balance until environmental change occurs and those species present can no longer maintain their dominance.

3.0 ECOLOGICAL SURVEYS

3.1 INTRODUCTION

Squaw Creek, near the CPSES, is an intermittent stream which originates near Tolar, Texas, and flows in a general southeasterly direction across Hood and Somervell Counties for a distance of 37 km (23 mi) to its confluence with the Paluxy River. The Paluxy River, in turn, merges with the Brazos River a short distance from the mouth of Squaw Creek.

Dam construction will change approximately two-thirds of the length of Squaw Creek from a stream habitat to a lake habitat; thus, a significant change in the species composition of upper Squaw Creek will occur. Certain organisms in Squaw Creek will not be able to survive in the impoundment due to lack of suitable habitat or reproductive conditions while others will be able to adapt to lake conditions.

Six biological sampling locations established on Squaw Creek were selected so as to provide biological data to determine construction effects upon the fish, plankton, aquatic macrophytes, and benthic macroinvertebrate populations inhabiting the creek, and to substantiate the baseline survey results. More specifically, sampling locations were selected to evaluate the project impacts on:

1) areas in the direct impact zone which may be affected by increased turbidity and siltation;

2) areas to be inundated by the proposed reservoir.

As mentioned previously, the aquatic ecosystem near the CPSES site was monitored during three periods; winter (January 28 and 29, 1975), spring (April 1 and 2, 1975), and summer (August 5, 1975). The winter survey was selected to evaluate the aquatic organisms when water temperatures were low. The spring survey was selected to coincide with the period of possible migration and spawning activities in Squaw Creek. The summer survey was selected to evaluate the period of stress due to high water temperature and low flow.

To determine ambient water conditions during sampling several *in situ* physical and chemical water quality measurements were recorded at each sampling location during each ecological survey.

The terrestrial ecosystem at the CPSES site includes three major habitat types; juniper woodlands, grassy slopes and woods along Squaw Creek (Riparian). These were sampled for avifauna, reptiles and amphibians, and terrestrial invertebrates. Sampling locations were selected to:

1) evaluate areas within the direct impact zone of construction;
2) establish baseline characteristics of terrestrial invertebrate

populations during the period of greatest diversity; and

3) evaluate the impact of construction on major terrestrial fauna food webs.

The terrestrial ecosystem was monitored during spring (May 16 through 22), and summer (July 11 through 14). The spring survey was timed to coincide with the spring migration of passerines while the summer survey was timed to observe the breeding avian populations.

Because construction will not begin near Lake Granbury for some time, it was not deemed necessary to initiate studies there at this time. Therefore, the first year's construction phase monitoring was restricted to the CPSES site on Squaw Creek.

3.2 SAMPLING LOCATIONS

3.2.1 Aquatic (Biological)

Biological sampling location A_0 was the uppermost station of the six Squaw Creek sampling locations. It consisted of a riffle with several deep to shallow pools. Bottom substrate varied from sand to gravel. Depths ranged from 0.1 m (0.3 ft) in the riffle to 3.7 m (12.0 ft) in the deepest pool, although the average pool depth was approximately 1.8 m (5.9 ft). Overhanging bank vegetation provided the only available fish cover in the area. This station was used for fish collection and *in situ* water quality sampling only.

Sampling location A_1, approximately 300 m (984 ft) downstream from A_0, consists of a series of pools and riffles over a bedrock substrate. Sand and fine gravel appear along the streambank in some areas. Depths range from 0.1 m (0.3 ft) in the riffles to 2.5 m (8 ft) in pools. Overhanging bank vegetation and large rocks provide limited cover for fish in the area. This location served as a fish collection and *in situ* water quality location only. The primary impact expected at A_0 and A_1 is a change from stream habitat to lake habitat.

Sampling location A_2, approximately 2 km (1.7 mi) downstream of location A_1 and approximately 0.5 km (0.3 mi) upstream of the proposed dam site, is composed of two natural pools divided by a narrow gravel riffle. Pool depths range from 0.6 to 1.2 m (2 to 4 ft), while riffle depths average 0.1 m (0.3 ft). Substrate in the upper pool is bedrock; gravel is the primary substrate type in the riffle and lower pools. Rocks and exposed roots provide some cover for fish. Siltation and the change to a lacustrine (lake-like) habitat are the primary impacts expected to affect aquatic organisms at location A_2.

Sampling location A_3 is near the low-water bridge which crosses Squaw Creek immediately downstream from the construction area. The habitat consists of two pools separated by the bridge. A gravel riffle occurs downstream from these pools. Substrate varies from mud and organic detritus which typifies the upper pool to a gravel-rock substrate in the lower pool. Depths range from 0.1 m (0.3 ft) in the riffles to 2.0 m (6.5 ft) in the pools. Aquatic vegetation, large rocks, and overhanging bank vegetation serve as potential cover for fish. Location A_3 is in the direct impact zone of upstream construction and should receive the impacts of turbidity and siltation.

Sampling location A_4 is under the State Highway 144 bridge over Squaw Creek. It consists of a series of large pools connected by a gravel riffle. Bottom substrate in the upper pool is gravel with sand-mud-detritus complex in the nearshore backwater areas. The lower pool substrate is predominantly bedrock with some gravel and leaf litter along the edges. Depths range from 2.0 m (6.5 ft) in the upper pool to 0.2 m (0.6 ft) in the riffle. Overhanging vegetation and large rocks provide fish cover. The greatest impact at this location is expected to be the downstream movement of fish and benthos due to high turbidity and extreme siltation.

Sampling location A_5 is 91.4 m (100 yd) downstream from the dam site; the area of greatest construction activity. It consists of a series of small pools connected by a gravel riffle. The substrate is predominantly gravel; however, due to construction in the immediate area, a layer of fine silt 15.4 to 20.5 cm (6 to 8 in) deep has collected in the pools.

3.2.2 Terrestrial (Biological)

The sampling locations selected for the terrestrial survey represent the major plant community types on the CPSES site.

Area 1 (grassy slopes) was located approximately 1.6 km (1.0 mi) southeast of the meteorological tower. This area is a gently sloping upland meadow. Texas wintergrass *(Stipa leucotricha)* and Indian blanket *(Gaillaridia pulchella)* were commonly observed community components.

Area 2 (juniper woodlands) was established approximately 1.6 km (1.0 mi) northwest of the meteorological tower. This area is characterized by a matrix of redberry and ashe juniper *(Juniperus pinchotii* and *J. ashei)* with occasional grassy openings. Perennial threeawn *(Aristida* sp.) was a common understory species. As in Area 1, Indian blanket was a conspicuous forb. However, the ground cover was observed to be sparse and few forbs occurred in the sampling area. The bulk of ground litter appeared to be juniper leaves.

Area 3 (Lower riparian) was established in the lower riparian zone described in the Environmental Report. It was located approximately 1.1 km (0.7 mi) north-northwest of the meteorological tower. Overstory vegetation was dominated by cedar elm *(Ulmus crassifolia)*, post oak *(Quercus stellata)*, juniper, pecan *(Carya illinoinesis)*, American elm *(Ulmus americana)* and ash *(Fraxinus* sp*)*. Common understory species include juniper, cedar elm, American beautyberry *(Callicarpa americana)*, pecan, hackberry *(Celtis occidentalis)*, soapberry *(Sapindus* sp*)*, and roughleaf dogwood *(Cornus drummodii)*, Lianas, such as Virginia creeper *(Parthenocissus quinquefolia)*, poison oak *(Rhus toxicodendron)*, and wild grape *(Vitis* sp.*)* also were observed.

3.3 PROCEDURES

3.3.1 Aquatic

3.3.1.1 *In Situ* Water Quality

In situ water quality measurements were taken concurrently with biological samples at A_0, A_1, A_2, A_3, A_4, and A_5, using a Yellow Springs Instruments (YSI) Model 57 dissolved oxygen meter, YSI model 33 SCT (salinity, conductivity, and temperature) meter, and a Secchi disk. The dissolved oxygen meter and SCT meter were calibrated prior to their use according to procedures outlined in their respective operation manuals. Turbidity analyses were conducted in the laboratory using a HACH Model 2100A turbidimeter.

3.3.1.2 Phytoplankton

Duplicate phytoplankton samples were collected at Locations A_2, A_3, A_4 in winter and spring, and at A_2 through A_5 in summer at mid-depth, using a 2.1 liter Alpha bottle water sampler (modified Van Dorn). Samples were placed into containers containing sufficient Merthiolate preservative to give a minimum final concentration of 36 milligrams per liter (mg/l). The preserved samples were analyzed at Dames & Moore's Environmental Laboratory. Analyses of phytoplankton samples were conducted according to methods outlined by the U.S. Environmental Protection Agency (EPA) (Weber, 1973). Samples were thoroughly mixed by inversion and one-liter aliquots were placed into plexiglass settling columns. Ten milliliters (ml) of Rodhe Acidic Lugol's iodine solution were added to facilitate settling and to further fix the sample. After settling for five days, the supernatant was siphoned to a settled volume of 50 ml.

One ml of each duplicate concentrate was then placed in a Sedgwick-Rafter (S-R) counting cell and enumerated by viewing 25 Whipple disk fields microscopically at 100X to 300X. Samples that were too concentrated to count accurately were diluted with distilled water. The following field count conversion for the Whipple disk was used to compute the concentration of organisms per liter:

$$\text{Organisms per liter} = \frac{C \times 1000 \text{ mm}^3 \times K}{A \times D \times F} = \frac{C\ (50{,}000)}{3{,}045}$$

where: C = number or organisms counted

K = volume of concentrate (50 ml)

A = area Whipple disk (0.1218 mm^2)

D = depth S-R cell (1 mm)

F = number of fields counted (25)

Taxonomic identification of organisms was made following Smith (1950), Prescott (1951, 1970), and Patrick and Reimer (1966).

3.3.1.3 Aquatic Macrophytes

The aquatic macrophytes were evaluated in May and August at six sampling locations which were previously established on Squaw Creek to conduct surveys on various aquatic elements, such as fish, benthos and plankton. The study consisted of examining each of the aquatic sampling locations to determine the composition of aquatic macrophytes. Each species was evaluated on a qualitative basis according to its abundance at the sampling location.

Production samples were collected within four-1/4m^2 (50 x 50 cm) quadrats at each sampling location. Five quadrats were sampled during the spring survey but due to the sparseness of the vegetation the sample size was reduced to four quadrats during the summer survey. The vegetation was clipped at the base and placed in plastic bags. After transporting to the laboratory, the samples were placed in wire screens and allowed to drain the excess water. The samples were then placed in paper bags and weighed to determine the wet weight. After determining the wet weight, the plants were dried at 70°C (158°F) for 96 hours and oven-dried weights were recorded.

3.3.1.4 Zooplankton

Duplicate mid-depth zooplankton samples were collected in Squaw Creek at A_2, A_3 and A_4 during winter and spring, during summer samples were collected at A_2 through A_5 with a 2.1 liter Alpha bottle and concentrated using a #25 mesh Wisconsin plankton net. Samples were preserved with

Rodhe Acidic Lugol's solution (conc. 1 ml/100 ml of sample) (Edmondson, 1959).

Each sample was scanned under a 10-50X Wild M5 stereo microscope, and all zooplankters were removed and enumerated. Identification was completed utilizing a 100X compound scope (AO 50) in accordance with Edmondson (1959). Total sample counts were made due to the low numbers of organisms.

3.3.1.5 Benthic Invertebrates

Community composition and structure of benthic macroinvertebrates were determined through the use of both a square foot box sampler for riffle habitats and an Ekman dredge for pool habitats.

Duplicate Ekman samples during winter (triplicate in spring and summer) were collected at randomly selected locations in pool habitats and washed in the field through a #30 mesh bucket sieve. Triplicate box samples were collected in randomly selected locations in riffle areas. Expended effort per box sample was held to three minutes per sample to maintain uniformity of effort between samples. Both Ekman and box samples were preserved in 70 percent ethanol containing rose bengal as a staining agent to aid in sorting and identification.

Benthic animals were sorted, enumerated, and identified, a Wild M5 stereo-dissecting scope was used to sort samples. Identifications to lowest applicable levels were made using a Wild M5 stereo-dissecting scope and a 100X compound scope (AO 50). Definitive taxonomic keys used were Pennak (1953) and Edmondson (1959). Supplementary keys utilized included Ross (1944), Burks (1953), Brown (1972), and Klemm (1972).

Samples were sufficiently large to create extreme difficulties in sorting. Therefore, 1/2 or 1/4 sample size aliquots were taken, and identifications and enumerations were made on these aliquots. Appropriate computations were made to convert the results into organisms per unit area.

3.3.1.6 Fish

Fish were collected from pool and riffle habitats at each location on Squaw Creek. Three capture devices were employed: 1) small mesh seines; 2) a backpack electroshocker; and 3) minnow traps. Two types of seines were used depending upon stream width and depth: 1) a 7.62 m x 1.22 m x 0.32 cm mesh (25 ft x 4 ft x 1/8 in); and 2) a 9.14 m x 1.82 m x 0.32 cm mesh (30 ft x 6 ft x 1/8 in) bag seine. Approximate 50-meter day and night seine hauls were made at each location during each survey.

Stream water depths ranged from 2.54 cm (1 in) to 2 m (78.6 in). The number of daylight seine hauls were held to 2 hauls per location.

This was to ensure a representative sample of equal effort per location. One seine haul per location was made in pool areas during night seining.

Electroshocking served as a seining efficiency check at each location and was used to sample fish populations residing in areas difficult to seine, such as undercut banks, deep water, and around large rocks and brush. Shocking was performed using a 110 volt AC custom-made shocker with an effective electrical field of 182.9 cm (6 ft) in diameter. Electroshocking was conducted for a 15-minute period at each location during daylight hours.

Fish collected during the fishery surveys were identifed to species in the field, when possible, and enumerated. Identifications were made using Knapp (1953), Trautman (1957), Hubbs (1964), Cross (1967), Eddy (1969), and Miller and Robison (1973). An identification number was assigned to each fish except where large numbers of forage fish were collected (i.e., *Gambusia*). Specimens were selected from the sample which represented maximum and minimum weights and lengths. The total number of individuals, total weight of the sample, and breakdown by sex were then recorded for the sample. Total length (in millimeters) and weight (in grams) were recorded for all fish collected. Scale samples were taken, and sex determination and gonadal condition were made.

Food web relationships were investigated for the winter, spring and summer surveys by removing stomachs from selected species of forage, game, and rough fish. Stomachs were preserved in 5 percent buffered formalin and stored in Whirl-pak bags for later analyses. Individuals within each species collected were grouped by 20-mm intervals according to their respective lengths. A maximum of five individuals within each group were then selected for stomach analyses. This procedure was followed for each location. At locations where samples contained less than five individuals within the particular size group for that species being collected, all specimens were processed as described below. A program using a maximum of three stomachs per 20-mm group per species was initiated for the January samples.

Preserved stomach samples were drained in the laboratory and the contents of each stomach sorted and identified to family, where possible, using keys by Pennak (1953), Hubbs (1964), and Eddy (1969). The number of individuals per family was counted and stomach content data tabulated as the number of individuals per stomach per fish. The columns for the number of individuals were then averaged by dividing the number of stomachs examined for each fish species, and the results recorded. As a result, the data in final form attempts to illustrate the relative importance of certain food organisms to individual fish species and to the fish population as a whole.

Fish collected during each survey were checked for external parasites at the time of capture. Obvious internal parasites were removed and preserved during gonadal condition checks and stomach extrication. Parasites were removed from larger fish in the field and preserved in 10 percent buffered formalin. Parasites were left on smaller fish and were removed in the laboratory. Each fish's parasites were preserved separately and labeled with the host species, date, location, and general condition of the fish. Identification to the generic level was accomplished when possible using Pennak (1953), Edmondson (1959) and Hoffman (1970), as taxonomic guides.

Individuals of each fish species collected were preserved in a 10 percent formalin solution buffered with sodium borate, stored in glass jars, and retained as voucher specimens.

3.3.2 Terrestrial

3.3.2.1 Avifauna

The strip census (Kendeigh, 1956; Emlen, 1971), possibly the most widely accepted method for censusing non-flocking land birds, was employed during this survey. Other methods, such as the sample plot method and some of the other transect methods (Emlen, 1971), require an exhaustive amount of intensive sampling effort throughout the year to provide adequate data.

The strip census was considered to provide sufficient information on the avifauna community in an efficient manner. The width of the strip cruised to effectively record all kinds of birds was of upmost importance. Determination of strip width was based on several criteria, such as coefficient of detectability or the relative degree of conspicuousness of each of the species likely to be encountered (Kendeigh, 1944; Emlen, 1971). Because of differences in the screening effect of the vegetation along the transects, the widths of the strips varied. The length was adjusted on each strip to compensate for varying widths and to assure that a comparable area was sampled in each habitat. The dimension of Area 1 (grassy slopes) transect was approximately 120 x 800 m (400 x 2,640 ft) for a total area of approximately 10.4 ha (25.7 a). This area has been reported as the most efficient for determining density (Graber and Graber, 1963). The investigators walked the center of the strip and recorded birds on either side at lateral distances to 60 m (200 ft). The Area 2 (juniper woodlands) and the Area 3 (lower riparian) strips were reduced in total width to 60 m (200 ft) and increased in length to 1,600 m (5,280 ft) because the screening effect of the vegetation was estimated to reduce the visibility of the most inconspicuous species to 30 m (100 ft). However, the total area for each strip was 10.4 ha (25.7 a).

After dimensions of the census strips were determined and areas were appropriately designated, the areas were censused. Each strip was censused during the morning hours (0600 - 1000, the period of greatest bird activity) on three consecutive days to reduce sampling bias. Two observers equipped with field glasses walked the median strip of each transect at approximately 3.2-4.8 km/hr (2-3 mph); all birds flushed or otherwise observed within the confines of the strip were recorded. The high, median, low and mean numbers of birds for each strip were recorded and estimates of relative abundance calculated. Chance observations of birds made between study areas and during other phases of the field program also were recorded.

Gamebird Forage Estimates

The bobwhite *(Colinus virginianus)* and the mourning dove *(Zenaida macroura)* are important resident gamebird species occurring in the area of the CPSES site. Ten bobwhite and seven mourning dove specimens were collected in areas outside but representative of the sampling areas (collection within the sampling areas would have severely biased the results of census conducted there). Forage content analysis provided information on feeding habits of these species on the CPSES site. After the birds were collected, the crops were removed and the contents put into Whirl-paks containing 70 percent ethanol. The samples were properly labeled with information on age-class and sex, and returned to the Dames & Moore Houston laboratory.

Crop analyses were conducted using a modification of the technique described by Korschgen (1969). Crop contents were thoroughly washed and separated according to size with the use of a series of standard sieves. Contents were separated to like types based on size, color and configuration. After separation, the contents were placed in separate vials. Identification of seeds was made using the 15-plate set of photographs of common "weed" seeds published by the USDA (undated), plates published by Lay (1969) and those published by Jackson (undated).

3.3.2.2 Reptiles and Amphibians

Several techniques were utilized on the CPSES site to better define the distribution, diversity, and relative abundance of herpetofauna. Each terrestrial sampling location was thoroughly searched for herpetofauna. Rocks, logs, and boards were overturned and possible den sites in limestone outcrops were explored. Road surveys were conducted after rains and at night to provide additional information. Most sections of Squaw Creek and other selected areas on the site deemed suitable habitat were extensively surveyed in an attempt to collect and identify as many species of herpetofauna as possible during the confines of the sampling program.

Capture methods varied depending on the target species. Frogs, toads, and some lizards were captured using nets. Snakes were normally captured with snake tongs. In some instances, various specimens were hand captured. Den sites in the limestone outcropping were sprayed with gasoline to drive out animals that may have been present but not readily apparent.

Voucher specimens were obtained for all species captured. When more than the necessary vouchers were taken, the excess individuals were marked using techniques described by Woodbury (1953).

3.3.2.3 Terrestrial Invertebrates

Standard entomological sweep nets were used (38 cm in diameter; 65 cm in handle length) on bushes and trees. Past experience in sampling insects on the Texas Coastal Prairie has shown 500 sweeps can adequately sample the insect fauna of a typical habitat. However, it also is true that insect diversity and abundance is a function of foliage density so this number of sweeps must be modified for any particular habitat according to vegetation density. Therefore, 500 sweeps were utilized as a baseline and the number of sweeps necessary in each of the three study areas was computed based upon the herbaceous plant density in each area (Table B-1, Appendix B). This allowed comparison between areas on an equal biomass basis. A summary of the sampling intensity is provided in Table B-2 (Appendix B). Variations in herbaceous density are reflected by the number of sweeps taken in each area. Each sample was taken as a replicate sample for purposes of analysis. The number of sweeps in the trees was the same for Areas 2 and 3. The volume swept in each habitat type was computed as:

$$V = \pi r^2 h = 3.14(19)^2(130)/1000 = .147m^3.$$

Because the sampling scheme was established on an equal biomass basis, this volume was essentially the same in each area (Table B-1, Appendix B) and can be used to compute densities of insects for each habitat.

The sweep was divided in Area 2 and 3 where samples were collected in both trees and grassland; a beating net was used to sample trees and large bushes. The number of tree sweeps in each area was set at 200 because it was estimated that a similar amount of biomass would be sampled in each area. The computed volume covered by each tree sweep was 0.092 m^3. Each vegetation type was sampled by the same investigator to standardize the effort expended in each habitat and to compensate for individual variation in sweeping.

All samples were collected May 19, 1975, between 1000 and 1400 hours to ensure that climatic conditions would be uniform in all area. The day was clear, sunny, with a slight wind.

All sweep samples were immediately placed into individual plastic bags containing ethyl acetate and replicates from each area were kept separate (each sample constituted a replicate). The insects were separated from the vegetation by hand sorting and identified to family and probable morpho-species. References used for keying insects are listed in Section 6.0. Identification was facilitated by using the reference insect collections from the University of Houston Coastal Center and the Allens Creek nuclear generating site monitoring program. Once a reference collection had been established for the CPSES site, individuals from each area were tallied.

In addition to the sweep samples, soil and litter samples were collected in each area to survey soil invertebrates. Litter was sparse in this area. Plant litter was collected from within a $1/4m^2$ (0.50 x 0.50 cm) quadrat in each sampling area. This litter was placed in a plastic bag containing ethyl acetate, taken to the laboratory and the insects sorted from the vegetation.

Soil organisms were sampled by a soil corer. Two samples were collected in each sampling area. Approximately 90 percent of the soil animals are found in the top 5 cm of the soil (Wallwork, 1970). Most of the above-ground litter and live vegetation was removed before the core was taken. The corer (10 cm in diameter) was driven 5 cm into the ground and the entire corer removed. Then, the soil core was carefully removed intact and sealed in a plastic bag. Soil cores from all sampling areas were collected the same day (May 19, 1975) to avoid climatic variations. The cores were set up on Berlese-Tullgren funnels to extract the organisms; these funnels utilize a combination of heat and light to drive the organisms out of the soil into the collecting media (Southwood, 1966; Phillipson, 1971). Each core was inverted and individually placed into a funnel; the cores were inverted to facilitate the organisms escape from the soil via their burrows and care was exercised not to break the core and destroy the escape routes. Each core was left in the Berlese-Tullgren funnels for 36 hours to ensure complete separation.

3.4 RESULTS AND DISCUSSION

3.4.1 Aquatic Ecology

3.4.1.1 Winter Survey

3.4.1.1.1 *In Situ* Water Quality

3.4.1.1.1.1 Dissolved Oyxgen

Dissolved oxygen (DO) values approached saturation levels for the partial pressure of oxygen and the range of water temperature encountered (Table A-1, Appendix A). DO values ranged from a low of 6.5 ppm (parts per million) to a high of 12.6 ppm. Both extremes were recorded at Location A_2. Night recordings showed general decreases in DO levels at all locations which might be expected because of cessation of photosynthetic activity (maximum reduction of 4.2 ppm - A_2), with the exception of A_1 where DO levels increased 1.0 ppm. DO levels at all locations were above Texas Water Quality Board (TWQB) minimal standards at all sampling times during the winter ecological survey.

3.4.1.1.1.2 Temperature

Water temperatures ranged from 12.4 to 17.0°C (54.3 to 62.6°F) during the sampling period. This range was found in early morning and early evening measurements, respectively. These temperature ranges conformed to water temperature data collected during the CPSES baseline survey (Ubelaker, 1973).

3.4.1.1.1.3 Specific Conductance

Osmotic imbalances in aquatic organisms may occur due to excessive electrolytes. Specific conductance, a measure of electrolytes, should be within a range of 150 to 500 μmhos/cm, with occasional maximums not exceeding 1,100 μmhos/cm if a good aquatic fauna is to be maintained (Ellis, 1937). Specific conductance, measured in μmhos, ranged from a low of 420 to a high of 550 μmhos. Conductivity readings recorded at night showed slight increases above those readings recorded during the morning sampling period. The highest values were recorded on the second day of sampling. Although occasional readings above 500 μmhos were recorded, these values are not considered to have limiting effects on the productivity of aquatic organisms in Squaw Creek.

3.4.1.1.1.4 Transparency

Transparency values, measured as centimeter depth of Secchi disk readings, were recorded only at Location A_3. All other locations had unlimited visibility (to bottom of the deepest pool in the immediate area). Readings at Location A_3 were recorded at 18.0 and 23.0 cm (7 and 9 in), respectively, during the two successive sampling dates. These transparency values conform to information collected during the CPSES baseline survey (Ubelaker, 1973). Transparency values indicate approximately half the depth to which photosynthesis can occur. Photosynthesis by algae in Squaw Creek did not appear to be limited by turbidity at the time of sampling. Allocthonous (originating outside the system) material undoubtedly aids productivity by adding nutrients to the Squaw Creek system.

3.4.1.1.1.5 pH

The pH condition is determined primarily by biological processes and the chemical nature of the surface and subsurface geology. Biological processes (photosynthesis and respiration) act to influence the nature of streams through the amounts of oxygen and carbon dioxide utilized or produced.

Values for pH ranged from a low of 7.7 to a high of 7.9 over the two day sampling period. This range of pH values was comparable with those values found during the CPSES baseline study (Ubelaker, 1973). Higher values were recorded at Location A_2, whereas lower values occurred at Location A_3. The greatest range in values occurred at Location A_1.

3.4.1.1.1.6 Turbidity

The turbidity measurements taken during the two day sampling period indicate that little runoff in the area of construction was reaching Squaw Creek. Values ranged from 0.51 Formazin Turbidity Units (FTU) at Location A_1 to 18.0 FTU at Location A_3. Data from the following day showed a general decrease in turbidity. These turbidity measurements were comparable with turbidity values found during winter months in the CPSES baseline survey (Ubelaker, 1973).

3.4.1.1.2 Phytoplankton

Seasonal population cycles in a lotic-(flowing water) or lentic-(still-water) type system is primarily controlled by nutrient availability, water temperature, turbidity and velocity of stream flow (Hynes, 1972). Turbidity and transparency readings recorded during the survey (Table A-1, Appendix A) would indicate that light penetration is not a factor limiting photosynthesis. No precipitation was recorded (Table A-1, Appendix A) that would indicate the occurrence of spates (extreme high flows) and associated scouring action. In the southern United States water temperature is the primary limiting factor for phytoplankton populations (Edmondson, 1959; Hynes, 1972). Due to the lack of detection of any limiting factor sampled for, water temperature and nutrient availability are probably the primary factors limiting productivity in Squaw Creek during winter months (Patterson, 1941; Erickson, 1953).

Phytoplankton species collected at Sampling Location A_2 are presented in Table A-4, Appendix A. Diatoms (Bacillariophyceae) were the numerically dominant group. Green algae (Chlorophyceae) also were common. The population structure of diatom numeric dominance followed by green algae also was maintained through Locations A_3 (Table A-5, Appendix A) and A_4 (Table A-6, Appendix A). The dominance of diatoms during the winter months was previously documented in the CPSES baseline survey (Ubelaker, 1973) and in other creeks of the Grand Prairie Land Resource Area (Hasty, 1950; Erickson, 1953)

3.4.1.1.3 Aquatic Macrophytes

No aquatic macrophytes were sampled during the winter survey of the 1975 Construction Phase Monitoring Program.

3.4.1.1.4 Zooplankton

The occurrence of planktonic zooplankton species is subject to constant change and partially dependent upon local conditions including seasonal climatic variation, as well as the physical characteristics of the region. Perhaps the most important factors affecting zooplankton distribution are those of water velocity, turbidity, and fluctuations in water temperature (Reid, 1961).

Cladocerans were found to be the numerically dominant organisms at Sampling Locations A_2 and A_4 (Tables A-17 and A-19, Appendix A). Rotifers were found to be the numerically dominant organism at Sampling Location A_3 (Table A-18, Appendix A). The dominance of cladocerans was documented during the CPSES baseline survey (Ubelaker, 1973). However, plankton investigations conducted in the north Texas area have established the dominance of rotifers during winter months as being the zooplankton pupulation structure of unpolluted streams (Patterson, 1941; Hasty, 1950; Erickson, 1953; Robbins, 1968).

3.4.1.1.5 Benthic Invertebrates

Squaw Creek is characterized by a variety of substrates (Section 2.1.2). At any one given point, substrates may possibly be limiting diversity (bedrock vs. silt) but, with such wide diversity in substrates, overall diversity of the stream probably is not limited by them. The absence of appreciable precipitation is not limited by them. The absence of appreciable precipitation and associated spates has previously been discussed (Section 2.3.1.3). As with the phytoplankton populations, spates were probably not operating to limit abundance of benthic invertebrate fauna of Squaw Creek during Dames & Moore's winter survey. In the absence of any other detected limiting factor, it is probably water temperature and nutrient availability that was limiting diversity during the winter survey. The seasonal swing of temperature controls the rhythm of the life histories of many aquatic invertebrates. Low winter temperatures may slow down growth and reproduction rates (Hynes, 1972).

Analysis of benthic samples revealed aquatic insects (Order Dipteran) to be the numerically dominant organism (Tables A-27 through A-32). Crustaceans were found to be the next most commonly encountered organism. This winter community structure was similar with that reported in the CPSES baseline survey (Ubelaker, 1974).

3.4.1.1.6 Fish

During winter, 1975, 437 fish representing 6 families and 8 genera and 12 species were collected in Squaw Creek at locations A_1 through A_4 (Table A-47, Appendix A). Detailed data, including numbers collected at each station by each method, are presented in Table A-51, Appendix A. The most abundant species collected was the mosquitofish *(Gambusia affinis)*, comprising 67.7 percent of the total number collected. Mosquitofish were especially abundant at Locations A_1 and A_2, where 134 and 141 were collected, respectively. Downstream, only 14 were collected at A_3 and 7 at A_4.

Sampling location A_3 and A_4 were dominated by members of the family Centrarchidae. The longear sunfish *(Lepomis megalotis)* and green sunfish *(Lepomis cyanellus)* were the second and third most abundant species collected, comprising 14.4 percent and 6.4 percent of the total, respectively. Of the 437 fish collected during winter, 168 (38.4 percent) were collected at Location A_1, while only 55 were collected at Locations A_3 and A_4 (Table A-51, Appendix A). All species collected during the winter 1975 survey had previously been recorded by either Forshage (1972) or Ubelaker (1973).

Assessments of gonadal maturity were based upon Nikolsky's (1963) description presented in Table A-50, Appendix A. The orangethroat darter *(Etheostoma spectabile)* was the only species observed to be in spawning condition (Stage V). All three female specimens collected were gravid. No male darters were collected, however. All other species were judged to be immature (Stage I) or in a resting stage. Table A-54, Appendix A, includes gonadal conditions as well as length-weight data and condition factors.

Condition factors of most species were within the range reported by Carlander (1969). Food relationships do, in part, influence conditions of fish, as well as growth rates and population levels. Therefore, condition factors may fluctuate as food habits change with the seasons, with life cycle changes and with the kinds of food available.

Food habits of selected species of fish were studied to determine what items were being utilized as forage during the winter survey. A total of 34 stomachs were analyzed from nine species collected at Locations A_1 through A_4. Food habit data are summarized in Table A-57, Appendix A.

Important winter food items of fishes collected in Squaw Creek included Chironomidae (midges), Copepoda (copepods), Baetidae (mayflies), Caenidae (mayflies), Dytiscidae (diving beetle larvae), Simulidae (blackflies), Amphipoda (scuds) and Diptera (non-aquatic adult flies). Table A-57, Appendix A, indicates organisms important in the diet of each species. The green sunfish, bluegill and longear sunfish had the most diverse diets, feeding primarily on aquatic insects and micro-crustaceans. Aquatic insects were the major food item for the yellow and black bullheads. Small fish were found in the stomachs of spotted and largemouth bass, although terrestrial insects were the chief constituent of the diet of the spotted bass. The forage species, including the shiners, minnows, and darters, were found to be feeding primarily on micro-crustaceans and aquatic insects.

Although fish were examined for external and internal parasites, only one parasitic organism was observed during the winter, blackspot, the metacercarial trematode larval genus *Neascus*. It occurred on seven species collected in Squaw Creek: the blackstripe topminnow, blacktail shiner, green sunfish, bluegill, longear sunfish, largemouth and spotted bass. Members of the family Centrarchidae had a particularly high incidence of infection. However, even heavily parasitized fish appeared to be in good condition.

3.4.1.2 Spring Survey

3.4.1.2.1 *In Situ* Water Quality

3.4.1.2.1.1 Dissolved Oxygen

Dissolved oxygen (DO) values for April 1-2, 1975, ranged from 6.7 parts per million (ppm) to a high of 11.8 ppm (Table A-2, Appendix A). The lowest value was recorded during the night fish seining at Sampling Location A_0 and the high value was recorded during the day sampling at Sampling Location A_2. Night recordings again showed a general decrease in DO levels at all locations. DO values for April 14, 1975, ranged from 7.1 to 11.8 ppm. DO levels at all locations were above Texas Water Quality Board (TWQB) minimal standards at all sampling times during the spring ecological survey.

3.4.1.2.1.2 Temperature

Water temperatures ranged from 13.5 to 24.0°C during the April 1-2, 1975, sampling period and 19.5 to 22.8°C during the April 14, 1975, sampling period (Table 2.2-1). These ranges were recorded from early morning and early evening measurements. These ranges conformed to water temperature data collected during the CPSES baseline survey (Ubelaker, 1973).

3.4.1.2.1.3 Specific Conductance

Specific conductance ranged from 475 to 675 μmhos/cm during the April 1-2, 1975, sampling period and 455 to 700 μmhos/cm during the April 14, 1975, sampling period (Table A-2, Appendix A).

3.4.1.2.1.4 Transparency

All sampling locations had unlimited visibility (to bottom of the deepest pool in the immediate area). This indicated a slight improvement at Sampling Location A_3 where, during the winter survey, transparency values of 18.0 and 23.0 cm (7 and 9 in) were recorded (Table A-2, Appendix A). These transparency values conform to information collected during the CPSES baseline survey (Ubelaker, 1973).

3.4.1.2.1.5 pH

Values for pH ranged from a low of 7.3 to a high of 7.9 over the April 1-2, 1975, sampling period (Table A-2, Appendix A). Water pH during the April 14, 1975, sampling period ranged from 7.7 to 7.9. These ranges of pH values are comparable with values recorded during the CPSES baseline survey (Ubelaker, 1973).

3.4.1.2.1.6 Turbidity

Turbidity measurements collected during the two day sampling period (April 1-2, 1975) indicate that little runoff in the area of construction was reaching Squaw Creek. Values ranged from 0.62 to 2.20 Formazin Turbidity Units (FTU) (Table A-2, Appendix A). The highest values recorded (1.7 and 2.2 FTU) were at Location A_3. The values exhibit a slight decrease in turbidity from the winter survey at this location. These turbidity measurements were comparable with turbidity values found during the spring months in the CPSES baseline survey (Ubelaker, 1973).

3.4.1.2.2 Phytoplankton

Phytoplankton species collected at Sampling Locations A_2, A_3 and A_4 are presented in Tables A-7, A-8 and A-9 (Appendix A), respectively. Diatoms (Bacillariophyceae) were the numerically dominant group at all locations. The strength of this group's dominance has increased over the winter survey. The continuation of their dominance and the appearance of additional species were expected. This population structure for phytoplankton species conformed to information presented in the CPSES baseline survey (Ubelaker, 1974).

3.4.1.2.3 Aquatic Macrophytes

During the aquatic macrophyte survey, macrophytes were found only in the area of aquatic Sampling Location A_1. Species observed at this location are recorded on Table A-15 (Appendix A). *Chara* sp. (stonewort), an algae, was the most abundant species found in the sampling area. This species was found growing in pools with slow running water. The soft bottom and the clear water passing over the limestone substrate of Squaw Creek provide excellent habitat for this taxon. Stonewort was very limited in its distribution but in the pools where it did occur, the population was quite dense. This dense growth contributes to the well being of the fauna of Squaw Creek, as noted in Table 2.0-3.

Stonewort was the only species collected in the production samples. The yield, based on five ¼m^2 quadrats, was 3,240 g/m^2 wet weight. The oven-dried weight yielded 916 g/m^2. The difference in wet-dry production represents approximately 254 percent moisture. Because there are no comparable data for other species or the other sampling stations, the wet-dry production is of little significance. The significance of stonewort in Squaw Creek is in the mass of plant material and the habitat it affords to fish larvae and small aquatic organisms which the fish feed upon.

Myriophyllum heterophyllum (Water-milfoil) was the only other submergent macrophyte found in Squaw Creek. This species also plays an important role in affording shelter and providing food for supporting many valuable insects (Table 2.0-3). However, this species was very limited in distribution and was limited to pools with slow moving water.

Distribution of emergent macrophytes (Table A-15, Appendix A) was based on substrate characteristics. *Sagittaria* sp. (Arrowhead), *Sphenopholis obtusata* (Prairie wedgegrass), *Agrostis semiverticillata* Water bentgrass), *Eleocharis* sp. (Spikerush), and *Carex* sp. (Sedge) were found growing in the wet, soft muds and sands along the banks of Squaw Creek. *Carex* was considered the most common because of its distribution along the sandy banks of Squaw Creek. This species was found well distributed along the creek irrespective of the location of sampling stations. The two grasses are marginal macrophytes because they are inundated only during periods of high water.

Salix nigra (Black willow) and *Justica americana* (American water willow) were observed growing in the fractures of the limestone bedrock of Squaw Creek. *Salix nigra* is a tree growth form which obtains considerable height. While tree sized plants of this species were observed growing along the banks of Squaw Creek, it was doubtful that any of the plants found in the creek bed obtain any size because no plants of significant stature were observed in the creek bed. *Justica americana* is a stoloniferous plant. While stolons are generally short-lived and produce during optimal vegetative activity, their function is primarily as organs of reproduction rather than perennation. However, this species has been reported to overwinter by stolons (Sculthorpe, 1967). The sparseness of this species along Squaw Creek would indicate that overwintering by stolons is limited.

3.4.1.2.4 Zooplankton

Rotifers were the numerically dominant group of zooplankton species collected during the spring survey (Tables A-20 through A-22, Appendix A). Copepod naupli exhibited a large increase over the winter survey and coincided with the copepods major spring population increase as detected by Ubelaker (1974). The overall increase of copepods during spring months was as anticipated.

3.4.1.2.5 Benthic Invertebrates

It would be expected that benthic invertebrate number and diversity would increase during the spring months (Hynes, 1972; Cloud and Stewart, 1974). A spring population peak was reported in the CPSES baseline survey (Ubelaker, 1974). The winter survey resulted in benthic data which was in agreement with the CPSES baseline survey. The spring survey resulted in data that reflected a decrease in individual numbers and diversity from the winter survey as well as the CPSES baseline survey. These data were completely opposite of that expected. Dames & Moore's biologists believe this reduction was probably due to recent *spates* and not effects from the construction activities of the CPSES.

Analysis of benthic samples revealed aquatic insects (Order Diptera) to be the numerically dominant organism (Tables A-33 through A-38, Appendix A). Generally, crustaceans were found to be the next most commonly encountered organism.

3.4.1.2.6 Fish

During spring, 1975, 464 fish representing 7 families and 16 species were collected in Squaw Creek at Locations A_0 through A_4

Table A-48, Appendix A). Detailed data, including numbers collected at each station by each method, are presented in Table A-52, Appendix A. The most abundant species collected was the mosquitofish *(Gambusia affinis)* which accounted for 59.3 percent of the total number collected. During the spring survey 275 total specimens were collected. Of this total, 81.8 percent were collected at Location A_1 which consisted of a large shallow pool with marsh edges. Within Squaw Creek, this location provides the most suitable habitat for the mosquitofish. Location A_2 also was numerically dominated by this species.

Location A_0, A_3 and A_4 were dominated by members of the family Centrarchidae. The green sunfish *(Lepomis cyanellus)* and the longear sunfish *(Lepomis megalotis)* were the second and third most abundant species collected, comprising 11.6 percent and 10.1 percent of the total, respectively. Other sunfish that were numerous during the spring included the bluegill *(Lepomis macrochiris)* and the orangespotted sunfish *(Lepomis humilis)* (Table A-52, Appendix A).

Two hundred fifty-six (55.2 percent) of the 464 fish collected during summer were collected at location A_1, while only 40 were collected at Locations A_0 and A_3 (Table A-52, Appendix A). Similarly, during winter, the highest number were collected at A_1. All species collected during the spring 1975 survey had been previously recorded by Forshage (1972) and Ubelaker (1974).

Assessments of gonadal maturity were based upon Nikolsky's (1963) descriptions presented in Table A-50, Appendix A. During spring, several species were found to be approaching or in spawning condition. Female blackstripe topminnow, yellow bullhead, and spotted bass were found to be in breeding condition (Stage V), but no Stage V males were observed. Stage V males of longear sunfish and gray redhorse were collected in the samples, but no breeding females were observed. Male and female specimens of eight other species had attained sexual maturity (Stage IV). Only one species, the orangethroat darter, was judged to be in the spent condition (Stage VI) while the remaining fish were judged to be immature or in a resting stage (Stage VII), as defined by Nikolsky (1963). Spawning activities of these species are expected to increase as water temperature increases in Squaw Creek. Table A-55, Appendix A, includes gonadal conditions as well as length-weight data and condition factors.

Condition factors of most species were within those reported by Carlander (1969). Food relationships do, in part, influence conditions of fish, as well as growth rates and population levels. Therefore, condition factors may fluctuate as food habits change with the seasons, with life cycle changes, and with the kinds of food available.

Food habits of selected species of fish were studied to determine what items were being utilized as forage during the spring survey.

A total of 133 stomachs were analyzed from 13 species collected at Locations A_0 through A_4. Food habit data are summarized in Table A-58, Appendix A.

Important food items of fishes collected in Squaw Creek in spring included Chrionomidae (midges), Copepoda (copepods), Baetidae (mayflies), Amphipoda (scuds), Caenidae (mayflies), Hydroptilidae (micro caddis flies), Physidae (snails), Cladocera (water fleas), Dytiscidae (diving beetle larvae), and Simuliidae (blackflies). A greater diversity of food organisms was available during spring than during the winter survey.

Table A-58, Appendix A, indicates organisms important in the diet of each species. The green sunfish, orangespotted sunfish, bluegill and longear sunfish had the most diverse diets, feeding upon a wide variety of micro-crustaceans, insects and physid snails. Aquatic insects and fish were found to be important components in the diets of spotted bass and white crappie. Aquatic insects also were a major food item for the black and yellow bullheads, although during spring, snails were the major constituent of the diet of the black bullhead. Forage species, including the shiners, minnows and darters, were found to feed principally on micro-crustaceans and aquatic insects.

Increases in the numbers and types of aquatic insects consumed in spring compared to winter correspond with increased availability.

Increases in fish metabolic rates resulted in increased predation upon the faunal types. A larger number of terrestrial insects was consumed during spring than in winter as would be expected because lower air temperatures during the winter months suppress terrestrial insect activity, thereby decreasing their availability during winter.

To accurately assess an organism's role in the aquatic food web, it is essential to consider that, although an organism may not be eaten directly by a large game species, it may represent a vital link in the food chain for that particular species. For example, small sunfish, minnows, and other forage species which are important as food items of larger game fish, consume small invertebrates. Consequently, although small invertebrates are not directly consumed to any great extent by these larger fish, they are important in sustaining fish populations.

The significance of fish parasites can be related directly to the importance of the fish which are their hosts. The fishes of Squaw Creek have been found to be parasitized by one external and several internal parasites. Common and scientific names of these parasites, their host fish and incidence are presented in Table A-60, Appendix A.

During spring, 1975, one taxon of external parasite was recorded. Blackspot, the metacercarial trematode larval genus *Neascus* was common among eight species collected in Squaw Creek: the blackstripe topminnow; blacktail shiner; green, bluegill, and longear sunfishes; white crappie; spotted bass; and orangethroat darter. Species of the family Centrarchidae had a particularly high rate of parasitism.

Several taxa of internal parasites were observed during gonadal condition checks and stomach content analyses. These parasites included nematodes, trematodes, and a tapeworm. Metacercariae of the strigeid fluke, *Posthodiplostomum minimum* (white grub), were commonly observed in five species of Centrarchidae and the yellow bullhead. They were observed primarily in the liver of the above species, but have been reported as occurring in all visceral organs including the spleen, kidneys, mesentaries, heart, and ovaries (Spall and Summerfelt, 1970). Mature centrarchids exhibited higher incidence of infection than did immature specimens. Also, male sunfish appeared to be more heavily infected than females of the same species. Spall and Summerfelt (1970) made similar observations in centrarchids from Lake Carl Blackwell, Oklahoma.

Other internal parasites besides white grub were encountered only on an occasional basis (see Table A-60, Appendix A). Even heavily-parasitized fish were judged to be in good condition. Parasitism of fish in Squaw Creek was not considered a problem during spring, but additional observations should be carried out after reservoir filling and subsequent plant operations begin.

3.4.1.3 Summer Survey

3.4.1.3.1 *In Situ* Water Quality

3.4.1.3.1.1 Dissolved Oxygen

Dissolved oxygen (DO) values for August 5, 1975, ranged from 3.2 parts per million (ppm) to 12.1 ppm (Table A-3, Appendix A). The lowest value was recorded at Sampling Location A_0 during the early morning when dissolved oxygen is usually at its lowest concentration due to the consumption of oxygen by aquatic plants and algae. The highest oxygen value was recorded at sampling location A_5. Night recordings again showed a general decrease in DO levels.

3.4.1.3.1.2 Temperature

Water temperatures ranged from a minimum of 24.0°C and a maximum of 34.0°C during the August 5, 1975, sampling period. These readings were both recorded from sampling location A_5. These ranges conformed to water temperature data collected during the CPSES baseline survey (Ubelaker, 1973).

3.4.1.3.1.3 Specific Conductance

Specific conductance ranged from 400 μmhos/cm to 700 μmhos/cm during the August 5, sampling period. These values are consistent with recordings from the previous Dames & Moore sampling periods.

3.4.1.3.1.4 Transparency

Transparency readings ranged from 27 cm to unlimited visibility (to bottom of the deepest pool in the immediate area). This indicates a slight decrease from the spring sampling period. However, the lowest reading was recorded at Sampling Location A_0, above the area of construction. These transparency conditions must be interpreted as naturally occurring and not as a result of construction.

3.4.1.3.1.5 pH

Values for water pH ranged from a low of 7.3 to a high of 8.1 during the August sampling period (Table A-3, Appendix A). This range of pH values are comparable with values recorded during the CPSES baseline survey (Ubelaker, 1973).

3.4.1.3.1.6 Turbidity

Turbidity measurements taken during the summer sampling period (Table A-3, Appendix A) ranged from 0.4 Formazin turbidity units (Station A_4 and A_5) to 1.4 Formazin turbidity units (Station A_0). Nighttime readings ranged from 0.7 Formazin turbidity units (Stations A_0 and A_1) to 1.6 Formazin turbidity units (Station A_4). These values indicate that little runoff in the area of construction was reaching Squaw Creek. The low readings taken at Sampling Location A_5(0.4 day and 1.4 night) indicates that increases in turbidity created by dam construction efforts in the immediate area were of short duration. These values were comparable with turbidity values found during summer months in the CPSES baseline survey (Ubelaker, 1973).

3.4.1.3.2 Phytoplankton

Twenty-three phytoplankton taxa were collected at Locations A_2 through A_5 during the summer survey (Tables A-10 - A-13, Appendix A). As during the spring and winter surveys, diatoms were numerically dominant, comprising over 98 percent of all phytoplankters collected at A_5. During the construction monitoring program, diatoms have composed an increasingly higher percentage of the phytoplankters collected. Hynes' (1972) reported that in temperate climates, diatoms usually dominate flowing waters in winter, but increasing water temperatures encourage the development of Chlorophyta (green algae) and Cyanophyta (blue-green algae), which attain their maximum development in warm waters. The diatoms *Navicula* and *Synedra* were extremely abundant at all locations, the latter comprising over 79 percent of the phytoplankters at A_5. Both genera are benthic forms frequently encountered in large numbers (Hynes, 1972).

The highest density (1.87×10^6 phytoplankters/liter) occurred at Location A_5 (Table A-13, Appendix A), downstream from the construction site. This area was not sampled during the winter and spring surveys.

The density at A_5 exceeded all those previously reported during the construction monitoring program. The phytoplankton densities at Locations A_2 through A_4, however, were lower during summer than during the spring survey. Summer water temperatures may have suppressed diatom development, although the location with the maximum density (A_5) also had the maximum water temperature (34°C).

Turbidity and transparency measurements taken concurrently with phytoplankton samples (Table A-3, Appendix A) indicate that light penetration was not a factor limiting photosynthesis. Within the 96-hour period preceding sampling, no precipitation was recorded that would have caused spates (extreme high flows) and associated scouring of the creek's substrates.

3.4.1.3.3 Aquatic Macrophytes

Aquatic macrophytes were previously sampled in Squaw Creek during the Spring Aquatic Survey. The details of this survey can be found in Section 3.4.1.2.3, which also provides a discussion of the classification used in evaluating aquatic macrophytes.

Species composition of aquatic macrophytes was noticeably changed from the spring to summer surveys. Five emergent and one submergent species observed during the spring survey were not observed within the sampling locations during the summer survey. Three new emergent and one submergent species were observed during the summer survey (Table A-15, Appendix A). None of the species involved were considered abundant.

The change in species composition probably can be best explained by an understanding of the physical character of Squaw Creek. This small stream has very limited flow during much of the year. However, following heavy rainfall the waterflow increases considerably which results in erosion of the sandy banks. Vegetation becomes established on the unstable sands but if the sands are washed away, the vegetation also will be removed. The intermittent flow of this stream does not permit a significant plant population to become established which would stabilize the sands against water erosion.

Submergent vegetation probably is the most important life form of aquatic macrophytes in Squaw Creek. The submergent species contribute the most to primary productivity and provide habitat and food for the higher trophic levels. Stonewort (*Chara* sp.), a multicellular algae, was the most common submergent macrophyte. This species was found growing in pools with slow running water. The soft bottom and the clear water passing over the limestone substrate of Squaw Creek provides excellent habitat for this taxon. This species was observed in only one sampling location during the spring survey but was found in four sampling locations during the summer survey.

Stonewort was the only taxon which contributed to the wet-dry production. Production was sampled in four of six sampling locations; only one sampling location (A_1) was sampled during the spring survey due to the lack of vegetation. This increase in vegetation would indicate construction had no significant impact on the macrophyte population.

Wet-dry production for the summer survey is presented in Table A-16. Wet production ranged from 2,700 to 3,686 g/m . The difference in wet and dry weights indicates a moisture percentage greater than 200 percent at all sampling locations.

We believe dry weight is a more reliable estimate of production within Squaw Creek. The use of dry weight (as distinct from wet weight) eliminates interspecific variations attributable solely to differences in the amount of water adhering to freshly sampled material and the water content of the material itself; differences which may be considerable among aquatic plants. Inorganic constituents form a larger total position of weight in aquatic plants; especially plants growing in calcareous water, such as Squaw Creek, where heavy incrustaceans of marl are deposited on the algae. Stonewort contains calcium carbonate which can influence the total weight.

3.4.1.3.4 Zooplankton

Copepods were the numerically dominant group of zooplankton species collected during the spring survey (Table A-23 through A-26, Appendix A). Sampling Locations A_2 and A_3 showed marked decreases over the zooplankton peaks detected during the spring survey. These decreases were probably the result of a combination of several natural factors such as decreasing food availability, increasing water temperatures, and water stagnation. Sampling Location A_4 showed an increase over the spring level. Location A_4 also contained the greatest diversity of the sampling locations. This was probably due to the nature of Squaw Creek at this point. Location A_4 is a rather large deep pool which creates a more lentic habitat which characterisically have greater densities and diversities with respect to lotic habitats (Hynes, 1972). An overall paucity of individuals and taxonomic groups were revealed at Sampling Location A_5. This was probably due to the frequent perturbation to the area by dam construction efforts in the immediate upstream vicinity

3.4.1.3.5 Benthic Invertebrates

Analysis of benthic samples again revealed a numerical dominance of aquatic insects. Chironomids, Order Diptera (midges) were found to be the numerically dominant group in the Ekman Samples (Table A-39 through A-42, Appendix A) and Ephemeroptera (mayflies) were found to be the numerically dominant group in the box samples (Tables A-43 through A-46, Appendix A). This division of dominance was probably due to difference in substrates between the areas that the two sampling devices were used in (riffle vs. pool).

With respect to other sampling locations, a striking lack of diversity and individual numbers were noted at sampling location A_2 and A_5. As with the zooplankton samples, this paucity was probably due to frequent perturbation and siltation due to construction efforts in the immediate vicinity.

Box samples at Sampling Location A_2 were not taken due to low water flow. Inherent in the design of the sampling device, a minimum water depth of 7.6 cm (3 in) is required for efficient operation.

3.4.1.3.6 Fish

During summer, 1975, 572 fish representing seven families and 15 species were collected in Squaw Creek at locations A_0 through A_5 (Table A-44, Appendix A). Detailed data, including numbers collected at each station, by sampling method, are presented in

Table A-56, Appendix A. The most abundant species was the stoneroller (*Campostoma anomalum*), which comprised 31.3 percent of the total number collected. It was particularly abundant at A_1, where 133 were collected in daylight seine samples. Stonerollers live in pools throughout much of the year; A_1 includes a series of several pools. Although stonerollers were the most abundant fish in Squaw Creek according to the TUGCO Environmental Report (Ubelaker, 1974), they comprised less than 1 percent of the total number collected in the winter and spring surveys. During those surveys, the mosquitofish (*Gambusia affinis*) was the most abundant species. However, during the summer survey, the mosquitofish ranked second in abundance, comprising 20.4 percent of the total. It was especially abundant in daylight seine samples at Locations A_1 and A_2. Similarly, it was extremely abundant at these locations during winter and spring. The third most abundant species, the blacktail shiner (*Notropis venustus*) comprised approximately 20.3 percent of the total and was particularly abundant in daylight seine samples at A_5, downstream from the construction site.

Species of the sunfish family (Centrarchidae) were relatively abundant at Locations A_0 through A_2, where pool habitats were available. The most abundant species, the longear sunfish *(Lepomis megalotis)*, was especially prevalent at A_2. Other sunfish that were numerous during the summer were the spotted bass *(Micropterus punctulatus)* and green sunfish *(Lepomis cyanellus)* (Table A-56, Appendix A).

Of the 572 fish collected during summer, 198 (34.6 percent) were collected at Location A_1, while only 32 were collected at Location A_4 (Table A-56, Appendix A). At A_5, nearest to construction activities, 103 fish were collected, representing approximately 18 percent of the total.

All species collected during the summer survey had been previously recorded in Squaw Creek by Forshage (1972) and Ubelaker (1974). However, the river redhorse *(Carpiodes carpio)*, a rough species, had not been collected during the winter or spring surveys. One specimen was collected at A_1 during the summer survey.

Assessments of gonadal maturity were based upon Nikolsky's (1963) descriptions presented in Table A-50, Appendix A. One female blacktail shiner and two female longear sunfish were found to be in breeding condition (Stage V), but no Stage V males were observed. Two female longear sunfish had attained maturity (Stage IV) while one female yellow bullhead and one female longear sunfish were in the spent condition (Stage VI). Fish in Stages IV through VI, therefore, represented less than 2 percent of the 572 fish collected during summer. The remaining fish were judged to be immature (Stage 1), as defined by Nikolsky (1963). Table A-50, Appendix A, includes gonadal conditions as well as length-weight data and condition factors.

Condition factors have been used to describe the plumpness or well-being of a fish. The coefficient of condition, k, most widely used is calculated by:

$$k = \frac{w10^5}{L^3}$$

where: w = weight in grams

L = length in mm

and 10^5 is a factor to bring the value of k near unity (Carlander, 1969). Condition factors vary with season, sex, sexual maturity, age, and several other factors including body shape. The perfectly proportioned fish has a theoretical condition factor of 3.0. However, many species, particularly long, slender fishes, do not conform to this ideal. During the summer survey, for example, condition factors of stonerollers and blacktail shiners were low (Table A-56, Appendix A). Yet, they were within or exceeded the condition factor ranges reported by Carlander (1969) as typifying these species. Condition factors of other abundant species including bluegills, green and longear sunfish, were compared to values calculated from data on Oklahoma fishes compiled by

Houser and Bross (1963). K values for Squaw Creek bluegills were higher than in Oklahoma waters while green sunfish values were similar and longear sunfish values were generally lower.

Food habits of selected species of fish were studied to determine what items were being utilized as forage during the summer survey. A total of 135 stomachs were analyzed from 11 fish species collected at Locations A_1 through A_5. Approximately 10 percent of these were empty. Food habit data collected during summer are summarized in Table A-59, Appendix A.

Important food items of fishes collected in Squaw Creek in summer included Cyclopidae (copepods), Talitridae (scuds), Baetidae (mayflies), Trichoptera (caddis flies) and Chironomidae (midges). The diversity of food organisms available in summer appeared to be similar to the diversity during spring and greater than the diversity during winter.

Table A-59, Appendix A, indicates organisms important in the diet of each species. The green sunfish, bluegill, and longear sunfish had the most diverse diets, feeding upon a wide variety of micro-crustaceans, insects and mollusks. Sunfishes and mosquitofish were found to be important components in the diets of largemouth and spotted bass. It was not possible, in several cases, to quantify the number or amount of food particles in the stomachs. This was particularly true for two of the most abundant species, the stoneroller and blacktail shiner, which principally consumed detritus and unidentifiable algae material.

To accurately assess an organism's role in the aquatic food web, it is essential to consider that, although an organism may not be eaten directly by a large game species, it may represent a vital link in the food chain for that particular species. For example, small sunfish, minnows and other forage species which are important as food items of larger game fish, consume small invertebrates. Consequently, although small invertebrates are not directly consumed to any great extent by these larger fish, they are important in sustaining fish populations.

Although fish were examined for external and internal parasites, only one parasitic organism was observed during the summer, the white grub *(Posthodiplostomum minimum)*. Metacercariae of this strigeid fluke were present in the liver of all of the centrarchids examined. However, no detrimental effects of the parasite were observed and even heavily parasitized fish were judged to be in good condition.

3.4.2 <u>Terrestrial Ecology</u>

3.4.2.1 Spring Survey

3.4.2.1.1 Avifauna

During the spring (1975) avifauna survey, 44 species were observed on the CPSES site. Twenty-four species were observed in the established census strips; the remaining 20 species were observed elsewhere on the CPSES site (Table B-3, Appendix B). Density and diversity of avifauna are functions of the quantity and quality of available habitat. Normally, one can expect increased diversity of bird populations in areas of increased foliage height diversity (MacArthur and Mac Arthur, 1961). Area 1, a grassy area with a few randomly distributed small mesquites, exhibited the lowest diversity of birds among the three areas sampled (Table B-3, Appendix B). This area lacked the foliage height diversity exhibited by the other two area. Area 2 (juniper woodland) exhibited greater avian diversity than Area 1, but less diversity than Area 3 (riparian). Avian diversity increased with the increase in available niches. The physical presence of Squaw Creek and the associated riparian vegetation provided a greater diversity of habitats, thereby sustaining greater avian diversity in Area 3.

Six species were observed on all areas sampled: 1) turkey vulture *(Cathartes aura)*; 2) bobwhite *(Colinus virginianus)*; 3) mourning dove *(Zenaida macroura)*; 4) mockingbird *(Mimus polyglottos)*; 5) brown-headed cowbird *(Molothrus ater)* and 6) lark sparrow *(Chondestes grammacus)*.

These particular species are often found in a variety of habitat types and are not severely dependent on any one habitat type.

The numerically dominant species observed on Area 1 was the lark sparrow. Densities of all species were relatively low, which may have amplified the numerical dominance of more conspicuous species.

The numerically dominant species observed on Area 2 were cardinal *(Cardinalis cardinalis)*, mourning dove, lark sparrow, and brown-headed cowbird. Each of these species is a permanent resident and, therefore, likely to nest on the CPSES site.

The numerically dominant species observed on Area 3 were the cardinal and mourning dove. The riparian woodlands provide good nesting sites for both resident breeders.

3.4.2.1.2 Reptiles and Amphibians

Fourteen reptiles and five amphibian species were observed during the spring herpetofauna survey. A list of species observed, respective numbers, and habitat types are presented in Table B-4, Appendix B.

Most amphibians observed were found in or very near Squaw Creek. Although water was standing in many of the siltation basins, no amphibians or reptiles were observed in these water bodies. Amphibians possess moist porous skin through which dehydration can occur if they are exposed to hot dry weather; therefore, most live in and/or around water. In arid and semi-arid regions, amphibians are usualy most active after rains and at night when dehydration is less critical. Most of the reptiles (water snakes) observed were along Squaw Creek or on construction roads at night. Roads absorb heat and maintain higher temperatures for longer periods than the surrounding areas after dark. Because reptiles are cold-blooded, they seek optimal environmental temperatures to maintain their own body temperatures. Bare, rocky ground or limestone ledges also will absorb more heat in early mornings than surrounding grassy or brushy areas.

Two toads were collected on the CPSES site. These were a Rocky Mountain toad *(Bufo w. woodhousei)* and a Gulf coast toad *(B. valliceps)*. These toads were both collected at night which is to be expected since most toads remain hidden during the day and emerge at night to hunt for food. Toads feed voraciously on insects and spiders and have been recognized as being of substantial economic importance as they sometimes eat as much as two-thirds of their body weight in a single night.

Three frog species were collected in the area of Squaw Creek. Blanchard's cricket frogs *(Acris crepitans blanchardi)* were especially abundant along the creek and quite conspicuous due to their loud chorusing activities. This species prefers muddy, beach-like edges of shallow streams and ponds. This habitat was readily available along large portions of Squaw Creek. While chorusing is a technique by which males attract females, it is not a positive indication that breeding is taking place. This species has been known to chorus for other, unknown reasons. While breeding was not actually observed, it is likely that breeding was taking place during the spring survey as the survey coincided with this species' breeding season.

Bullfrogs *(Rana catesbeiana)* were observed along the banks of Squaw Creek in areas of thick vegetation and debris accumulation. This large frog prefers a habitat containing permanent, deep water. Bullfrogs were heard calling at night and it is quite likely breeding was taking place. The bullfrog is an opportunistic predator and feeds on anything it can swallow. Its diet consists of both terrestrial and aquatic arthropods, small invertebrates as well as small turtles, snakes and birds.

The Rio Grande leopard frog *(R. pipiens berlandeiri)* was present along the Squaw Creek shoreline. It is generally found in every aquatic situation, both permanent and temporary and may wander great distances from water. This species feeds primarily on non-aquatic insects such as beetles, grasshoppers, crickets, worms and snails.

Four species of turtles were observed on the CPSES site. Three of these were members of the aquatic community and one was terrestrial. A large common snapping turtle *(Chelydra s. serpentina)*, two Texas sliders *(Pseudemys concinna texana)* and four Texas softshells *(Trionyx spinifer emoryi)* were found in Squaw Creek. All three species prefer permanent bodies of water such as streams and rivers. These turtles feed on various small aquatic invertebrates, fish and carrion. The snapping turtle may also include reptiles, birds and small mammals as well as surprisingly large quantities of vegetation in its diet.

The ornate box turtle *(Terrapene o. ornata)* is a common terrestrial turtle in this area. It is found in drier habitats and feeds on succulent vegetation, grasses, fruits and invertebrates.

The three species of lizards observed at the site occurred primarily in areas of rock piles and ledges which offer abundant sunning spots as well as hiding places. The Texas spiny lizard *(Sceloporus olivaceus)* is regarded as essentially being aboreal. They are usually seen in mesquite, cottonwood or cedar trees and the specimen collected on the site was found hiding under rocks in an area heavily vegetated with cedar trees. The collard lizard *(Crotophytus c. collaris)* and the Texas earless lizard *(Holbrookia t. texana)* live exclusively on limestone ledges and rock piles and tend to be territorial. The creation of new rock piles due to construction activities on the CPSES site has probably enabled these species to increase their population sizes in the local area beyond what may normally occur there.

Three of the seven species of snakes found on the site were observed in the area of Squaw Creek. The diamond-backed water snake *(Natrix r. rhombitera)* and blotched water snake *(Natrix erythrogaster transversa)* were frequently encountered during both day and night surveys. Two young western ribbon snakes *(Thamnophis sauritus proximus)* were found along the creek banks. While the ribbon snake is not as aquatic in habits as the water snake, it is considered semi-aquatic and takes to the water quite readily. The water snake and ribbon snake feed on salamanders, frogs and small fishes.

The Eastern yellow-bellied racer *(Coluber constrictor flaviventris)* and western coachwhip *(Masticophis flagellum testaceus)* are two snake species that have similar habits and occur in the same habitat. Both are agile and swift and generally aggressive when cornered. They prefer open grassland habitats where they feed on a remarkable varied diet which may include arthropods, amphibians and reptiles, birds and mammals.

The Texas rat snake *(Elaphe obsoleta lindheimeri)* is probably the most commonly occurring non-poisonous snake found on terrestrial portions of the CPSES site. Two young specimens were collected while crossing construction roads. This species is found in a variety of habitats and feeds on rodents and young birds. Rat snakes are believed to be of considerable economic importance in areas where rodents are considered a problem.

The western diamond-back rattlesnake *(Crotalus atrox)* was the only venomous snake observed during the spring survey. The specimen recorded was killed on the site by construction workers. Although numerous accounts of literally hundreds of rattlesnakes being forced from dens by blasting and earth-moving activities earlier in the year were given, only two were reportedly observed by construction personnel during the survey. Many limestone outcroppings occur throughout the site. These are favored habitats of the rattlesnake and while the ledges were repeatedly probed and searched for rattlers, none were found. It is possible that the aforementioned disturbances may have dirven the snakes out of dens where the local populations were reduced to a great degree. If such a reduction has occurred, the result may be a significant increase in local rodent populations due to the loss of an important predator. Rodents and rabbits account for a large portion of the rattlesnakes diet and the rattler may play an important role in controlling small mammal populations in localized areas.

3.4.2.1.3 Terrestrial Invertebrates

3.4.2.1.3.1 Taxonomic Structure

A total of 501 insect species were collected (Table B-5, Appendix B) and 488 or 97 percent were in the major orders (in decending order of species abundance); Hymenoptera, Diptera, Coleoptera, Homoptera, Hemiptera, Orthoptera, and Lepidoptera, while the remaining 3 percent were distributed among 6 orders. The complete list of families of insects collected and numbers of species captured by sampling area and replicate sweep sample is presented in Appendix B.

For purposes of comparison between and among collection areas, trees and grassland samples are scored separately (Table B-6, Appendix B). The total number of species sampled per grassland habitat was almost identical in each site, being 202, 202, and 198 in Areas 1, 2, and 3, respectively. There were, however, some differences between and among the areas in the distribution of these species among the orders. Area 1, which was a more dense grassland, contained more species of Homoptera and Orthoptera, while Area 3 along Squaw Creek contained more species of Coleoptera, Diptera and Hymenoptera. Area 2, which was a similar though less dense grassland than Area 1, was intermediate in composition between the other two areas. Since the general trophic involvement differs among the insect orders collected, some of these differences in taxonomic representation among sites must be reflected in trophic structure of the three communities which will be further emphasized.

Sweep samples from trees in Areas 2 and 3 also were approximately equal with 64 and 71 species collected in these two areas, respectively. Collections from the trees were different from those in the grassland component. For example, the total species collected in Areas 2 and 3, 249 and 242, respectively, were substantially greater than for Area 1. This underscores the point that the diversity of insect communities was closely tied to the diversity and structure of the plant community and, as additional components of the plant community were added (such as trees), so were additional components of the insect community (Cameron and Bryant, 1974).

The total number of individuals collected per insect order (Table B-7, Appendix B) as in the number of species indicated Area 1 contained more individuals of Homoptera and Orthoptera than Area 3 with Area 2 intermediate, indicating the dominant grassland component of Area 1. The total number of individuals collected in the three grassland habitats was almost identical in the three areas (excluding spiders), with 1,123, 1.128, and 1,184 individuals collected in Areas 1, 2, and 3, respectively. With the exception of one Diptera species in Area 3 and one Coleoptera species in Area 2, there was no preponderance of any species. These two species were concentrated in a single portion of the habitat with the fly found almost exclusively in vegetation immediately along the edge of the creek (Area 3) and the beetle (a flower beetle) being almost exclusively in flower heads in Area 2. If these two species are subtracted from the individual totals for these areas, the resultant numbers of individuals are 929 (Area 2) and 764 (Area 3). These numbers indicate the remaining productivity may be greater in Area 2 than the other grassland components. The numbers of spiders were approximately equal in the three grass components (71, 131, and 63 for Areas 1, 2, and 3, respectively), although there may be an indication of more predators of this type in Area 2 grass.

The tree components of Areas 2 and 3, added to the numbers of individuals in these areas, bring the three totals to 1,123, 1,249, and 1,333, respectively. Because these individuals represented species not commonly collected in the grass component, the increased total number was meaningful and not due to additional sweep samples.

Both numbers of species and numbers of individuals are important components of taxonomic structure of animal and plant communities. The concept of species diversity takes into account both attributes of a community such that two communities with different numbers of species may have equal levels of diversity due to differences in distribution of individuals among species. An index of diversity can be utilized to summarize these two components in a single measure. The Shannon and Weaver (1949) index was utilized in the form provided by Lloyd and Ghelardi (1964):

$$H(s) = \log_{10}N - \frac{1}{N}\sum^{s} n_i \log_{10} n_i$$

where N = the total number of individuals collected and n_i = the number collected per species.

Species diversity (in $\log_{10}$ units) for the three collection areas, the separate grasslands component for each major order collected, and the average for each order and collection area are presented in Table B-8, Appendix B). The grassland diversities were approximately the same for the three areas, although Area 3 was somewhat less diverse because of the large abundance of a single Dipteran species. Without this species, the average grassland diversity of Area 3 was 0.979, very close to diversity observed for Area 1. Paralleling species numbers, the greatest diversity of Homoptera and Orthoptera, a large herbivore component of the community occurred in Area 1 while the greater diversity of Hymenoptera and Cleoptera was in Area 3 with Area 2 intermediate.

The contribution of the distribution of individuals among available species to total diversity was determined by calculating the evenness or equitability component of diversity, J, as

$$J = H(s)/H_{max}$$

where $H_{max} = \log_{10}(s)$, the number of species. The more evenly or equally individuals are distributed among the species in a collection, the greater the equitability component such that, if each species contains an equal amount of individuals, the equitability is 1.0.

Equitabilities for subhabitat types and collecting areas are given in Table B-9, Appendix B. Although Area 3 grass had a lower equitability due to the one Diptera species, overall the distribution of individuals among species was approximately the same in all areas with average equitabilities of 0.761, 0.755, and 0.751 for the three areas, respectively.

Distributions of soil fauna among taxonomic categories and species are given in Table B-10 (Appendix B). Although few individuals per category were found, these represented eight orders with mites and flies predominating. The distributions of the soil organisms among the areas and replicates within each area are given in Table B-11, Appendix B. As with sweep samples, the number of individuals and the number of species were the same in all area.

Replicate litter samples from ¼ m^2 plots also were taken from each collection area and examined for organisms but none were found. This was not unusual for the type of vegetation containing mostly annuals or large perennials, since litter does not tend to accumulate.

3.4.2.1.3.2 Trophic Composition

Although total number of species and total individuals per area are important comparisons for community composition and productivity, the trophic structure within a community is a more sensitive measure of its dynamics. The exact trophic habits of many insects species are unknown, but a close approximation of trophic placement into general categories can be accomplished by inspecting the mouth parts of the species in question and the general activities of members of different taxonomic families as reported in the literature. For example, the Homoptera species can be regarded as wholly phytophagous (feed on plants) while more subdivisions accoring to family placement are necessary for other orders. For purposes of trophic analysis, five major categories of community involvement are recognized:

Herbivore: (Phytophagous) — Species which confine their diet mainly to live plants and include species which feed on flower nectar as well as species which feed directly on plant sap or leaves.

Predator; Species which generally feed on other insects, devouring them from the outside. Classically, a predator feeds on a succession of prey during a lifetime and the prey itself is not a major component of the ecological environment of the predator. This category also includes micro-predators, such as mosquitoes, which feed on a prey from without but are not permanently attached to the prey as with an external parasite.

Parasite: Species which usually feed on a host from within and the host constitutes flow of food to the parasite as well as providing an environment to the parasite. This category also includes external parasites which attach to their host during feeding.

Detritivore: Species which feed on decaying animal and vegetable matter, including rotting leaves, fruit, logs, excrement, carcasses, etc. During larval life, they are usually confined to a single food source and environment.

Scavenger: Species which generally feed on organic matter, whether living or dead. Few species actually fall into this category and usually one confines this category to insects such as ants or roaches.

In general, a reasonably accurate picture of community dynamics can be discerned from these categories. However, in some cases, an insect species may occupy one trophic level as a larval and another as an adult. In most instances, the larval habitat is classified as the major energy consumer while in a few others where both larval and adult forms are active feeders, both categories are counted in the trophic comparison. Thus, the total number of species divided among trophic categories may be slightly greater than the total number of species per taxonomic order listed earlier.

The trophic compositions of the three areas and subhabitats are given in Table B-12, Appendix B, as: the number of species(A), and the percentage of total species complement represented in each trophic level(B). As suggested earlier, the major differences between and among the areas were in the herbivores than from Area 3. This paralleled the greater percentage of open grassland in the first two areas. Conversely, Area 3 had a greater number and percentage of the predator-parasite component.

The major determinants of trophic composition appear to be intimately related to the type of habitat sampled, where proportionately more herbivores occurred in the more open grassland components. Predators, parasites, and detritivores were predominant along Squaw Creek. In this area, both tree and grass samples displayed similar trophic composition so that the average trophic component per sample area was a reflection of the entire area community.

Although the number of insects collected in each area were similar, a few species were predominant in each area. A phytophagous Chloropid fly was the dominant species in the grass immediately along the stream bank (Area 3). Large numbers of phytophagous Mordillid beetle were collected from the forb flowers and two phytophagous Mirid bugs were collected in the grass in Area 2. Area 1 was dominated by a phytophagous Syrphid fly, a phytophagous Pentatomid bug, and a phytophgous Cicadellid leaf hopper. Other species which occurred in moderate abundance included: a phytophagous Bombilliidae fly in Areas 1 and 2; a phytophagous Cicadellidae in all areas; a phytophagous Membracid in Areas 1 and 3; and a phytophagous Curculionid beetle in Areas 1 and 2. The only non-phytophagous species in moderate abundance was a Cocconellidae beetle which was collected in all areas, although it was predominant in Areas 1 and 3. This beetle feeds mainly upon aphids, but it was closely tied to the herbivore component of these communities - approximately 70 percent of the insect fauna.

3.4.2.1.3.3 Similarity Analysis

An analysis of faunal distribution overlap was used to determine similarity or dissimilarity among the plant communities and duplication of faunal elements among collection areas. The number of species found only in one area (Table B-13, Appendix B) were, in a sense, restricted to that area at the level of sampling precision utilized. Approximately 49 percent of the insects of each community were found only at that area with Area 3 containing the largest proportion of discrete species. This increase in number and percentage of discrete species at Area 3 over Area 2 was attributed to Diptera which were much more numerous at Area 3 than the others (see Table B-6, Appendix B).

Converse to the number of discrete species at each area was the mutual similarity or overlap in faunal components among these communities. The number and percentage of overlapping species were used to display the mutual similarities between any two areas and also formed the basis of further analyses which revealed the overall similarity relationships.

The basic analytic approach was to compute a matrix of mutual similarities between all possible pairs of areas (or subareas) and to summarize this variation in fewer dimensions by various statistical procedures which include cluster analysis and principal component analysis. Because cluster analysis can distort the major relationships in a data set and principal component analysis can distrot the minor ones (i.e., mutually closest pairs) (Rohlf, 1972), both methodologies were utilized in this study for maximal information retrival.

A matrix of mutual similarities was computed among the areas, subdivided by habitat type (i.e., grass and tree components) using Sørensen's coefficient S, giving the overlap between any two faunal areas as:

$$S = 2c/(a + b)$$

where a and b are the numbers of species present in the two areas and c is the number of species in common between them (Sørensen, 1948; Greig-Smith, 1964). Several clustering procedures are available and the commonly accepted hierarchial agglomerative method utilizing unweighted arithmetic averages as giving the best fit to the original data matrix was used for this study (Sokal and Michener, 1958; Farris, 1969; Whittaker and Gauch, 1973). Basically, this technique joins groups which are mutually closest (highest similarity value) and successively reduces the similarity matrix as areas are joined in a cluster. Principal component analysis reduces the dimensionality of the similarity matrix by displaying common axes of variation interrelating the collection areas. These axes are then rotated by the Varimax procedure to maximize intergroup trends, therefore, identifying sets of areas that tend to vary together in their faunal elements (Kaiser, 1958; Harman, 1967; Rummel, 1970; Bryant, et al., 1973; Cameron and Bryant, 1974; Bryant and Atchley, 1975).

The similarity matrix between and among areas and habitat types for the sweep samples utilizing Sørensen's coefficient is shown in Table B-14, Appendix B, and the dendogram resulting from the cluster analysis is shown on Figure B-1, Appendix B. The grassland habitats of Areas 1 and 2 form a single mutually close faunal pairing with approximately 45 percent faunal elements overlapping. Samples from Area 3, the creekside grass community, then join this cluster at a slightly lower level of similarity, forming a cluster of all three grassland or understory communities. The tree samples then join this cluster one at a time at an even lower similarity. Because of the nesting effect on these successive clusters (none are separated), cluster analysis could distort some of the more major trends (see Rohlf, 1972) and a parallel principal component analysis may better reveal the community interrelationships.

The results of the principal component analysis with three factors are given in Table B-15, Appendix B, and depicted on Figure B-2, Appendix B. The first factor, accounting for 33 percent of the variation in the samples, was clearly a grassland component with the three grass habitats being separated from the two tree samples. The second factor, which accounted for an additional 20 percent of variation, was a factor for trees of Area 2 alone, and the third, which accounted for 21 percent of the variation, was for Area 3 trees alone. Although this factor also depicted a relationship between both grass (understory) and tree components of this area, it was considered an Area 3 factor. Thus, principal component analysis revealed that the grass habitat components of all three areas have much of their fauna in common and that, although there was some overlap between tree and understory components within Area 3, the two tree samples were different from each other and from their proximal understory. It was not surprising that the tree components were different in the two areas, since Area 2 was dominated by juniper while Area 3 was a mixed stand of hardwood tree species.

A parallel similarity analysis was carried out for the soil sample fauna, though little emphasis is placed upon these relationships because of a limited number of individuals or species (Tables B-6, B-7 and Figure B-3, Appendix B). The first factor accounted for 31 percent of the variance and separated Samples 2A, 2B, and 3A from the remaining samples. Samples in Area 2 were collected in very similar habitat away from any juniper canopy, and those in Area 3 were collected along the creek bank where the grassland was similarly composed. Factor 2, which accounted for 21 percent of the variation, was a contrast of Samples 1A and 3A with the remaining ones. Sample 1A was collected along an eroded area in the open field, and its similarity with Sample 3A may have reflected some component of this runoff influence. The final factor displayed differences between Samples 1B and 3B and the remaining ones. Although Sample 3B was taken along the creek, it was on a dry shelf where the soil was hardened. Similarly, a sample from Area 1 was taken in hard soil, less sandy than the remaining areas, and this factor may have represented a contrast of the drier and heavier clay areas with the more sandy areas.

3.4.2.2 Summer Survey

3.4.2.2.1 Avifauna

During the summer (1975) avifauna survey, 24 species were observed on the CPSES site; 22 of which were observed during the spring survey. Sixteen species were observed in the established strips; the remaining eight species were observed elsewhere on the CPSES site (Table B-18, Appendix B). As in the spring survey, Area 3 exhibited greater avian diversity than did either of the other two areas which were sampled. Area 2, again, exhibited greater avian diversity than did Area 1 (Table B-18, Appendix B).

One species was observed on all sampling areas during the summer survey; bobwhite. Seven species, lark sparrow, mourning dove, brown-headed cowbird, cardinal, field sparrow *(Spizella pusilla)*, Carolina Chicadee *(Parus carolinesis)* and painted bunting *(Passerina ciris)*, were observed on two of the three sampling areas. These eight species represented approximately 80 percent of the total number of birds observed on all transects during the summer survey (Table B-18, Appendix B).

The numerically dominant species observed on the grassy slopes sampling area during the summer avifauna survey were the bobwhite and eastern meadowlark *(Sturnella magna)*. These two species, most commonly associated with grasslands, accounted for approximately 75 percent of the total number of individuals observed on the grassy slopes sampling area (Table B-18, Appendix B).

The lark sparrow was the numerically dominant species observed in the juniper woodlands during the summer avifauna survey. Other individuals observed were more or less evenly distributed among the remaining species recorded (Table B-18, Appendix B).

The cardinal was the numerically dominant species observed on the Squaw Creek sampling area during the summer survey and accounted for approximately 30 percent of all individual observed along Squaw Creek (Table B-18, Appendix B). Rough-winged swallow *(Stelgidopteryx ruficollis)*, painted bunting and bobwhite were also commonly observed on this area during the summer survey.

Only two new species were observed during the summer avifauna survey that were not observed during the spring survey; ladder-backed woodpecker was a permanent resident and probably was not observed during the spring survey because of the relatively small population (Table B-18, Appendix B).

Small fluctuations in the number of resident breeders (Table B-18, Appendix B) was likely a function of nesting habits. Increased numbers of cardinals and bobwhites were due to the number of immature birds observed during the summer survey. Other species, such as the mourning dove, exhibited slight decreases which may have resulted from a portion of the population carrying out nesting duties during the summer survey.

Gamebird Forage Estimates

The results of crop content analyses performed on mourning dove and bobwhite specimens collected are presented in Table B-19, Appendix B. Based upon the data collected during the summer, 1975, avifauna survey, Croton was the most important item in the diet of both the mourning dove and bobwhite. Mourning doves collected also had ingested the seeds of many grasses, forbs and sedges. The bobwhites collected showed a preference for insects and spiders. Comparison of these results with those of Guthrey (1973) collected in fall showed very little similarity. However, diets vary with season and area based upon the availability of food items. Because bobwhites are not migratory, they must be and are adaptive creatures. In late spring and summer when insect numbers are high and seeds are relatively scarce, bobwhites feed upon insects as our study indicates. Seeds provide a bulk of the bobwhite diet in late fall and winter when insects become less abundant and seeds become more common. Mourning doves will fly great distances to and from feeding areas. We cannot be sure that the doves collected on the CPSES site actually fed on the site. However, because of nesting activities which occur during this time of year, they probably were feeding in nearby areas.

3.4.2.2.2 Reptiles and Amphibians

No reptiles and amphibians were sampled during the summer survey portion of the 1975 Construction Phase Monitoring Program.

4.0 WATER QUALITY

4.1 INTRODUCTION

Concurrent with Dames & Moore's 1975 Construction Phase Biological Monitoring Program, TUGCO's engineers collected surface and groundwater samples for chemical and physical parameters. Quality Control checks were performed quarterly by an outside, independent laboratory. The laboratory also conducted quarterly analyses for additional water quality parameters on surface and groundwater samples. Table 4.1-1 presents parameters and frequency of collection and analysis. Presented in this section are the results and limited discussion of those analyses.

4.2 SAMPLING LOCATIONS

Surface water samples were collected from five locations. Four of these locations, S_0, S_1, S_2 and S_4 correspond to biological Sampling Locations A_0, A_3, A_4 and A_5, respectively, and are described in Section 3.2.1.

The fifth location is outside the sphere of Dames & Moore's investigation. This station, S_3, is located at the junction of Highway 67 and Squaw Creek (Figure 3.2-1), approximately 4.0 miles (6.04 km) below the dam site.

Groundwater samples were collected from four locations designated G_1, G_2, G_3 and G_4. Their respective locations are indicated on Figure 3.2-1.

4.3 PROCEDURES

Collection and analysis were conducted in accordance with procedures presented in Standard Methods for the Examination of Water and Waste Water, 13th Edition (1971).

4.4 RESULTS AND DISCUSSION

4.4.1 Physical

4.4.1.1 Surface Waters

Monthly measurements of selected physical water quality parameters are presented in Table C-1 through C-5. January through April pH values are above the established standards of 8.5 (upper range limit) (TWQB, 1972). However, this is not reflected by *in situ* measurements taken by Dames & Moore biologists (Table A-1 through A-3, Appendix A), and it is believed not to reflect actual water pH values. pH values for this time period were taken by colormetric procedures which do not produce a precision value but a range value. This procedure was changed with the May sample to the use of a L&N pH meter. Values recorded from this date on are comparable with values recorded by Dames & Moore and are with the range of pH values for water quality criteria established by the TWQB (1972) for the CPSES site.

Turbidity values for the entire time period were extremely high in comparison with data taken by Dames & Moore biologists (Table A-1 through A-3, Appendix A, and Ubelaker (1974)). This discrepancy is due to instrumentation and the inherent difficulty in reading low turbidity values on a logrythmic scale. It is felt these turbidity values do not accurately reflect actual water conditions and that actual values are in a range of 0.1 to 2.0 FTU. A change of instrumentation is planned for the 1976 and subsequent monitoring programs. This should correct any future discrepancy in turbidity values.

4.4.1.2 Groundwater

Monthly measurements of selected physical water quality parameters are presented in Tables C-12 through C-15, Appendix C.

4.4.2 Chemical

4.4.2.1 Surface Waters

Quarterly chemical analysis was performed on selected parameters. These data are presented in Tables C-6 through C-10. In addition, analysis of trace metals were performed at Sampling Locations S_0 and S_1. These data are presented in Table C-11, Appendix C.

For the parameters tested, no values were detected in violation of Texas Water Quality criteria as established for the CPSES site (TWQB, 1972). These data are comparable with those reported by Ubelaker (1974) without any detected variations as a result of Construction activites.

4.4.2.2 Groundwater

Quarterly analysis of groundwater samples was performed on selected parameters. Results of these analyses are presented in Tables C-12 through C-15, Appendix C.

5.0 RECOMMENDATIONS

5.1 AQUATIC

Results of the water quality surveys indicate the waters of Squaw Creek have not deteriorated as a result of construction activities in the area. Maintenance of this water quality is attributed to the use of dams which prevent runoff from the construction area into Squaw Creek.

Continued use of dams to prevent silting due to runoff is recommended to ensure the water clarity essential to the photosynthetic process. No construction damage to Squaw Creek phytoplankton populations was detected during the first year of biological monitoring. However, according to Hynes (1972), as the construction of the impoundment progresses, a marked shift in species composition will occur, for when dams reduce the rate of flow, they encourage the development of plankton more typical of lakes.

Based on the findings of the aquatic macrophyte surveys, construction activities at the CPSES site do not appear to have had any impacts on aquatic macrophytes. Production increased between the spring and summer surveys. This increase was most noticeable in the number of stations which had sufficient vegetation to obtain an adequate sample. If siltation occurred it was of brief duration since continuous turbidity within the water column would reduce the photosynthetic activity of the submergent vegetation.

No extensive damage to Squaw Creek aquatic invertebrate community (benthos and zooplankton) was indicated during the 1975 Construction Phase Biological Monitoring Program. Only in areas of direct construction activity (Sampling Location A_5) were any abnormalities detected. Under "normal" conditions, these abnormalities would rapidly revert to their respective climatic stages through recruitment and successional patterns. However, with the closing of the dam subsequent habitat changes will be of such nature as to exclude this from happening. Through time, a lake fauna and flora will develop to replace the disturbed stream fauna.

Dames & Moore biologists believe that no recommendation other than continuance of programs to prevent downstream siltation and excessive terrestrial runoff are required at this time.

5.2 TERRESTRIAL

As a result of the 1975 Construction Phase Biological Monitoring Program, Dames & Moore biologist have no recommendation to make. However, with respect to the 1976 program, it is recommended, as a result of the poor results obtained during the reptile and amphibian investigation, that the survey be conducted earlier in the season. Scheduling should be timed when night-time temperatures do not drop below 50° F for a two-week period prior to the investigation.

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7.0 LIST OF TABLES AND FIGURES

Appendix C

LIST OF FIGURES

Appendix B

TABLE 1.2-1

SAMPLING DATES AND PARAMETERS SAMPLED
FIRST YEAR CONSTRUCTION PHASE MONITORING PROGRAM

Survey	Date	Parameters
Winter	01-28-75	*In-Situ* Water Quality Nekton
	01-29-75	*In-Situ* Water Quality Zooplankton Phytoplankton Benthos
Spring	04-01-75	*In-Situ* Water Quality Nekton Zooplankton Phytoplankton Benthos
	04-02-75	*In-Situ* Water Quality Nekton
	05-18-75	Aquatic Macrophytes
Summer	08-05-75	*In-Situ* Water Quality Nekton Zooplankton Phytoplankton Benthos Aquatic Macrophytes

TABLE 2.0-1

DENSITIES OF PHYTOPLANKTON COLLECTED IN SQUAW CREEK DURING THE CONSTRUCTION MONITORING PROGRAM

	Winter			Spring			Summer			
	A_2	A_3	A_4	A_2	A_3	A_4	A_2	A_3	A_4	A_5
Total Bacillariophyceae (diatoms)	312[a]	657	739	9.20×10^5	7.64×10^5	3.69×10^5	1.86×10^5	7.02×10^5	1.73×10^5	1.84×10^5
Total Chlorophyceae (green algae)	107	115	41	3.28×10^4	4.93×10^4	6.57×10^4	6.90×10^3	1.33×10^3	4.84×10^3	7.96×10^3
Total Cyanophyceae (blue-green algae)	8	33	49	2.46×10^4	1.64×10^4	3.28×10^4	1.30×10^4	2.85×10^4	3.91×10^3	1.72×10^4
Total Euglenophyceae (euglenoids)	25	-	8	-	-	-	-	-	-	-
TOTAL ALL SPECIES	452	805	837	9.77×10^5	8.29×10^5	4.68×10^5	2.06×10^5	7.32×10^5	1.82×10^5	2.10×10^5

[a]Numerical values represent phytoplankters per liter.

TABLE 2.0-2

SCIENTIFIC NAMES AND OCCURRENCES OF PHYTOPLANKTON COLLECTED IN SQUAW CREEK DURING THE CONSTRUCTION MONITORING PROGRAM

Division Class Scientific Name	Occurrence During Winter	Occurrence During Spring	Occurrence During Summer
Chlorophyta (green algae)			
Chlorophyceae			
Ankistrodesmus sp.	A_2, A_3, A_4	A_2, A_4	A_2, A_4, A_5
Cosmarium sp.		A_2	A_2, A_3, A_4, A_5
Dictyosphaerium sp.		A_2	A_4
Kirchneriella sp.		A_3	
Microspora sp.	A_3, A_4		
Oocystis sp.			A_2, A_4
Pediastrum sp.			A_4
Scenedesmus sp.	A_3, A_4		A_2, A_4, A_5
Spirogyra sp.	A_2, A_3	A_3, A_4	A_2
Tetraedron sp.			A_4
Unidentified green coccoid	A_4		
Unidentified green filament			A_4

TABLE 2.0-2 (Cont'd)

Division Class Scientific Name	Occurrence During Winter	Occurrence During Spring	Occurrence During Summer
Chrysophyta (yellow-green algae)			
Bacillariophyceae (diatoms)			
Cocconeis sp.	A_4	A_2, A_3	A_3, A_4, A_5
Cymbella sp.	A_2, A_3, A_4	A_2, A_3, A_4	A_2, A_3, A_4, A_5
Diatoma sp.		A_4	
Fragilaria sp.	A_3, A_4	A_2	A_2, A_3, A_4, A_5
Gomphonema sp.	A_4		A_3, A_4, A_5
Gyrosigma sp.			A_2, A_3, A_4, A_5
Melosira sp.	A_3	A_4	
Navicula sp.	A_2, A_3, A_4	A_2, A_3, A_4	A_2, A_3, A_4, A_5
Nitzschia sp.	A_2, A_3, A_4	A_2, A_3, A_4	A_3, A_4, A_5
Pinnularia sp.		A_3, A_4	A_2, A_5
Rhoicosphenia sp.		A_2, A_3, A_4	
Stephanodiscus sp.			A_3, A_4, A_5
Surirella sp.	A_3		
Synedra sp.	A_2, A_3, A_4	A_2, A_3, A_4	A_2, A_3, A_4, A_5
Centric diatoms	A_3		A_4
Girdle view diatoms	A_2, A_3, A_4	A_2, A_3, A_4	A_2

TABLE 2.0-2 (Cont'd)

Division Class Scientific Name	Occurrence During Winter	Occurrence During Spring	Occurrence During Summer
Cyanophyta (blue-green algae)			
Myxophyceae			
Anabaena sp.	A_3, A_4		A_2, A_5
Lyngbya sp.	A_4		
Merismopedia sp.			A_2, A_3, A_5
Microcystis sp.		A_2, A_4	
Oscillatoria sp.	A_2, A_3	A_2, A_3, A_4	A_2, A_3, A_5
Spirulina sp.			A_2
Euglenophyta (euglenoids)			
Euglenophyceae			
Euglena sp.			A_4
Trachelomonas sp.	A_2, A_4		

TABLE 2.0-3

HABITAT FUNCTION OF AQUATIC MACROPHYTES FOUND IN SQUAW CREEK 1975

Scientific Name	Function[a]
Chara sp.	Shelter; excellent producer of fish food; has a softening effect on water, abstracting lime and carbon dioxide and depositing marl.
Sagittaria sp.	Foliage provides shade and shelter for young fish as well as food.
Sphenopholis obtusata	Supports insects
Agrostis semiverticillata	Supports insects
Eleocharis sp.	Supports insects
Carex sp.	Supports insects
Salix nigra	Supports insects
Myriophyllum heterophyllum	Shelter and valuable food producer supporting many insects.
Justica americana	Provide favorable breeding habitat for mosquitoes.

[a]Habitat function of aquatic macrophytes relative to aquatic environment of Squaw Creek compiled from Fassett, 1966; Sculthorpe, 1967.

TABLE 2.0-4

MEAN DENSITIES OF ZOOPLANKTON COLLECTED IN SQUAW CREEK DURING THE CONSTRUCTION MONITORING PROGRAM

	Winter			Spring			Summer			
	A2	A3	A4	A2	A3	A4	A2	A3	A4	A5
Rotifera	0.20[a]	4.80	0.40	7.68	2.40	2.64	1.68	0.24	0.48	-
Cladocera	1.00	1.40	1.60	-	0.48	2.40	0.48	0.24	1.68	-
Copepoda	-	1.20	0.40	5.76	1.92	2.88	3.83	0.48	11.68	-
Ostrocoda	-	-	-	0.72	1.20	2.64	-	-	1.20	-
Amphipoda[b]	-	-	-	-	-	-	-	-	0.96	-
Insecta[b]	0.20	1.20	0.80	1.68	2.64	6.24	0.72	0.24	5.48	1.20
Arachida[b]	-	-	-	-	-	0.24	0.24	0.24	0.48	-
Nematoda[b]	-	-	-	-	-	-	-	-	3.10	-
Oligochaeta[b]	-	0.80	0.20	-	-	0.72	-	-	-	-
Total	1.40	9.40	3.40	15.84	8.64	17.76	6.95	1.44	25.03	1.20

[a]Numerical values represent zooplankters per liter

[b]Organisms which are not considered plankters but incidental in sample

TABLE 2.0-5

MEAN DENSITIES OF BENTHIC ORGANISMS PER SAMPLING LOCATION BY SAMPLING EFFORT AND SAMPLING DEVICE

	EKMAN					BOX SAMPLE				
Date	A2	A3	A4	A5	Mean	A2	A3	A4	A5	Mean
01-29-75	[a]4630.5	3836.7	4025.7	-[b]	4155.3	35759.4	17307.9	29214.4	-	27427.2
04-01-75	3502.8	5581.8	2261.7	-	3782.1	6112.4	2323.6	5675.8	-	4703.9
08-05_75	505.1	1480.5	5142.6	762.3	1972.6	-[c]	6327.6	13072.1	2312.4	7237.4

[a]Numerical values represent organisms per meter squared.

[b]Sampling location A5 was sampled during summer survey only.

[c]Unable to take Box Sample at A2 due to low water.

TABLE 2.0-6

SCIENTIFIC AND COMMON NAMES, NUMBERS, AND SIZE RANGES (TOTAL LENGTH IN MM) OF FISHES COLLECTED IN SQUAW CREEK DURING THE CONSTRUCTION MONITORING PROGRAM

Family Scientific Name Common Name	Winter 1975	Spring 1975	Summer 1975	Total All Surveys	Percent of Total Catch
Cyprinidae (Minnows)					
Campostoma anomalum Stoneroller	1 (62)[a]	2 (14, 15)	179 (34-95)	182	12.4
Notropis venustus Blacktailed shiner	8 (38-73)	8 (61-97)	116 (21-83)	132	9.0
Notropis sp. Unidentified shiner	3 (26-36)	-	-	3	0.2
Pimephales vigilax Bullhead minnow	-	1 (75)	-	1	0.1
Catostomidae (Suckers)					
Carpiodes carpio River carpsucker	-	-	1 (80)	1	0.1
Moxostoma congestum Gray redhorse	-	1 (461)	-	1	0.1
Ictaluridae (Catfishes)					
Ictalurus melas Black bullhead	-	4 (114-166)	1 (186)	5	0.3
Ictalurus natalis Yellow bullhead	1 (78)	11 (65-245)	3 (60-210)	15	1.0
Ictalurus punctatus Channel catfish	-	2 (115,132)	1 (242)	3	0.2
Cyninodontidae (Killifishes)					
Fundulus notatus Blackstripe topminnow	13 (41-68)	7 (45-68)	6 (29-52)	26	1.8
Poeciliidae (Livebearers)					
Gambusia affinis Mosquitofish	296 (11-49)	275 (23-44)	117 (15-50)	688	46.7
Centrarchidae (Sunfishes)					
Lepomis cyanellus Green sunfish	28 (35-201)	54 (45-190)	28 (40-211)	110	7.5
Lepomis humilis Orangespotted sunfish	-	17 (31-95)	-	17	1.1
Lepomis macrochirus Bluegill	15 (23-124)	24 (32-176)	11 (29-48)	50	3.4
Lepomis megalotis Longear sunfish	63 (32-149)	47 (30-153)	67 (31-118)	177	12.0
Lepomis sp. Unidentified sunfish	1 (19)	-	3 (17-21)	4	0.3
Micropterus punctulatus Spotted Bass	4 (158-203)	9 (84-343)	31 (56-106)	44	3.0
Micropterus salmoides Largemouth bass	1 (173)	-	2 (111,138)	3	0.2
Pomoxis annularis White crappie	-	1 (211)	-	1	0.1
Percidae (Darters)					
Etheostoma spectabile Orangethroat darter	3 (50-59)	1 (53)	6 (27-41)	10	0.7
TOTAL ALL SPECIES	437	464	572	1,473	

[a]All length data available are included in parentheses.

TABLE 2.0-7

SEASONAL BIRD SPECIES DIVERSITY[a] EXHIBITED ON SAMPLING LOCATIONS

Sampling Locations	Spring				Summer			
	H'	H_{max}	J	S	H'	H_{max}	J	S
Sampling Location 1	2.06	2.20	(0.94)	9	1.29	1.61	(0.80)	5
Sampling Location 2	2.24	2.64	(0.85)	14	2.03	2.20	(0.92)	9
Sampling Location 3	2.45	2.83	(0.87)	17	2.06	2.40	(0.86)	11

[a] H' = Species Diversity

H_{max} = Maximum Diversity

J = Equitability

S = Number of Species in Sample

TABLE 2.0-8

BIRDS OBSERVED ON THE CPSES SITE
DURING THE SPRING AND SUMMER, 1975, AVIFAUNA SURVEYS

Family Scientific Name[a] Common Name	Habitat[b] Type	Abundance[c] Spring	 Summer	Status[d]
Ardeidae				
Butorides virescens				
Green heron	S	c	u	SR
Cathartidae				
Cathartes aura				
Turkey vulture	A	c	c	R,B
Accipitridae				
Buteo jamaicensis				
Red-tailed hawk	A	u	-	R,B
Buteo lineatus				
Red-shouldered hawk	R	u	-	R,B
Phasianidae				
Colinus virginianus				
Bobwhite	A	c	c	R,B
Charadriidae				
Charadrius vociferus				
Killdeer	C	c	c	R,B
Scolopacidae				
Actitis macularia				
Spotted sandpiper	S	u	-	R,B
Columbidae				
Zenaida macroura				
Mourning dove	A	c	c	R,B
Cuculidae				
Coccyzus americanus				
Yellow-billed cuckoo	J,R	c	c	S,B
Geococcyx californianus[e,f]				
Roadrunner	C	c	u	R,B
Caprimulgidae				
Chordeiles minor				
Common nighthawk	A	a	c	S,B

TABLE 2.0-8 (Cont'd)

Family Scientific Name[a] Common Name	Habitat[b] Type	Abundance[c] Spring	 Summer	Status[d]
Troglodytidae				
Salpinctes obsoletus				
Rock wren	J	u	–	R,B
Mimidae				
Mimus polyglottos				
Mockingbird	A	c	c	R,B
Sylviidae				
Polioptila caerulea				
Blue-gray gnatcatcher	R	u	–	T
Laniidae				
Lanius ludovicianus				
Loggerhead shrike	A	c	c	R,B
Sturnidae				
Sturnus vulgaris				
Starline	C	u	–	R,B
Vireonidae				
Vireo griseus				
White-eyed vireo	R	c	–	S,B
Parulidae				
Vermivora ruficapilla				
Nashville warbler	J	u	–	T
Icteria virens				
Yellow-breasted chat	R	u	–	T,B
Ploceidae				
Passer domesticus				
House sparrow	C	c	c	R,B
Icteridae				
Sturnella magna				
Eastern meadowlark	G	c	c	R,B
Cassidix mexicanus				
Great-tailed grackle	R	c	–	R,B
Quiscalus quiscula				
Common grackle	C	u	–	R,B
Molothrus ater				
Brown-headed cowbird	A	c	c	R,B

TABLE 2.0-8 (Cont'd)

Family Scientific Name[a] Common Name	Habitat[b] Type	Abundance[c] Spring	 Summer	Status[d]
Apodidae				
Chaetura pelagica				
Chimney swift	A	c	-	S,B
Trochilidae				
Archilochus colubris				
Ruby-throated hummingbird	J	u	-	T
Alcedinidae				
Megaceryle alcyon				
Belted kingfisher	S	u	u	R,B
Picidae				
Dendrocopos villosus				
Hairy woodpecker	J	u	-	R,B
Dendrocopos scalaris				
Ladder-backed woodpecker	J	-	u	R,B
Tyrannidae				
Tyrannus tyrannus				
Eastern kingbird	B	c	-	S,B
Muscivora forficata				
Scissor-tailed flycatcher	A	c	c	SR,B
Myiarchus crinitus				
Great crested flycatcher	J	u	-	S,B
Hirundinidae				
Stelgidopteryx ruficollis				
Rough-winged swallow	A	c	c	S,B
Hirundo rustica				
Barn swallow	A	c	-	T
Corvidae				
Cyanocitta cristata				
Blue jay	R	c	-	R,B
Corvus brachyrhynchos				
Common crow	R	u	u	R,B
Paridae				
Parus carolinensis				
Carolina chickadee	R	c	c	R,B
Parus bicolor				
Tufted titmouse	R	c	-	R,B
Psaltriparus minimus				
Bushtit	J	c	-	R,B

TABLE 2.0-8 (Cont'd)

Family Scientific Name[a] Common Name	Habitat[b] Type	Abundance[c] Spring	 Summer	Status[d]
Fringillidae				
Cardinal	A	c	c	R,B
Painted bunting	R,J	c	c	S,B
Savannah sparrow	B	c	-	W
Lark sparrow	A	c	c	R,B
Clay-colored sparrow	G	u	-	T
Field sparrow	G,J	-	c	S,B
Song sparrow	B	c	c	W

[a]Nomenclature follows A.O.U. Checklist.

[b]Habitat Type - J = Juniper woodlands
G = Grasslands
R = Riparian
C = Construction areas
S = Squaw Creek
A = All habitat types

[c]Relative Abundance - u = uncommon; less than 5 individuals per day observed.
c = common; 5-100 individuals per day observed.
a = abundant; more than 100 individuals per day observed.

[d]Status from Peterson, 1963.
R = Resident
B = Breeding
T = Transient
S = Summer
W = Winter

TABLE 4.1-1

PHYSICAL AND CHEMICAL PARAMETERS - ENVIRONMENTAL MONITORING - CONSTRUCTION PHASE

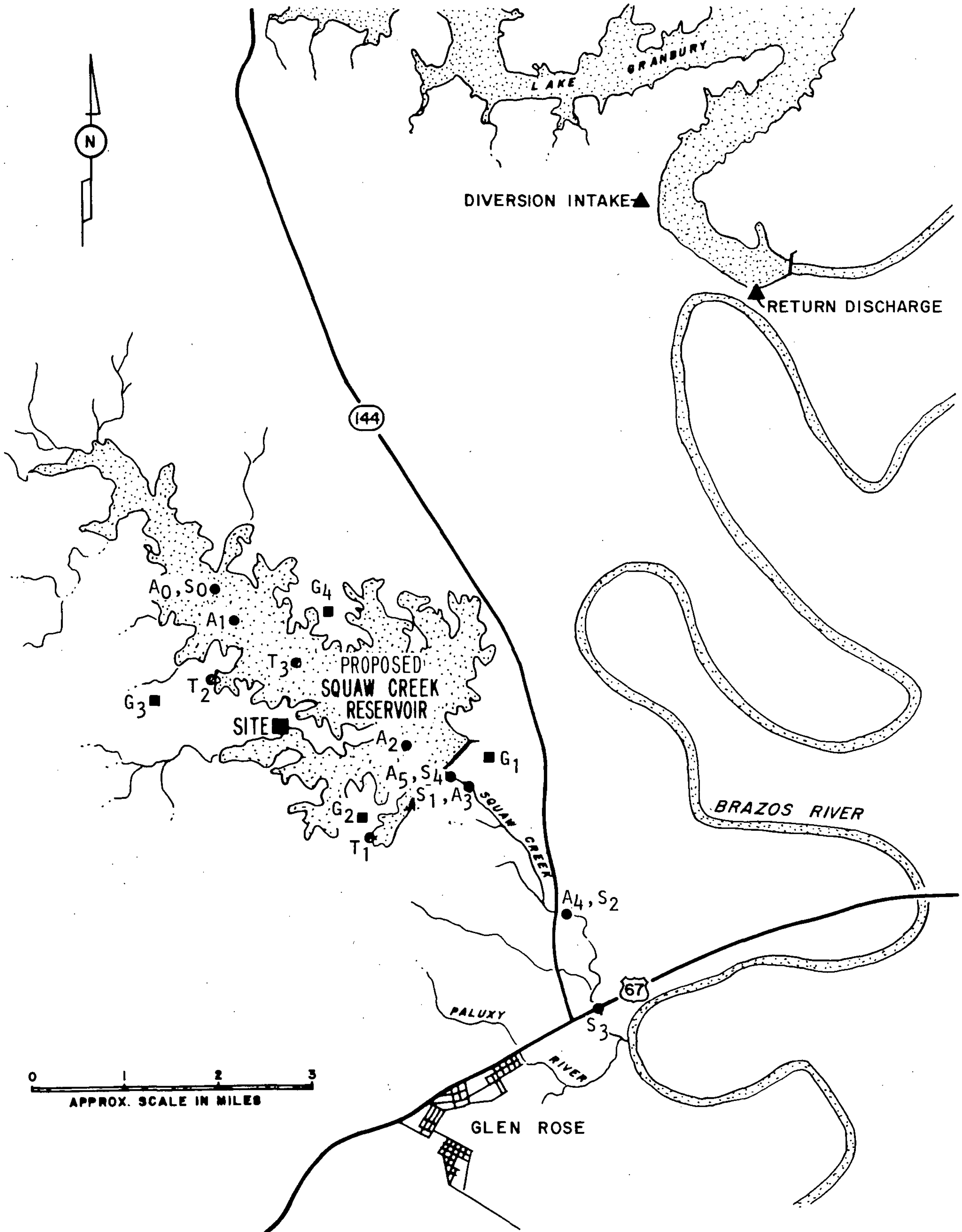
TYPE OF ANALYSES	PARAMETER	FREQUENCY OF MEASUREMENT	METHOD OF MEASUREMENT	ACCURACY OR LIMITS OF DETECTION
Water Quality (Squaw Creek)				
Physical	Temperature	Monthly	YSI 51 A	± 0.25° C
	Specific Conductance	Monthly	Hach DR/2	± 25 µmhos/cm
	Turbidity	Monthly	Hach DR/2	± 10 FTU
Chemical	Alkalinity	Monthly	Hach DR/2	± 3 mg/l
	Dissolved Oxygen	Monthly	YSI 51 A	± 0.1 ppm
	pH	Monthly	L&N 7417	± 0.1 pH unit
	Total Solids	Quarterly	Evaporation and Filtration	Standard Methods[a]
	Suspended	Quarterly	Evaporation and Filtration	Standard Methods
	Dissolved	Quarterly	Evaporation and Filtration	Standard Methods
	Potassium	Quarterly	Standard Methods	Standard Methods
	Fluoride	Quarterly	Standard Methods	Standard Methods
	Nitrogen	Quarterly	Standard Methods	Standard Methods
	Kjeldahl (Total)	Quarterly	Standard Methods	Standard Methods
	Ammonia	Quarterly	Standard Methods	Standard Methods
	Nitrate	Quarterly	Standard Methods	Standard Methods
	Nitrite	Quarterly	Standard Methods	Standard Methods
	Total Phosphate	Quarterly	Standard Methods	Standard Methods
	Orthophosphate	Quarterly	Standard Methods	Standard Methods
	Iron	Quarterly	Standard Methods	Standard Methods
	Sodium	Quarterly	Standard Methods	Standard Methods
	Chloride	Quarterly	Standard Methods	Standard Methods
	Sulfide	Quarterly	Standard Methods	Standard Methods
	Silica	Quarterly	Standard Methods	Standard Methods
	Manganese	Quarterly	Standard Methods	Standard Methods
	BOD	Quarterly	Standard Methods	Standard Methods
	COD	Quarterly	Standard Methods	Standard Methods
Trace Elements	Arsenic	Summers 1975, 1977, then every 6 months from 1978 through 1981	Atomic Absorption	± 0.1 ppm
	Chromium		Atomic Absorption	± 0.08 ppm
	Copper		Atomic Absorption	± 0.1 ppm
	Mercury		Atomic Absorption	± 0.1 ppm
	Zinc		Atomic Absorption	± 0.02 ppm
	Cadmium		Atomic Absorption	± 0.1 ppm
	Cobalt		Atomic Absorption	± 0.5 ppm
	Lead		Atomic Absorption	± 0.05 ppm
	Molybdenum		Atomic Absorption	± 0.05 ppm

TABLE 4.1-1 (Continued)

PHYSICAL AND CHEMICAL PARAMETERS - ENVIRONMENTAL MONITORING - CONSTRUCTION PHASE

TYPE OF ANALYSES	PARAMETER	FREQUENCY OF MEASUREMENT	METHOD OF MEASUREMENT	ACCURACY OR LIMITS OF DETECTION
Groundwater				
Physical	Water Level	Monthly	Electrical Contact	-
	Temperature	Monthly	YSI 51 A	± 0.25° C
	Conductivity	Monthly	Hach DR/2	± 25 μmhos/cm
Chemical	Silica	Quarterly	Standard Methods	Standard Methods
	Dissolved Calcium	Quarterly	Standard Methods	Standard Methods
	Dissolved Magnesium	Quarterly	Standard Methods	Standard Methods
	Sodium	Quarterly	Standard Methods	Standard Methods
	Potassium	Quarterly	Standard Methods	Standard Methods
	Carbonate	Quarterly	Standard Methods	Standard Methods
	Sulfate	Quarterly	Standard Methods	Standard Methods
	Chloride	Quarterly	Standard Methods	Standard Methods
	Dissolved Fluoride	Quarterly	Standard Methods	Standard Methods
	Nitrate	Quarterly	Standard Methods	Standard Methods
	Phosphate	Quarterly	Standard Methods	Standard Methods
	TDS	Quarterly	Evaporation and Filtration	Standard Methods
	Hardness	Quarterly	Standard Methods	Standard Methods
	Calcium	Quarterly	Standard Methods	Standard Methods
	Magnesium	Quarterly	Standard Methods	Standard Methods
	Non-Carbonate Hardness	Quarterly	Standard Methods	Standard Methods
	pH	Quarterly	L&N 7417	± 0.1 pH unit

[a] American Public Health Association, 1971



NOTE:

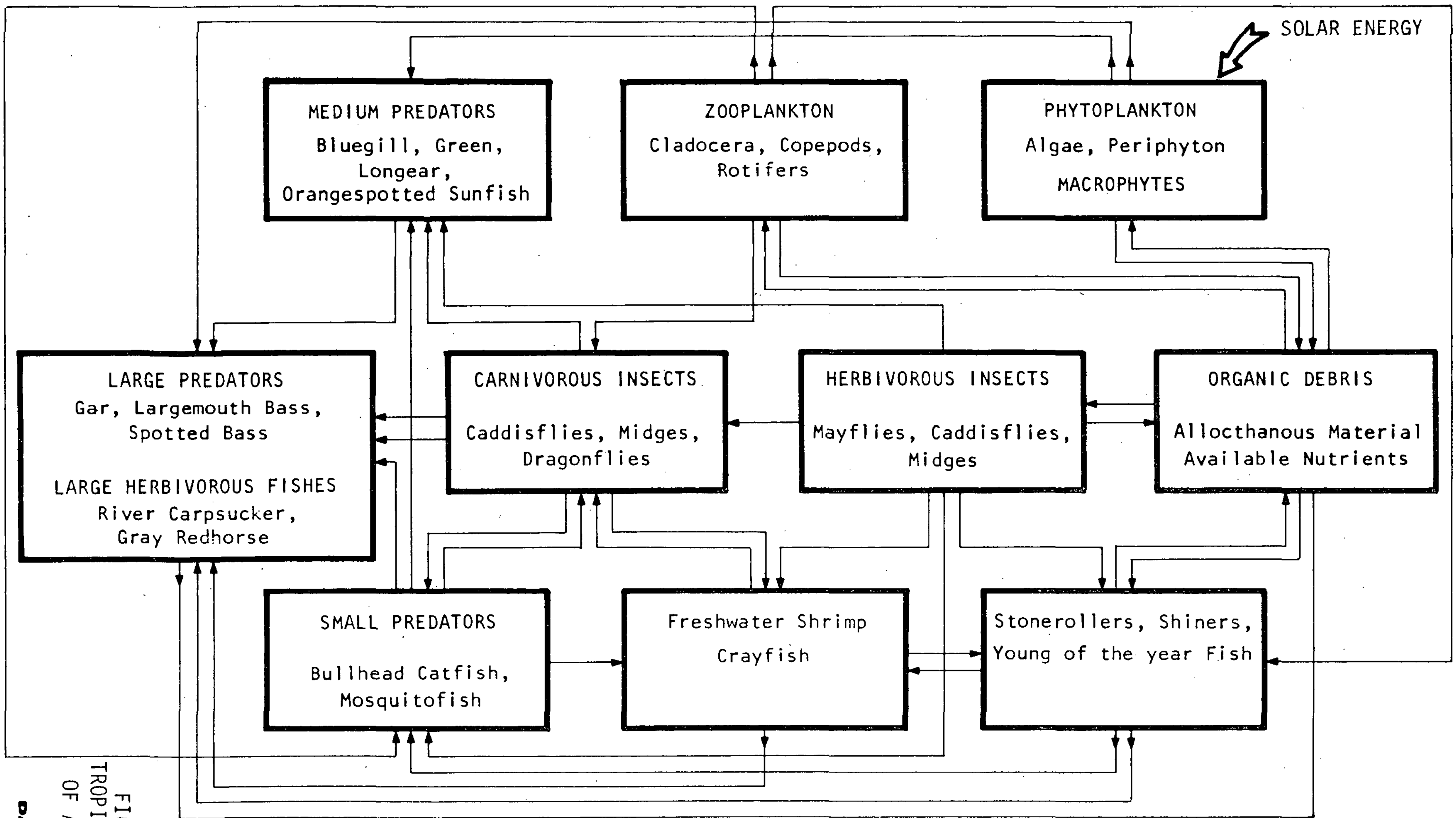
A - AQUATIC SAMPLING LOCATIONS
S - WATER QUALITY SAMPLING LOCATIONS
G - GROUND WATER SAMPLING LOCATION
T - TERRESTRIAL SAMPLING LOCATIONS

COMANCHE PEAK S.E.S.
NUCLEAR PLANT
UNITS 1 and 2

SQUAW CREEK SAMPLING LOCATIONS

FIGURE 1.2-1

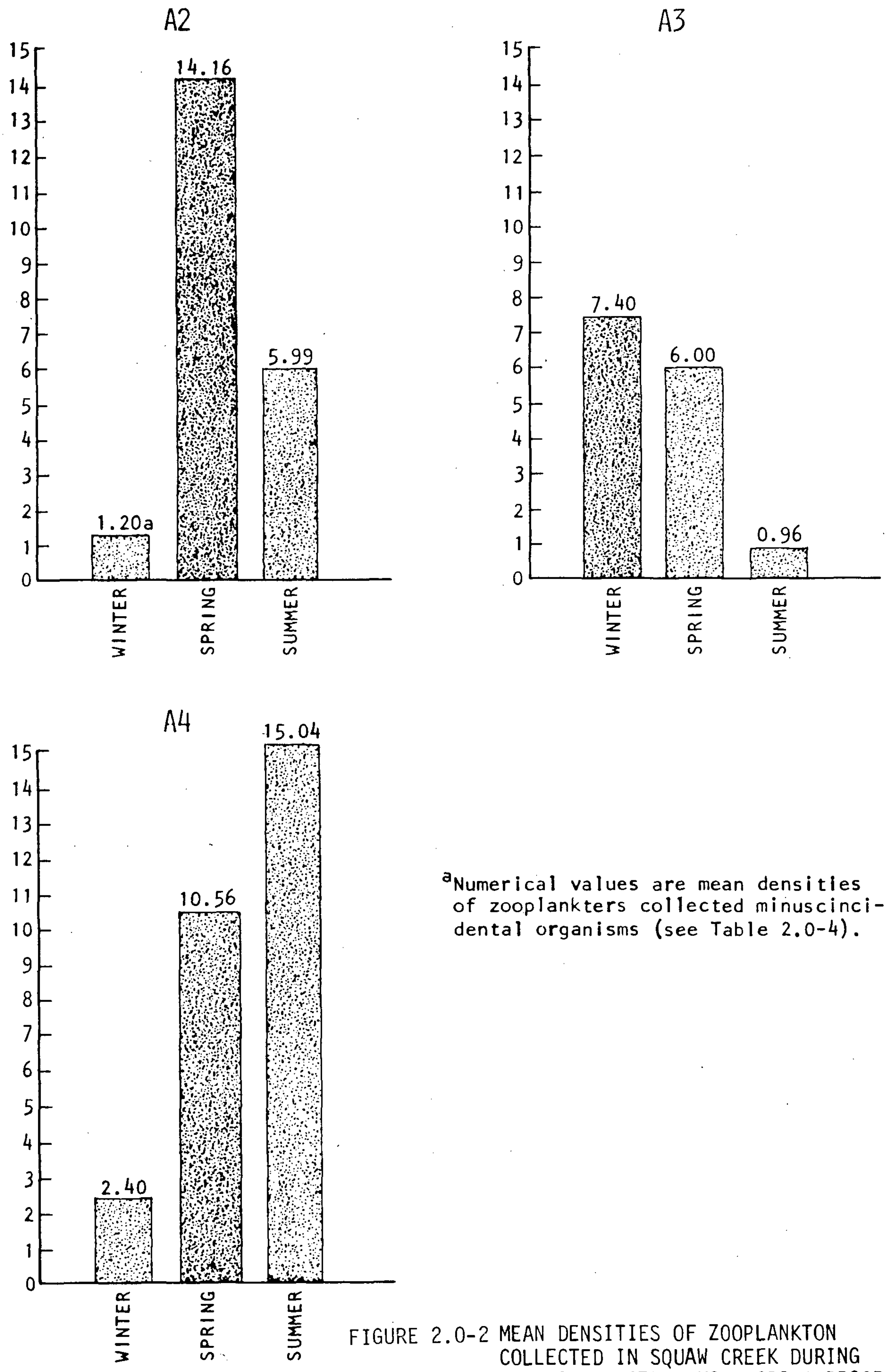
4486-022



Note: Energy flow in direction of arrows.

FIGURE 2.0-1
TROPIC RELATIONSHIPS
OF AQUATIC BIOTA

DAMES & MOORE



[a]Numerical values are mean densities of zooplankters collected minuscincidental organisms (see Table 2.0-4).

FIGURE 2.0-2 MEAN DENSITIES OF ZOOPLANKTON COLLECTED IN SQUAW CREEK DURING THE CONSTRUCTION MONITORING PROGRAM

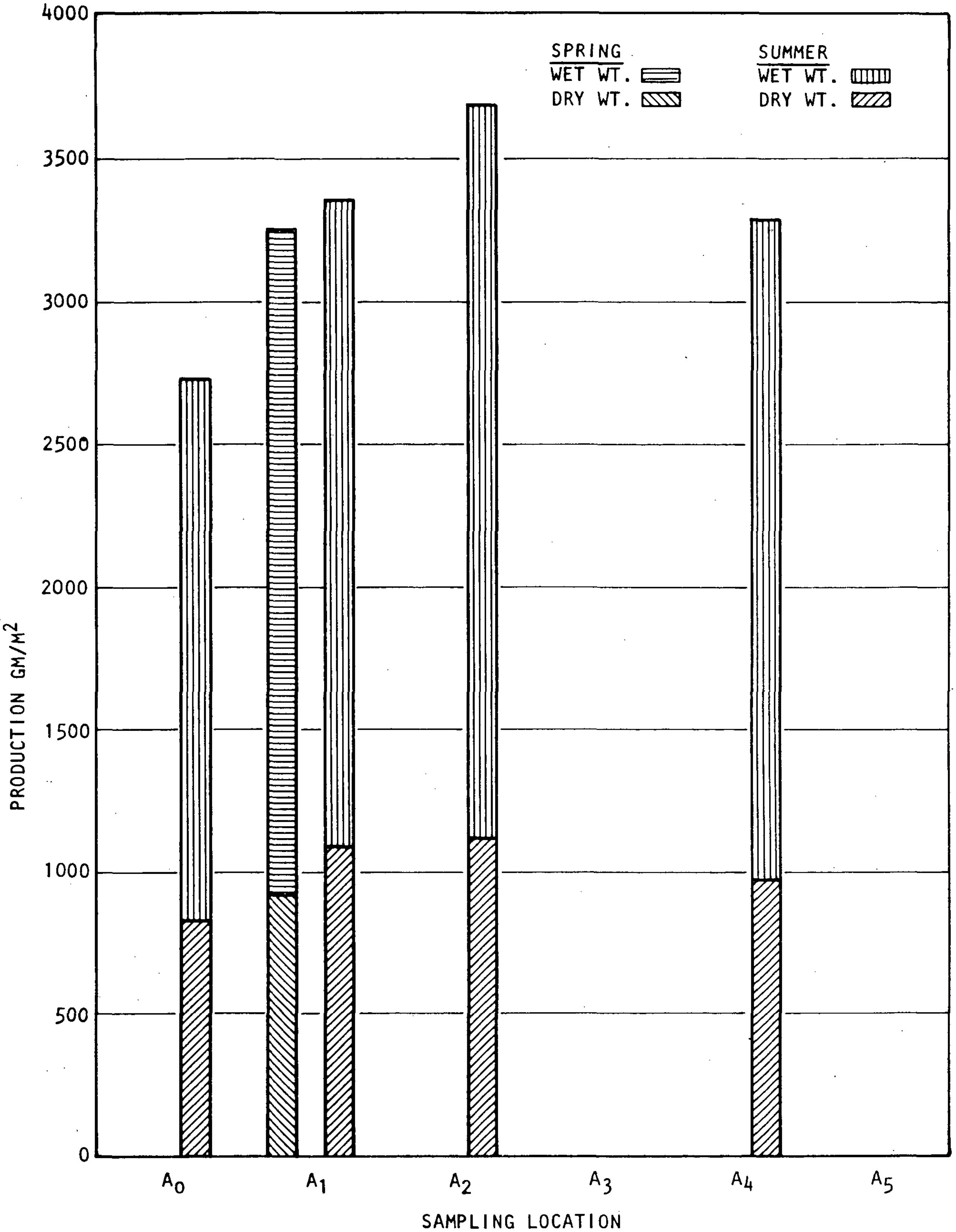


FIGURE 2.0-3 COMPARISON OF AQUATIC MACROPHYTE WET-DRY PRODUCTION BETWEEN SPRING AND SUMMER BY SAMPLING LOCATION

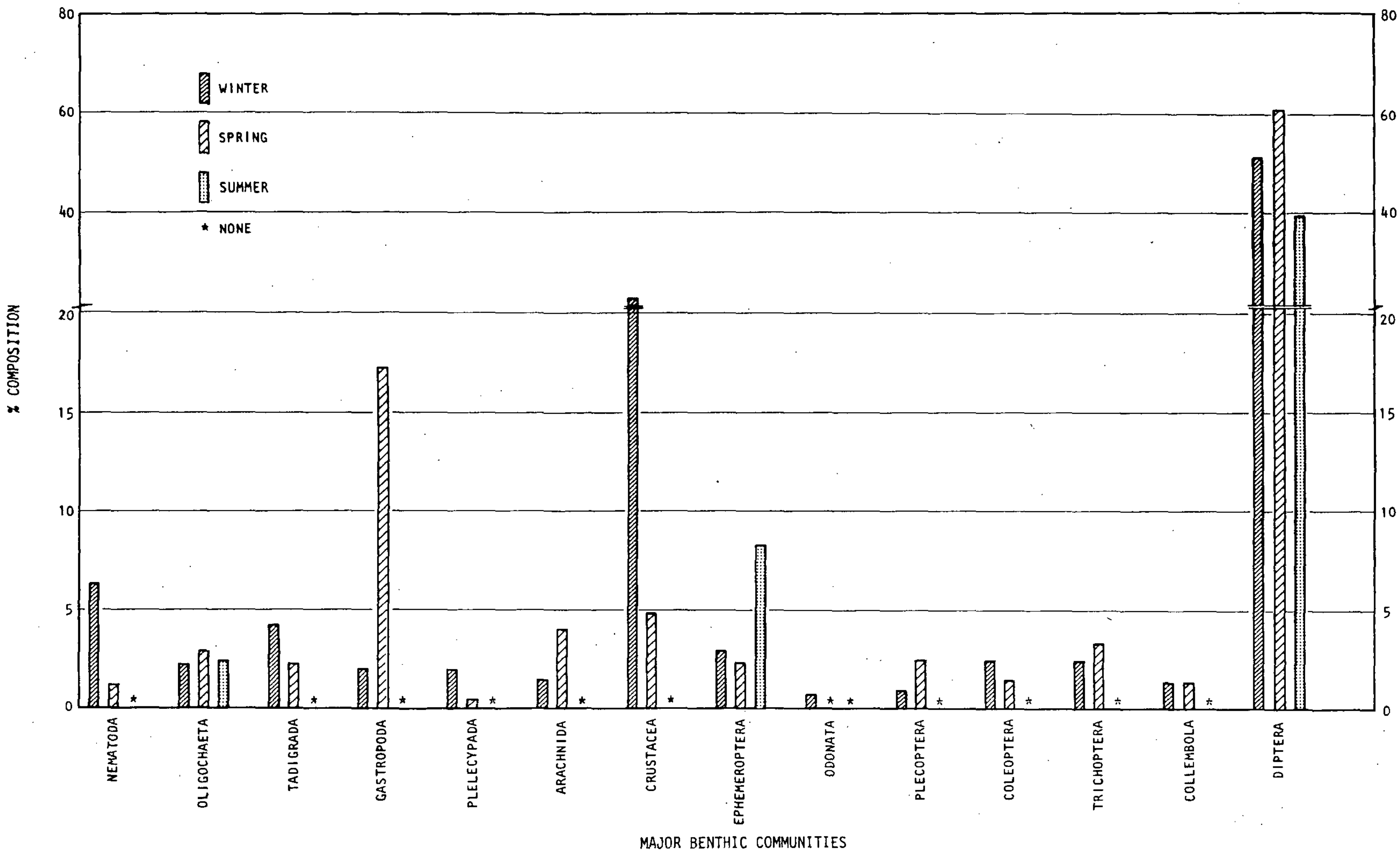


Figure 2.0-4 SEASONAL PERCENTAGE OF VARIOUS COMPONENTS OF BENTHIC COMMUNITY AT SAMPLING LOCATION A2

DAMES & MOORE

466.12 (4-64)

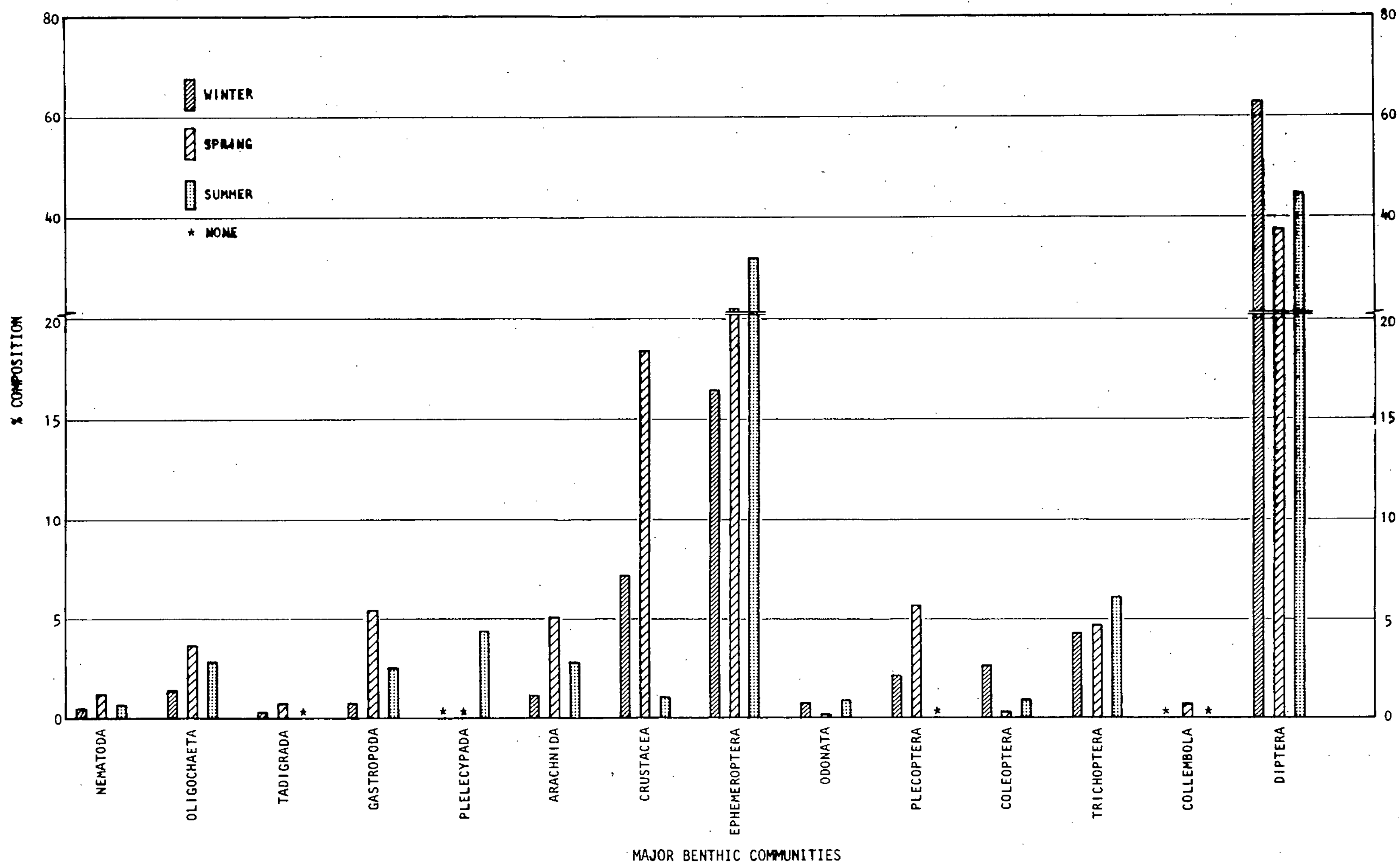


Figure 2.0-5 SEASONAL PERCENTAGE OF VARIOUS COMPONENTS OF BENTHIC COMMUNITY AT SAMPLING LOCATION A3

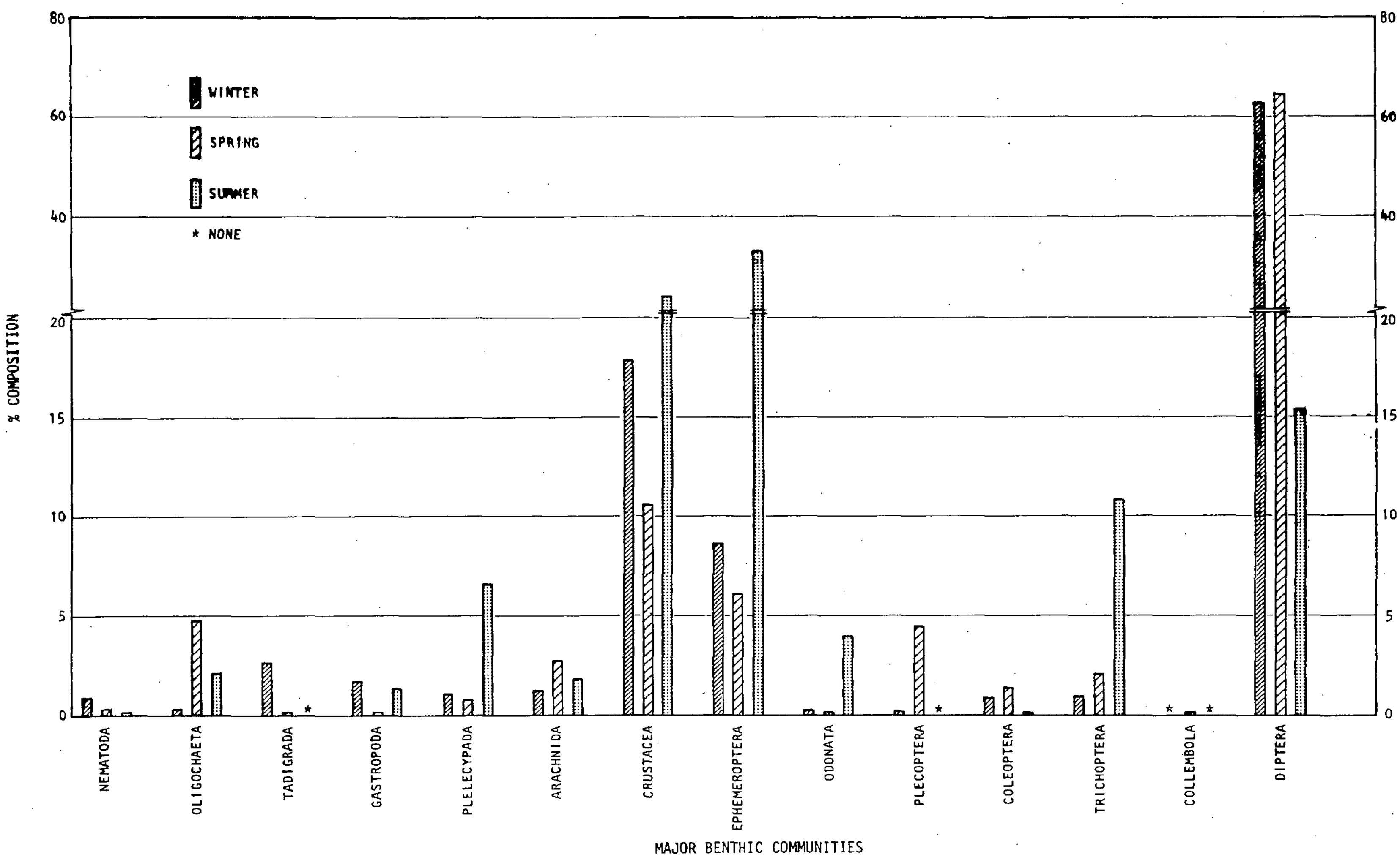


Figure 2.0-6 SEASONAL PERCENTAGE OF VARIOUS COMPONENTS OF BENTHIC COMMUNITY AT SAMPLING LOCATION A4

DAMES & MOORE

SPRING	AREA	1	2	3
	1	--		
	2	43	--	
	3	54	58	--

SUMMER	AREA	1	2	3
	1	--		
	2	43	--	
	3	13	60	--

FIGURE 2.2-1 Sørensen's Coefficient of Similarity for Birds Between Sampling Areas (In Percent) on CPSES Site

TABLE A-1

IN SITU PHYSICAL AND CHEMICAL WATER QUALITY DATA
COLLECTED FROM SQUAW CREEK NEAR GLEN ROSE, TEXAS
WINTER, 1975 CONSTRUCTION PHASE MONITORING PROGRAM

Sampling Location	A_1	A_2	A_3	A_4
01-28-75 (Day) Time of Reading	0715	1105	1415	1700
Dissolved Oxygen (ppm)	10.20	12.60	9.60	11.40
Specific Conductance (μmhos)	460	440	420	465
Temperature (°C)	12.40	12.40	14.00	16.00
pH	7.70	7.90	7.70	7.80
Transparency (depth in cm)	Visible to bottom	Visible to bottom	18.00	Visible to bottom
Turbidity (Formazin Turbidity Units)	0.65	0.53	18.00	0.60
01-28-75 (Night) Time of Reading	2150	2240	2330	2040
Dissolved Oxygen (ppm)	11.20	8.40	8.40	9.00
Specific Conductance (μmhos)	495	450	490	470
Temperature (°C)	14.90	17.00	15.00	16.00
pH	No Readings Taken			
Transparency (depth in cm)	No Readings Taken			
Turbidity (Formazin Turbidity Units)	No Readings Taken			
01-29-75 (Day) Time of Reading	0710	0740	0905	1005
Dissolved Oxygen (ppm)	9.60	6.50	8.20	9.60
Specific Conductance (μmhos)	550	490	510	510
Temperature (°C)	13.50	14.00	14.50	15.70
pH	7.90	7.90	7.70	7.70
Transparency (depth in cm)	Visible to bottom	Visible to bottom	23.00	Visible to bottom
Turbidity (Formazin Turbidity Units)	0.51	0.90	7.50	0.60

Precipitation in site area 96 hours prior to and during sampling period(1)

Date	Amount of Rainfall in Inches
January 23	0.00
January 24	0.04
January 25	0.00
January 26	0.00
January 27	0.00
January 28	0.00
January 29	Trace
January 30	0.08

(1) Adapted from "The Glen Rose Reporter".

TABLE A-2

IN SITU PHYSICAL AND CHEMICAL WATER QUALITY DATA
COLLECTED FROM SQUAW CREEK NEAR GLEN ROSE, TEXAS
SPRING, 1975 CONSTRUCTION PHASE MONITORING PROGRAM

Sampling Location	A_0	A_1	A_2	A_3	A_4
04-01-75 (Day) Time of Reading (CDST)	1435	1440	1515	1630	1715
Dissolved Oxygen (ppm)	7.9	11.0	11.8	10.9	9.3
Specific Conductance (μmhos)(cm)	650	650	600	525	590
Temperature (°C)	20.2	21.0	24.0	19.0	22.8
pH	7.3	7.7	7.9	7.6	7.5
Transparency (depth in cm)	Visible to Bottom	Visible to Bottom	Visible to Bottom	Visible to Bottom	Visible to Bottom
Turbidity (Formazin Turbidity Units)	0.78	0.62	0.84	1.70	1.00
04-01-75 (Night) Time of Reading (CDST)	2055	2215	2340	0045	0155
Dissolved Oxygen (ppm)	6.7	8.8	6.4	7.0	9.2
Specific Conductance (μmhos)(cm)	675	600	520	550	500
Temperature (°C)	17.0	17.0	16.8	17.2	16.5
pH	7.5	7.6	7.6	7.7	7.8
Transparency (depth in cm)	No Readings Taken				
Turbidity (Formazin Turbidity Units)	No Readings Taken				
04-02-75 (Day) Time of Reading (CDST)	0850	1015	1140	1345	1515
Dissolved Oxygen (ppm)	6.8	11.0	11.4	9.9	9.7
Specific Conductance (μmhos)(cm)	600	575	500	475	485
Temperature (°C)	13.5	13.8	13.0	15.5	16.4
pH	7.8	7.5	7.9	7.4	7.5
Transparency (depth in cm)	Visible to Bottom	Visible to Bottom	Visible to Bottom	Visible to Bottom	Visible to Bottom
Turbidity (Formazin Turbidity Units)	0.76	0.85	0.65	2.20	1.40
04-14-75 (Day) Time of Reading (CDST)	0810	1005	1222	1422	1545
Dissolved Oxygen (ppm)	7.1	10.4	11.8	9.0	8.5
Specific Conductance (μmhos)(cm)	590	700	700	455	640
Temperature (°C)	19.5	19.8	20.2	20.6	22.8
pH	7.7	7.9	7.9	7.7	7.7
Transparency (depth in cm)	Visible to Bottom	Visible to Bottom	Visible to Bottom	Visible to Bottom	Visible to Bottom
Turbidity (Formazin Turbidity Units)	No Readings Taken				

TABLE A-2 (Cont'd)

PRECIPITATION IN SITE AREA 96 HOURS PRIOR TO AND DURING SAMPLING PERIOD[a]

Date	Amount of Rainfall in Inches
March 28	0.03
March 29	0.11
March 30	0.00
March 31	0.00
April 1	0.00
April 2	0.00
April 7	1.93
April 10	0.03
April 11	0.00
April 12	0.00
April 13	0.10
April 14	0.01

[a]Adapted from National Weather Service data - "Glen Rose Reporter".

TABLE A-3

IN-SITU PHYSICAL AND CHEMICAL WATER QUALITY DATA
COLLECTED FROM SQUAW CREEK NEAR GLEN ROSE, TEXAS
SUMMER, 1975 CONSTRUCTION PHASE MONITORING PROGRAM

Sampling Location	A_0	A_1	A_2	A_3	A_4	A_5
08-05-75 (Day)						
Time of Reading (CDST)	0630	0920	1215	1645	1835	1515
Dissolved Oxygen (ppm)	3.2	10.6	9.1	6.9	6.8	12.1
Specific Conductance (μmhos)(cm)	650	700	650	600	600	650
Temperature (°C)	24.5	24.0	27.9	31.0	31.0	34.0
pH	7.5	7.7	8.1	7.9	7.4	7.8
Transparency (depth in cm)	27	Visible to bottom	Visible to bottom	29	Visible to bottom	Visible to bottom
Turbidity (Formazin Turbidity Units)	1.4	0.7	0.9	1.3	0.4	0.4
08-05-75 (Night)						
Time of Reading (CDST)	2225	2255	2330	0012	0030	2355
Dissolved Oxygen (ppm)	6.3	6.1	3.6	5.8	5.8	7.8
Specific Conductance (μmhos)(cm)	700	550	400	500	610	600
Temperature (°C)	27.5	25.5	26.0	25.5	25.5	24.0
pH	7.3	7.7	7.5	7.6	7.5	7.6
Turbidity (Formazin Turbidity Units)	0.7	0.7	1.4	1.1	1.6	1.4

PRECIPITATION IN SITE AREA 96 HOURS PRIOR TO AND DURING SAMPLING PERIOD[1]

Date	Amount of Rainfall in Inches
August 1	.00
August 2	.04
August 3	.00
August 4	.00
August 5	.00
August 6	.00
August 7	.00
August 8	.00
August 9	.00

[1]Adapted from National Weather Service data - "Glen Rose Reporter."

TABLE A-4

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_2

Organism	Number Per ML Rep. A.	Rep. B	Mean	SD*	Percent
Chlorophyceae					
Ankistrodesmus sp.	114.94	65.68	90.31		20.00
Spirogyra sp.	0.00	32.84	16.42		3.64
Total Chlorophyceae	114.94	98.52	106.73		23.64
Bacillariophyceae					
Nitzschia sp.	180.62	147.78	164.20		36.36
Girdle View Diatoms	98.52	32.84	65.68		14.55
Navicula sp.	65.68	32.84	49.26		10.91
Cymbella spp.	16.42	16.42	16.42		3.64
Synedra sp.	0.00	32.84	16.42		3.64
Total Bacillariophyceae	361.25	262.73	311.99		69.09
Cyanophyceae					
Oscillatoria sp.	16.42	0.00	8.21		1.82
Total Cyanophyceae	16.42	0.00	8.21		1.82
Euglenophyceae					
Trachelomonas sp.	16.42	32.84	24.63		5.45
Total Euglenophyceae	16.42	32.84	24.63		5.45
TOTAL	509.03	394.09	451.56	81.28	100.00

*Not Applicable

TABLE A-5

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_3

Organism	Number Per ML Rep. A.	Rep. B	Mean	SD*	Percent
Chlorophyceae					
Spirogyra sp.	82.10	16.42	49.26		6.12
Ankistrodesmus sp.	16.42	49.26	32.84		4.08
Scenedesmus sp.	0.00	32.84	16.42		2.04
Microspora sp.	0.00	32.84	16.42		2.04
Total Chlorophyceae	98.52	131.36	114.94		14.29
Bacillariophyceae					
Nitzschia sp.	344.83	213.46	279.15		34.69
Synedra sp.	65.68	213.46	139.57		17.35
Cymbella spp.	32.84	131.36	82.10		10.20
Navicula sp.	49.26	49.26	49.26		6.12
Girdle View Diatoms	32.84	32.84	32.84		4.08
Fragilaria sp.	0.00	49.26	24.63		3.06
Melosira sp.	32.84	0.00	16.42		2.04
Centric Diatoms	32.84	0.00	16.42		2.04
Surirella sp.	16.42	16.42	16.42		2.04
Total Bacillariophyceae	607.55	706.08	656.81		81.63
Cyanophyceae					
Oscillatoria sp.	16.42	32.84	24.63		3.06
Anabaena sp.	0.00	16.42	8.21		1.02
Total Cyanophyceae	16.42	49.26	32.84		4.08
TOTAL	722.50	886.70	804.60	116.11	100.00

*Not Applicable

TABLE A-6

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_4

Organism	Number Per ML Rep. A.	Rep. B	Mean	SD*	Percent
Chlorophyceae					
Unidentified Green Coccoid	32.84	0.00	16.42		1.96
Scenedesmus sp.	0.00	16.42	8.21		.98
Ankistrodesmus sp.	0.00	16.42	8.21		.98
Microspora sp.	0.00	16.42	8.21		.98
Total Chlorophyceae	32.84	49.26	41.05		4.90
Bacillariophyceae					
Nitzschia sp.	295.57	164.20	229.89		27.45
Cymbella spp.	361.25	32.84	197.04		23.53
Girdle View Diatoms	49.26	114.94	82.10		9.80
Navicula sp.	98.52	49.26	73.89		8.82
Cocconeis sp.	65.68	49.26	57.47		6.86
Fragilaria sp.	98.52	0.00	49.26		5.88
Synedra sp.	32.84	16.42	24.63		2.94
Gomphonema sp.	32.84	16.42	24.63		2.94
Total Bacillariophyceae	1034.48	443.35	738.92		88.24
Cyanophyceae					
Anabaena sp.	65.68	16.42	41.05		4.90
Lyngbya sp.	0.00	16.42	8.21		.98
Total Cyanophyceae	65.68	32.84	49.26		5.88
Euglenophyceae					
Trachelomonas sp.	0.00	16.42	8.21		.98
Total Euglenophyceae	0.00	16.42	8.21		.98
TOTAL	1133.00	541.87	837.44	417.99	100.00

*Not Applicable

TABLE A-7

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_2

	Number of Organisms Per Liter			Standard*	Percent
Organism	Rep. A	Rep. B	Mean	Deviation	Composition
Bacillariophyceae					
Rhoicosphenia sp.	197,040	229,880	213,460	-	21.85
Navicula sp.	98,520	65,680	82,100	-	8.40
Nitzschia sp.	82,100	213,460	147,780	-	15.13
Synedra sp.	49,260	32,840	41,050	-	4.20
Girdle View Diatoms	377,660	180,620	279,140	-	28.57
Cymbella sp.	147,780	131,360	139,570	-	14.29
Fragillaria sp.	16,420	0	8,210	-	0.84
Cocconeis sp.	0	16,420	8,210	-	0.84
Total Bacillariophyceae	968,780	870,260	919,520	-	94.12
Chlorophyceae					
Ankistrodesmus sp.	16,420	16,420	16,420	-	1.68
Distyosphaerium sp.	16,420	0	8,210	-	0.84
Cosmarium sp.	0	16,420	8,210	-	0.84
Total Chlorophyceae	32,840	32,840	32,840	-	3.36
Cyanophyceae					
Oscillatoria sp.	16,420	16,420	16,420	-	1.68
Microcystis sp.	0	16,420	8,210	-	0.84
Total Cyanophyceae	16,420	32,840	24,630	-	2.52
Station Total	1,018,040	935,940	976,990	-	100.00

*Not Applicable

TABLE A-8

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_3

Organism	Number of Organisms Per Liter Rep. A	Rep. B	Mean	Standard* Deviation	Percent Composition
Bacillariophyceae					
Rhoicosphenia sp.	49,360	82,100	65,730	-	7.93
Navicula sp.	131,360	180,620	155,990	-	18.81
Nitzschia sp.	65,680	32,840	49,260	-	5.94
Synedra sp.	147,780	426,920	287,350	-	34.65
Girdle View Diatoms	114,940	98,520	106,730	-	12.87
Pinnularia sp.	0	16,420	8,210	-	0.99
Cymbella sp.	49,260	114,940	82,100	-	9.90
Cocconeis sp.	0	16,420	8,210	-	0.99
Total Bacillariophyceae	558,380	968,780	763,580	-	92.08
Chlorophyceae					
Spyrogyra sp.	0	82,100	41,050	-	4.95
Kerchneriella sp.	16,420	0	8,210	-	0.99
Total Chlorophyceae	16,420	82,100	49,260	-	5.94
Cyanophyceae					
Oscillatoria sp.	16,420	16,420	16,420	-	1.98
Total Cyanophyceae	16,420	16,420	16,420	-	1.98
Station Total	591,220	1,067,300	829,260	-	100.00

*Not Applicable

TABLE A-9

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_4

Organism	Number of Organisms Per Liter Rep. A	Rep. B	Mean	Standard* Deviation	Percent Composition
Bacillariophyceae					
Rhoicosphenia sp.	0	16,420	8,210	-	1.75
Navicula sp.	82,100	164,200	123,150	-	26.32
Nitzschia sp.	32,840	16,420	24,630	-	5.26
Melosira sp.	65,680	0	32,840	-	7.01
Synedra sp.	114,940	16,420	65,680	-	14.04
Girdle View Diatoms	49,260	49,260	49,260	-	10.53
Pinnularia sp.	16,420	0	8,210	-	1.75
Cymbella sp.	65,680	32,840	49,260	-	10.53
Diatoma sp.	0	16,420	8,210	-	1.75
Total Bacillariophyceae	426,920	311,980	369,450	-	78.95
Chlorophyceae					
Spirogyra sp.	49,260	65,680	57,470	-	12.28
Ankistrodesmus sp.	16,420	0	8,210	-	1.75
Total Chlorophyceae	65,680	65,680	65,680	-	14.03
Cyanophyceae					
Oscillatoria sp.	16,420	16,420	16,420	-	3.51
Microcystis sp.	32,840	0	16,420	-	3.51
Total Cyanophyceae	49,260	16,420	32,840	-	7.02
Station Total	541,860	394,080	467,970	-	100.00

*Not Applicable

TABLE A-10

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 08-05-75
SAMPLING LOCATION A_2

	Number of Organisms Per Liter			Standard*	Percent
Organism	Rep. A	Rep. B.	Mean	Deviation	Composition
Bacillariophyceae					
Cymbella sp.	21,232	0	10,616.0	-	5.15
Navicula sp.	145,970	31,860	88,915.0	-	43.17
Fragilaria sp.	7,962	531	4,246.5	-	2.06
Synedra sp.	128,719	26,019	77,369.0	-	37.56
Pinnularia sp.	1,327	0	663.5	-	0.32
Gyrosigma sp.	6,635	531	358.3	-	1.74
Girdle view diatoms	1,327	0	663.5	-	0.32
Total Bacillariophyceae	313,172	58,941	186,056.5	-	90.33
Chlorophyceae					
Oocystis sp.	1,327	531	929.0	-	0.45
Cosmarium sp.	1,327	2,654	1,990.5	-	0.97
Ankistrodesmus sp.	3,981	0	1,990.5	-	0.97
Scenedesmus sp.	2,654	0	1,327.0	-	0.64
Spirogyra sp.	1,327	0	663.5	-	0.32
Total Chlorophyceae	10,616	3,185	6,900.5	-	3.35
Cyanophyceae					
Oscillatoria sp.	9,289	531	4,910.0	-	2.38
Anabaena sp.	0	1,593	796.5	-	0.39
Merismopedium sp.	13,270	0	6,635.0	-	3.22
Spirulina sp.	1,327	0	663.5	-	0.32
Total Cyanophyceae	23,886	2,124	13,005.0	-	6.31
STATION TOTAL	347,674	64,250	205,962.0	-	100.00

*Not Applicable

TABLE A-11

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 08-05-75
SAMPLING LOCATION A_3

	Number of Organisms Per Liter			Standard*	Percent
Organism	Rep. A	Rep. B.	Mean	Deviation	Composition
Bacillariophyceae					
Cymbella sp.	21,232	5,308	13,270.0	-	1.81
Navicula sp.	360,944	305,210	333,077.0	-	45.51
Nitzschia sp.	0	3,981	1,990.5	-	0.27
Fragilaria sp.	5,308	13,270	9,289.0	-	1.27
Synedra sp.	403,408	265,400	334,404.0	-	45.69
Stephanodiscus sp.	0	1,327	663.5	-	0.09
Gomphonema sp.	0	1,327	663.5	-	0.09
Cocconeis sp.	0	1,327	663.5	-	0.09
Gyrosigma sp.	13,270	2,654	7,962.0	-	1.09
Total Bacillariophyceae	804,162	599,804	701,983.0	-	95.91
Chlorophyceae					
Cosmarium sp.	2,654	0	1,327.0	-	0.18
Total Chlorophyceae	2,654	0	1,327.0	-	0.18
Cyanophyceae					
Oscillatoria sp.	47,772	1,327	24,549.5	-	3.35
Merismopedium sp.	7,962	0	3,981.0	-	0.54
Total Cyanophyceae	55,734	1,327	28,530.5	-	3.89
STATION TOTAL	862,550	601,131	731,840.5	-	100.00

*Not Applicable

TABLE A-12

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 08-05-75
SAMPLING LOCATION A_4

Organism	Number of Organisms Per Liter Rep. A	Rep. B.	Mean	Standard* Deviation	Percent Composition
Bacillariophyceae					
Cymbella sp.	3,186	3,315	3,250.5	-	1.79
Navicula sp.	42,480	54,366	48,423.0	-	26.61
Nitzschia sp.	1,593	1,989	1,791.0	-	0.98
Fragilaria sp.	1,593	5,304	3,448.5	-	1.89
Synedra sp.	44,604	162,435	103,519.5	-	56.88
Stephanodiscus sp.	531	0	265.5	-	0.15
Gomphonema sp.	1,062	0	531.0	-	0.29
Cocconeis sp.	531	2,654	1,592.5	-	0.88
Gyrosigma sp.	9,558	4,641	7,099.5	-	3.90
Centric diatoms	2,654	3,315	2,984.5	-	1.64
Total Bacillariophyceae	107,792	238,019	172,905.5	-	95.01
Chlorophyceae					
Dictyosphaerium sp.	0	663	331.5	-	0.18
Oocystis sp.	531	0	265.5	-	0.15
Cosmarium sp.	1,062	1,327	1,194.5	-	0.66
Ankistrodesmus sp.	531	1,327	929.0	-	0.51
Tetraedron sp.	0	663	331.5	-	0.18
Euglena sp.	0	663	331.5	-	0.18
Pediastrum sp.	531	0	265.5	-	0.15
Scenedesmus sp.	1,062	0	531.0	-	0.29
Unidentified green filament	0	1,989	994.5	-	0.55
Total Chlorophyceae	3,717	6,632	5,174.5	-	2.85

TABLE A-12 (Cont'd)

Organism	Number of Organisms Per Liter Rep. A	Rep. B.	Mean	Standard* Deviation	Percent Composition
Cyanophyceae					
Oscillatoria sp.	3,186	4,641	3,913.5	-	2.15
Total Cyanophyceae	3,186	4,641	3,913.5	-	2.15
STATION TOTAL	114,695	249,292	181,993.5	-	100.00

*Not Applicable

TABLE A-13

PHYTOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 08-05-75
SAMPLING LOCATION A_5

Organism	Number of Organisms Per Liter Rep. A	Rep. B.	Mean	Standard* Deviation	Percent Composition
Bacillariophyceae					
Cymbella sp.	0	2,654	1,327.0	-	0.07
Navicula sp.	326,319	334,278	330,298.5	-	17.68
Nitzschia sp.	2,654	0	1,327.0	-	0.07
Fragilaria sp.	15,918	10,612	13,265.0	-	0.71
Synedra sp.	1,995,056	957,738	1,476,397.0	-	79.05
Stephanodiscus sp.	0	2,654	1,327.0	-	0.07
Pinnularia sp.	2,654	0	1,327.0	-	0.07
Gomphonema sp.	15,918	2,654	9,286.0	-	0.50
Cocconeis sp.	2,654	2,654	2,654.0	-	0.14
Gyrosigma sp.	5,306	5,306	5,306.0	-	0.28
Total Bacillariophyceae	2,366,479	1,318,550	1,842,514.5	-	98.64
Chlorophyceae					
Cosmarium sp.	5,306	0	2,653.0	-	0.14
Ankistrodesmus sp.	2,654	2,654	2,654.0	-	0.14
Scenedesmus sp.	2,654	2,654	2,654.0	-	0.14
Total Chlorophyceae	10,614	5,308	7,961.0	-	0.42
Cyanophyceae					
Oscillatoria sp.	10,612	2,654	6,633.0	-	0.35
Anabaena sp.	0	2,654	1,327.0	-	0.07
Merismopedium sp.	2,654	15,918	9,286.0	-	0.50
Total Cyanophyceae	13,266	21,226	17,246.0	-	0.92
STATION TOTAL	2,390,359	1,345,084	1,867,721.5	-	100.00

*Not Applicable

TABLE A-14

AQUATIC MACROPHYTES COLLECTED IN SQUAW CREEK DURING SPRING 1975 SURVEY

Kingdom Family Scientific Name[a] Common Name	Life Form[b]	Coverage[c]
Thallophyta		
Characeae		
Chara sp. Stonewort	Submergent	Sparse
Spermophyta		
Alismataceae		
Sagittaria sp.[d] L. Arrowhead	Emergent	Sparse
Gramineae		
Sphenopholis obtusata (Michx.) Scribn. Prairie wedge grass	Emergent	Sparse
Agrostis semiverticillata (Forsk.) Christ. Water bentgrass	Emergent	Sparse
Cyperaceae		
Eleocharis sp.[d] R. Br. Spikerush	Emergent	Sparse
Carex sp.[d] L. Sedge	Emergent	Common
Salicaceae		
Salix nigra Marsh Black willow	Emergent	Sparse
Haloragaceae		
Myriophyllum heterophyllum Michx. Water-milfoil	Submergent	Sparse
Acanthaceae		
Justica americana (L.) Vahl American water willow	Emergent	Sparse

[a]Nomenclature follows Correll and Johnston, 1970

[b]Life form classification follows Sculthorpe, 1967

[c]Coverage based on qualitative estimates and follow classification presented by APHA, 1971

[d]Flowering structures not available for identification to species

TABLE A-15

AQUATIC MACROPHYTES COLLECTED IN SQUAW CREEK

DURING SUMMER 1975 SURVEY

Kingdom Family Scientific Name[a] Common Name	Life Form[b]	Coverage[c]
Thallophyta		
Characeae		
Chara sp. Stonewort	Submergent	Common
Spermophyta		
Typhaceae		
Typha angustifolia L. Narrow-leaved Cattail	Emergent	Sparse
Cyperaceae		
Eleocharis sp.[d] R. Br. Spikerush	Emergent	Sparse
Carex sp.[d] L. Sedge	Emergent	Common
Fuirena squarrosa Michx. Umbrella-grass	Emergent	Sparse
Ceratophyllaceae		
Ceratophyllum demersum L. Common Hornwort	Submergent	Sparse

[a]Nomenclature follows Correll and Johnston, 1970.

[b]Life form classification follows Sculthorpe, 1967.

[c]Coverage based on qualitative estimates and follow classification presented by APHA, 1971.

[d]Flowering structures not available for identification to species.

TABLE A-16

WET-DRY PRODUCTION OF AQUATIC MACROPHYTES COLLECTED IN SQUAW CREEK

DURING SUMMER 1975 SURVEY

SAMPLING LOCATION	WET WT (g/m^2)	DRY WT (g/m^2)	WET-DRY WT (g/m^2)	MOISTURE (%)
A_0	2730	824	1906	231
A_1	3302	1081	2221	205
A_2	----	----	----	----
A_3	3686	1113	2573	231
A_4	3289	964	2325	241
A_5	----	----	----	----

TABLE A-17

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_2

Organism	Number of Organisms Per Liter Rep. A.	Rep. B	Mean	Standard Deviation*	Percent Composition
Rotatoria					
Notholca sp.	0.00	0.40	0.20		14.29
Total Rotatoria	0.00	0.40	0.20		14.29
Cladocera					
Bosmina sp.	0.80	0.40	0.60		42.86
Chydorus sp.	0.00	0.40	0.20		14.29
Alona sp.	0.00	0.40	0.20		14.29
Total Cladocera	0.80	1.20	1.00		71.43
Insecta					
Insecta	0.00	0.40	0.20		14.29
Total Insecta	0.00	0.40	0.20		14.29
TOTAL	0.80	2.00	1.40		100.00

*Not Applicable

TABLE A-18

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_3

Organism	Number of Organisms Per Liter Rep. A.	Rep. B	Mean	Standard Deviation*	Percent Composition
Oligochaeta					
Chaetogaster sp.	1.20	0.40	0.80		8.51
Total Oligochaeta	1.20	0.40	0.80		8.51
Rotatoria					
Notholca sp.	3.60	5.20	4.40		46.81
Vanoyella globusa	0.40	0.00	0.20		2.13
Trichotria sp.	0.00	0.40	0.20		2.13
Total Rotatoria	4.00	5.60	4.80		51.06
Cladocera					
Chydorus sp.	0.00	2.40	1.20		12.77
Alona sp.	0.00	0.40	0.20		2.13
Total Cladocera	0.00	2.80	1.40		14.89
Copepoda					
Nauplii	0.00	1.20	0.60		6.38
Cyclopoid copepodite	0.40	0.40	0.40		4.26
Eucyclops macrurus	0.40	0.00	0.20		2.13
Total Copepoda	0.80	1.60	1.20		12.77
Insecta					
Insecta	0.00	0.40	0.20		2.13
Diptera					
Chironomide Larvae	1.60	0.40	1.00		10.64
Total Insecta	1.60	0.80	1.20		12.77
TOTAL	7.60	11.20	9.40		100.00

*Not Applicable

TABLE A-19

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_4

Organism	Number of Organisms Per Liter Rep. A.	Rep. B	Mean	Standard Deviation*	Percent Composition
Oligochaeta					
Chaetogaster sp.	0.40	0.00	0.20		5.88
Total Oligochaeta	0.40	0.00	0.20		5.88
Rotatoria					
Monostyla bulla	0.40	0.00	0.20		5.88
Notholca sp.	0.00	0.40	0.20		5.88
Total Rotatoria	0.40	0.40	0.40		11.76
Cladocera					
Chydorus sp.	0.80	2.00	1.40		41.18
Alona sp.	0.40	0.00	0.20		5.88
Total Cladocera	1.20	2.00	1.60		47.06
Copepoda					
Cyclopoid copepodite	0.00	0.40	0.20		5.88
Nauplii	0.00	0.40	0.20		5.88
Total Copepoda	0.00	0.80	0.40		11.76
Diptera					
Chironomide Larvae	1.20	0.40	0.80		23.53
Total Diptera	1.20	0.40	0.80		23.53
TOTAL	3.20	3.60	3.40		100.00

*Not Applicable

TABLE A-20

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_2

Organism	Number of Organisms Per Liter Rep. A	Rep. B	Mean	Standard* Deviation	Percent Composition
Rotifera					
Lecanidae					
Monostyla bulla	0.48	0.48	0.48	-	3.03
Brachionidae					
Brachionus sp.	12.96	1.44	7.20	-	45.45
Total Rotifera	13.44	1.92	7.68	-	48.48
Copepoda					
Cyclopoida					
Cyclops sp.	0.0	0.48	0.24	-	1.52
Calanoida					
Diaptomus sp.	10.56	0.0	5.28	-	33.32
Nauplii	0.48	0.0	0.24	-	1.52
Total Copepoda	11.04	0.48	5.76	-	36.36
Ostracoda	1.44	0.0	0.72	-	4.55
Total Ostracoda	1.44	0.0	0.72	-	4.55
Diptera					
Chironomidae	2.40	0.96	1.68	-	10.61
Total Diptera	2.40	0.96	1.68	-	10.61
Station Total	28.32	3.36	15.84	-	100.00

*Not Applicable

TABLE A-21

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_3

Organism	Number of Organisms Per Liter Rep. A	Rep. B	Mean	Standard* Deviation	Percent Composition
Rotifera					
Brachionidae					
Notholea sp.	0.48	0.0	0.24	-	2.78
Brachionas sp.	2.40	1.92	2.16	-	25.00
Total Rotifera	2.88	1.92	2.40	-	27.78
Cladocera					
Chydoridae					
Alona monocantha	0.48	0.0	0.24	-	2.78
Chydorus sp.	0.48	0.0	0.24	-	2.78
Total Cladocera	0.96	0.0	0.48	-	5.56
Copepoda					
Cyclopoida					
Cyclops sp.	0.0	0.48	0.24	-	2.78
Calanoida					
Diaptomus sp.	2.40	0.0	1.20	-	13.89
Nauplii	0.48	0.48	0.48	-	5.56
Total Copepoda	2.88	0.96	1.92	-	22.22
Ostracoda	0.0	2.4	1.20	-	13.89
Total Ostracoda	0.0	2.4	1.20	-	13.89
Diptera					
Chironomidae	2.88	1.92	2.40	-	27.78
Total Diptera	2.88	1.92	2.40	-	27.78
Plecoptera	0.0	0.48	0.24	-	2.78
Total Plecoptera	0.0	0.48	0.24	-	2.78
Station Total	9.60	7.68	8.64	-	100.00

TABLE A-22

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_4

Organism	Number of Organisms Per Liter Rep. A	Rep. B	Mean	Standard* Deviation	Percent Composition
Oligochaeta					
Naididae					
Chaetogaster sp.	0.48	0.96	0.72	-	4.05
Total Oligochaeta	0.48	0.96	0.72	-	4.05
Rotifera					
Brachionidae					
Notholca sp.	0.48	0.0	0.24	-	1.35
Brachionus sp.	3.84	0.96	2.4	-	13.51
Total Rotifera	4.32	0.96	2.64	-	14.86
Cladocera					
Chydoridae					
Alona monocantha	0.0	3.36	1.68	-	9.46
Chydorus sp.	0.48	0.0	0.24	-	1.35
Bosminidae					
Bosmina sp.	0.48	0.48	0.48	-	2.71
Total Cladocera	0.96	3.84	2.40	-	13.52
Copepoda					
Cyclopoida					
Cyclops sp.	0.96	0.0	0.48	-	2.71
Nauplii	4.32	0.48	2.4	-	13.51
Total Copepoda	5.28	0.48	2.88	-	16.22
Ostracoda	0.0	5.28	2.64	-	14.86
Total Ostracoda	0.0	5.28	2.64	-	14.86
Diptera					
Chironomidae	7.68	4.32	6.00	-	33.78
Total Diptera	7.68	4.32	6.00	-	33.78
Plecoptera	0.48	0.0	0.24	-	1.35
Total Plecoptera	0.48	0.0	0.24	-	1.35
Arachnida					
Acarina	0.0	0.48	0.24	-	1.35
Total Arachnida	0.0	0.48	0.24	-	1.35
Station Total	19.20	16.32	17.76	-	100.00

*Not Applicable

TABLE A-23

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 08-05-75
SAMPLING LOCATION A_2

Organism	Number of Organisms Per Liter Rep. A	Rep. B.	Mean	Standard* Deviation	Percent Composition
Rotifera					
Lecanidae					
Lecane sp.	2.40	0.96	1.68	-	24.17
Total Rotifera	2.40	0.96	1.68	-	24.17
Cladocera					
Chydoridae					
Alona sp.	0.48	0.0	0.24	-	3.45
Daphnidae					
Simocephalus sp.	0.48	0.0	0.24	-	3.45
Total Cladocera	0.96	0.0	0.48	-	6.90
Copepoda					
Cyclopoida					
Copepodids	2.40	0.0	1.20	-	17.27
Cyclops sp.	0.96	0.0	0.48	-	6.90
Nauplii	4.29	0.0	2.15	-	30.94
Total Copepoda	7.65	0.0	3.83	-	55.11
Diptera					
Chironomidae	0.96	0.48	0.72	-	10.36
Total Diptera	0.96	0.48	0.72	-	10.36
Arachnida					
Acarina	0.0	0.48	0.24	-	3.45
Total Arachnida	0.0	0.48	0.24	-	3.45
STATION TOTAL	11.97	1.92	6.95	-	100.00

*Not Applicable

TABLE A-24

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 08-05-75
SAMPLING LOCATION A_3

Organism	Number of Organisms Per Liter Rep. A	Rep. B.	Mean	Standard* Deviation	Percent Composition
Rotifera					
Lecanidae					
Monostyla sp.	0.0	0.48	0.24	-	16.67
Total Rotifera	0.0	0.48	0.24	-	16.67
Cladocera					
Bosminidae					
Bosmina sp.	0.48	0.0	0.24	-	16.67
Total Cladocera	0.48	0.0	0.24	-	16.67
Copepoda					
Cyclopoida					
Cyclops sp.	0.48	0.0	0.24	-	16.67
Nauplii	0.0	0.48	0.24	-	16.67
Total Copepoda	0.48	0.48	0.48	-	33.34
Diptera					
Chironomidae	0.48	0.0	0.24	-	16.67
Total Diptera	0.48	0.0	0.24	-	16.67
Arachnida					
Acarina	0.0	0.48	0.24	-	16.67
Total Arachnida	0.0	0.48	0.24	-	16.67
STATION TOTAL	1.44	1.44	1.44	-	100.00

*Not Applicable

TABLE A-25

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 08-05-75
SAMPLING LOCATION A_4

Organism	Number of Organisms Per Liter			Standard*	Percent
	Rep. A	Rep. B.	Mean	Deviation	Composition
Rotifera					
Lecanidae					
Lecane sp.	0.0	0.48	0.24	-	0.96
Monostyla sp.	0.0	0.48	0.24	-	0.96
Total Rotifera	0.0	0.96	0.48	-	1.92
Cladocera					
Chydoridae					
Chyodorus sp.	0.0	1.43	0.72	-	2.88
Allonella sp.	0.48	0.0	0.24	-	0.96
Marothricidae					
Ilyocryptus spinifer	0.0	0.48	0.24	-	0.96
Daphnidae					
Simocephalus sp.	0.48	0.48	0.48	-	1.92
Total Cladocera	0.96	2.39	1.68	-	6.72
Copepoda					
Cyclopoida					
Copepodids	1.90	3.33	2.62	-	10.47
Cyclops sp.	0.48	1.43	0.96	-	3.83
Eucyclops agilis	0.48	0.48	0.48	-	1.92
Macrocyclops albidus	0.96	0.48	0.72	-	2.88
Microcyclops sp.	5.24	0.0	2.62	-	10.46
Cyclops venustoides	0.48	0.0	0.24	-	0.96
Nauplii	2.38	5.71	4.05	-	16.18
Total Copepoda	11.92	11.43	11.68	-	46.66

TABLE A-25 (Cont'd)

Organism	Number of Organisms Per Liter			Standard*	Percent
	Rep. A	Rep. B.	Mean	Deviation	Composition
Ostrocoda	1.43	0.96	1.20	-	4.79
Total Ostrocoda	1.43	0.96	1.20	-	4.79
Amphipoda					
Gammanidae	1.43	0.48	0.96	-	3.83
Total Amphipoda	1.43	0.48	0.96	-	3.83
Diptera					
Chironomidae	0.0	1.90	0.95	-	3.79
Total Diptera	0.0	1.90	0.95	-	3.79
Plecoptera	0.48	3.81	2.15	-	8.59
Total Plecoptera	0.48	3.81	2.15	-	8.59
Tricoptera	4.76	0.0	2.38	-	9.51
Total Tricoptera	4.76	0.0	2.38	-	9.51
Arachnida					
Acarina	0.48	0.48	0.48	-	1.92
Total Arachnida	0.48	0.48	0.48	-	1.92
Nematoda	3.33	2.86	3.10	-	12.39
Total Nematoda	3.33	2.86	3.10	-	12.39
STATION TOTAL	24.79	25.27	25.03	-	100.00

*Not Applicable

TABLE A-26

ZOOPLANKTON DATA
SITE: SQUAW CREEK
DATE: 08-05-75
SAMPLING LOCATION A_5

	Number of Organisms Per Liter			Standard*	Percent
Organism	Rep. A	Rep. B.	Mean	Deviation	Composition
Diptera					
Chironomidae	0.48	1.43	0.96	-	80.0
Total Diptera	0.48	1.43	0.96	-	80.0
Plecoptera	0.48	0.0	0.24	-	20.0
Total Plecoptera	0.48	0.0	0.24	-	20.0
STATION TOTAL	0.96	1.43	1.20	-	100.00

*Not Applicable

TABLE A-27

BENTHIC DATA (EKMAN)
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_2

Organism	Number of Organisms Per Meter Squared			Standard	Percent
	Rep. A	Rep. B	Mean	Deviation[a]	Composition
Nematoda	0.00	37.80	18.90		0.40
Total Nematoda	0.00	37.80	18.90		0.40
Oligochaeta	94.50	283.50	189.00		4.08
Total Oligochaeta	94.50	283.50	189.00		4.08
Tardigrada	0.00	56.70	28.35		0.62
Total Tardigrada	0.00	56.70	28.35		0.62
Gastropoda					
Physidae					
Physa sp.	0.00	113.40	56.70		1.22
Total Gastropoda	0.00	113.40	56.70		1.22
Pelecypoda					
Sphaeriidae					
Sphaerium sp.	0.00	151.20	75.60		1.63
Total Pelecypoda	0.00	151.20	75.60		1.63
Arachnida					
Acarina	18.90	18.90	18.90		0.40
Total Arachnida	18.90	18.90	18.90		0.40

[a]Calculated on station total only

TABLE A-27 (Cont'd)

Organism	Number of Organisms Per Meter Squared			Standard	Percent
	Rep. A	Rep. B	Mean	Deviation[a]	Composition
Crustacea					
Ostracoda					
Cypridopsis vidua	37.80	75.60	56.70		1.22
Copepoda					
Harpacticoida					
Attheyella sp.	37.80	56.70	47.25		1.02
Bryocamptus sp.	18.90	75.60	47.25		1.02
Cyclopoida					
Cyclops vernalis	283.50	434.70	359.10		7.76
Cyclops sp.	170.10	132.30	151.20		3.27
Eucyclops agilis	113.40	189.00	151.20		3.27
Paracyclops sp.	0.00	56.70	28.35		0.62
Copepid	37.80	75.60	56.70		1.22
Branchiopoda					
Diplostraca					
Cladocera					
Chydorus sp.	415.80	434.70	425.25		9.18
Alona sp.	37.80	151.20	94.50		2.04
Amphipoda					
Talitridae					
Hyalella azteca	37.80	56.70	47.25		1.02
Total Crustacea	1190.70	1738.80	1464.75		31.64
Ephemeroptera					
Caenidae					
Caenis sp.	56.70	94.50	75.60		1.63
Total Ephemeroptera	56.70	94.50	75.60		1.63

[a]Calculated on station total only

TABLE A-27 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Mean	Standard Deviation[a]	Percent Composition
Odonata					
Gomphidae					
Gomphus maxwelli	0.00	18.90	9.45		0.20
Dromogomphus spoliatus	0.00	18.90	9.45		0.20
Libellulidae	37.80	18.90	28.35		0.62
Total Odonata	37.80	56.70	47.25		1.02
Coleoptera					
Dytiscidae					
Hydroporus sp.	132.30	132.30	132.30		2.86
Hydrophilidae					
Berosus sp.	56.70	56.70	56.70		1.22
Total Coleoptera	189.00	189.00	189.00		4.08
Trichoptera					
Hydroptilidae					
Ochrotrichia sp.	0.00	18.90	9.45		0.20
Hydroptila sp.	0.00	18.90	9.45		0.20
Total Trichoptera	0.00	37.80	18.90		0.40
Collembola					
Isotomidae					
Isotomurus palastris	132.30	75.60	103.95		2.25
Total Collembola	132.30	75.60	103.95		2.25
Diptera					
Chironomidae	1984.50	2457.00	2220.75		47.96
Ceratopogonidae	18.90	18.90	103.95		2.25
Anthomyiidae	18.90	0.00	9.45		0.20
Tabanidae					
Tabanus sp.	18.90	0.00	9.45		0.20
Total Diptera	2041.20	2646.00	2343.60		50.61
STATION TOTAL	3761.10	5499.90	4630.50		100.00

[a]Calculated on station total only

TABLE A-28

BENTHIC DATA (EKMAN)
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_3

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Mean	Standard Deviation[a]	Percent Composition
Nematoda	0.00	56.70	28.35		0.75
Total Nematoda	0.00	56.70	28.35		0.75
Oligochaeta	56.70	75.60	66.15		1.72
Total Oligochaeta	56.70	75.60	66.15		1.72
Tardigrada	18.90	0.00	9.45		0.25
Total Tardigrada	18.90	0.00	9.45		0.25
Gastropoda					
Physidae					
Physa sp.	18.90	18.90	18.90		0.50
Helisoma sp.	18.90	0.00	9.45		0.25
Total Gastropoda	37.80	18.90	28.35		0.75
Crustacea					
Copepoda					
Harpacticoida					
Attheyella sp.	18.90	0.00	9.45		0.25
Cyclopoida					
Cyclops vernalis	0.00	264.60	132.30		3.45
Eucyclops agilis	0.00	75.60	37.80		0.99
Branchiopoda					
Diplostraca					
Cladocera					
Simocephalus sp.	18.90	0.00	9.45		0.25
Chydorus sp.	37.80	0.00	18.90		0.50
Ceriodaphnia sp.	37.80	0.00	18.90		0.50

[a]Calculated on station total only

TABLE A-28 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Mean	Standard Deviation[a]	Percent Composition
Amphipoda					
Talitridae					
Hyalella azteca	151.20	75.60	113.40		2.96
Total Crustacea	264.60	415.80	340.20		8.90
Ephemeroptera					
Baetidae					
Baetis sp.	37.80	56.70	47.25		1.23
Caenidae					
Caenis sp.	434.70	56.70	245.70		6.40
Siphlonuridae					
Ameletus sp.	18.90	0.00	9.45		6.25
Total Ephemeroptera	491.40	113.40	302.40		7.88
Odonata					
Coenagrionidae					
Enallagma sp.	18.90	0.00	9.45		0.25
Gomphidae	0.00	18.90	9.45		0.25
Total Odonata	18.90	18.90	18.90		0.50
Coleoptera					
Hydrophilidae					
Berosus sp.	37.80	37.80	37.80		0.99
Dytiscidae					
Hydroporus sp.	264.60	56.70	160.65		4.18
Total Coleoptera	302.40	94.50	198.45		5.17
Diptera					
Chironomidae	4460.40	585.90	2523.15		65.76
Ceratopogonidae	415.80	226.80	321.30		8.37
Total Diptera	4876.20	812.70	2844.45		74.13
STATION TOTAL	6066.90	1606.50	3836.70		100.00

[a]Calculated on station total only

TABLE A-29

BENTHIC DATA (EKMAN)
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_4

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Mean	Standard Deviation[a]	Percent Composition
Turbellaria					
Dugesia sp.	18.90	0.00	9.45		0.23
Total Turbellaria	18.90	0.00	9.45		0.23
Nematoda	132.30	0.00	66.15		1.64
Total Nematoda	132.30	0.00	66.15		1.64
Oligochaeta	37.80	0.00	18.90		0.47
Total Oligochaeta	37.80	0.00	18.90		0.47
Hirudinea					
Glossiphonia sp.	37.80	132.30	85.05		2.11
Total Hirudinea	37.80	132.30	85.05		2.11
Tardigrada	359.10	0.00	179.55		4.46
Total Tardigrada	359.10	0.00	179.55		4.46
Gastropoda					
Physidae					
Physa sp.	113.40	0.00	56.70		1.40
Planorbidae					
Helisoma trivolvis	56.70	0.00	28.35		0.70
Ancylidae					
Ferrissia sp.	0.00	56.70	28.35		0.70
Total Gastropoda	170.10	56.70	113.40		2.80
Pelecypoda					
Sphaeriidae					
Sphaerium sp.	0.00	113.40	56.70		1.40
Eupera cubensis	0.00	18.90	9.45		0.23
Total Pelecypoda	0.00	132.30	66.15		1.63

[a]Calculated on station total only

TABLE A-29 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Mean	Standard Deviation[a]	Percent Composition
Arachnida					
Acarina	37.80	18.90	28.35		0.70
Total Arachnida	37.80	18.90	28.35		0.70
Crustacea					
Ostracoda	0.00	56.70	28.35		0.70
Copepoda					
Harpacticoida					
Attheyella sp.	18.90	0.00	9.45		0.23
Cyclopoida					
Cyclops vernalis	75.60	642.60	359.10		8.92
Eucyclops agilis	56.70	472.50	264.60		6.57
Macrocyclops albidus	0.00	37.80	18.90		0.47
Cyclops sp.	37.80	0.00	18.90		0.47
Copepid	37.80	0.00	18.90		0.47
Branchiopoda					
Diplostraca					
Cladocera					
Chydorus sp.	151.20	37.80	94.50		2.34
Allonella sp.	37.80	0.00	18.90		0.47
Alona sp.	151.20	0.00	75.60		1.88
Simoceplalus sp.	0.00	132.30	66.15		1.64
Ceriodaphnia sp.	0.00	56.70	28.35		0.70
Amphipoda					
Talitridae					
Hyalella azteca	18.90	132.30	75.60		1.88
Total Crustacea	585.90	1568.70	1077.30		26.76
Ephemeroptera					
Baetidae					
Baetis sp.	0.00	94.50	47.25		1.17
Caenidae					
Caenis sp.	132.30	113.40	122.85		3.05
Total Ephemeroptera	132.30	207.90	170.10		4.22

[a]Calculated on station total only

TABLE A-29 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Mean	Standard Deviation[a]	Percent Composition
Odonata					
Libellulidae					
Libellula sp.	0.00	18.90	9.45		0.23
Gomphidae					
Progomphus sp.	0.00	18.90	9.45		0.23
Total Odonata	0.00	37.80	18.90		0.46
Coleoptera					
Hydrophilidae					
Berosus sp.	0.00	75.60	37.80		0.94
Dytiscidae					
Hydroporus sp.	18.90	37.80	28.35		0.70
Total Coleoptera	18.90	113.40	66.15		1.64
Trichoptera					
Hydroptila sp.	18.90	0.00	9.45		0.23
Total Trichoptera	18.90	0.00	9.45		0.23
Diptera					
Chironomidae	642.60	2532.60	1587.60		39.44
Ceratopogonidae	75.60	982.80	529.20		13.15
Total Diptera	718.20	3515.40	2116.80		52.59
STATION TOTAL	2268.00	5783.40	4025.70		100.00

[a]Calculated on station total only

TABLE A-30

BENTHIC DATA (BOX SAMPLER)
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_2

	Number of Organisms Per Meter Squared				Standard	Percent
Organism	Rep. A	Rep. B	Rep. C	Mean	Deviation[a]	Composition
Nematoda	677.71	511.06	11909.92	4366.23		12.21
Total Nematoda	677.71	511.06	11909.92	4366.23		12.21
Oligochaeta	99.99	0.00	0.00	33.33		0.09
Total Oligochaeta	99.99	0.00	0.00	33.33		0.09
Tardigrada	2644.18	4355.12	1111.00	2703.43		7.56
Total Tardigrada	2644.18	4355.12	1111.00	2703.43		7.56
Gastropoda						
Physidae						
Physa sp.	888.80	288.86	1733.16	970.27		2.71
Total Gastropoda	888.80	288.86	1733.16	970.27		2.71
Arachnida						
Acarina	1033.23	111.10	888.80	677.71		1.90
Total Arachnida	1033.23	111.10	888.80	677.71		1.90
Crustacea						
Ostracoda						
Cypridae						
Cypridopsis vidua	266.64	266.64	711.04	414.77		1.16
Copepoda						
Harpacticoida						
Attheyella sp.	3121.91	4421.78	4177.36	3907.02		10.90
Attheyella sp. copepid	0.00	44.44	0.00	14.81		0.04
Bryocamptus sp.	299.97	0.00	444.40	248.12		0.69

[a]Calculated on station total only

TABLE A-30 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Cyclopoida						
Cyclops vernalis	77.77	133.32	44.44	85.17		0.24
Cyclops sp.	55.55	22.22	0.00	25.92		0.07
Eucyclops agilis	22.22	66.66	0.00	29.63		0.07
Paracyclops sp.	55.55	0.00	0.00	18.52		0.05
Branchiopoda						
Diplostraca						
Cladocera						
Chydorus sp.	0.00	44.44	0.00	14.81		0.04
Alona sp.	0.00	111.10	0.00	37.03		0.10
Amphipoda						
Talitridae						
Hyalella azteca	44.44	0.00	133.32	59.25		0.17
Total Crustacea	3944.06	5110.60	5510.56	4855.05		13.58
Ephemeroptera						
Baetidae						
Baetis sp.	1610.95	66.60	1244.32	973.96		2.72
Caenidae						
Caenis sp.	311.08	288.86	666.60	422.18		1.18
Total Ephemeroptera	1922.03	355.46	1910.92	1396.14		3.90
Plecoptera						
Perlidae						
Perlesta sp.	566.61	111.10	933.24	536.98		1.50
Total Plecoptera	566.61	111.10	933.24	536.98		1.50

[a]Calculated on station total only

TABLE A-30 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Coleoptera						
Dytiscidae						
Agabus sp.	55.55	22.22	0.00	25.92		0.07
Hydroporus sp.	0.00	22.22	0.00	7.41		0.02
Hydrophilidae						
Berosus sp.	11.11	0.00	222.22	77.77		0.22
Enochrus sp.	11.11	22.22	88.88	40.74		0.11
Total Coleoptera	77.77	66.66	311.10	151.81		0.42
Tricoptera						
Hydroptilidae						
Ochrotrichia sp.	522.17	111.10	444.40	359.22		1.00
Hydroptila sp.	322.19	288.86	2355.32	988.79		2.77
Hydropsychidae						
Cheumatopsyche sp.	11.11	0.00	44.44	18.52		0.05
Total Tricoptera	855.47	399.96	2844.16	1366.53		3.82
Diptera						
Chironomidae	12121.01	20220.20	23642.08	18661.10		52.19
Ceratopogonidae	99.99	0.00	0.00	33.33		0.09
Tabanidae						
Tabanus sp.	22.22	0.00	0.00	7.41		0.02
Total Diptera	12243.22	20220.20	23642.08	18701.83		52.30
STATION TOTAL	24953.07	31530.12	50794.94	35759.38	18992.92	100.00

[a]Calculated on station total only

TABLE A-31

BENTHIC DATA (BOX SAMPLER)
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_3

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Nematoda	66.66	0.00	0.00	22.22		0.13
Total Nematoda	66.66	0.00	0.00	22.22		0.13
Oligochaeta	488.84	0.00	44.44	177.76		1.03
Total Oligochaeta	488.84	0.00	44.44	177.76		1.03
Tardigrada	44.44	0.00	133.32	59.25		0.34
Total Tardigrada	44.44	0.00	133.32	59.25		0.34
Gastropoda						
Physidae						
Physa sp.	155.54	22.22	133.32	103.69		0.60
Total Gastropoda	155.54	22.22	133.32	103.69		0.60
Arachnida						
Acarina	377.74	355.52	422.18	385.14		2.22
Total Arachnida	377.74	355.52	422.18	385.14		2.22
Crustacea						
Ostracoda						
Candona sp.	66.66	22.22	0.00	29.63		0.17
Cypridopsis vidua	155.56	133.32	44.44	111.10		0.64
Copepoda						
Harpacticoida						
Attheyella sp.	933.24	711.04	222.20	622.16		3.60
Bryocamptus sp.	66.66	0.00	0.00	22.22		0.13

[a]Calculated on station total only

TABLE A-31 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Cyclopoida						
Cyclops vernalis	44.44	44.44	0.00	29.63		0.17
Cyclops sp.	0.00	22.22	0.00	7.40		0.04
Eucyclops agilis	22.22	44.44	0.00	22.22		0.13
Macrocyclops albidas	0.00	0.00	44.44	14.81		0.09
Branchiopoda						
Diplostraca						
Cladocera						
Alona sp.	44.44	133.32	0.00	59.25		0.34
Alonella sp.	11.11	0.00	0.00	3.70		0.02
Chydorus sp.	22.22	0.00	0.00	7.40		0.04
Amphipoda						
Hyalella azteca	0.00	66.66	0.00	22.22		0.13
Total Crustacea	1306.55	1177.66	311.08	931.76		5.38
Ephemeroptera						
Leptophebiidae						
Paraleptoplebia sp.	66.66	244.42	0.00	103.69		0.60
Baetidae						
Baetis sp.	5243.92	4244.02	2755.28	4081.07		23.60
Caenidae						
Caenis sp.	199.98	22.22	177.76	133.32		0.77
Heptageniidae						
Stenonema sp.	0.00	22.22	44.44	22.22		0.13
Total Ephemeroptera	5510.56	4532.88	2977.48	4340.30		25.08
Odonata						
Coenagrionidae						
Amphiagrion sp.	0.00	44.44	0.00	14.81		0.09
Total Odonata	0.00	44.44	0.00	14.81		0.09

[a]Calculated on station total only

TABLE A-31 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Plecoptera						
Perlidae						
Perlesta sp.	977.68	866.58	311.08	718.44		4.15
Nemouridae						
Leuctra sp.	0.00	0.00	44.44	14.81		0.09
Total Plecoptera	977.68	866.58	355.52	733.26		4.24
Coleoptera						
Dytiscidae						
Hydroporus sp.	22.22	22.22	0.00	14.81		0.09
Hydrophilidae						
Berosus sp.	0.00	0.00	44.44	14.81		0.09
Total Coleoptera	22.22	22.22	44.44	29.62		0.17
Trichoptera						
Hydropsychidae						
Cheumatopsyche sp.	311.08	377.74	399.96	362.92		2.10
Hydroptilidae						
Hydroptila sp.	799.92	1466.52	533.28	933.24		5.39
Ochrotrichia sp.	333.30	155.54	133.32	207.38		1.20
Total Trichoptera	1444.30	1999.80	1066.56	1070.22		8.69
Diptera						
Chironomidae	11798.82	2910.82	7510.36	7406.66		42.79
Simuliidae	1066.56	1977.58	1688.72	1577.62		9.12
Tabanidae						
Tabanus sp.	22.22	0.00	44.44	22.22		0.13
Total Diptera	12887.60	4888.40	9243.52	9006.51		52.03
STATION TOTAL	23282.13	13909.72	14731.86	17307.90	5190.14	100.00

[a] Calculated on station total only

TABLE A-32

BENTHIC DATA (BOX SAMPLER)
SITE: SQUAW CREEK
DATE: 01-29-75
SAMPLING LOCATION A_4

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Nematoda	66.66	0.00	66.66	44.44		0.15
Total Nematoda	66.66	0.00	66.66	44.44		0.15
Oligochaeta	0.00	0.00	22.22	7.41		0.03
Total Oligochaeta	0.00	0.00	22.22	7.41		0.03
Hirudinea						
Glossiphonia sp.	22.22	0.00	0.00	7.41		0.03
Total Hirudinea	22.22	0.00	0.00	7.41		0.03
Tardigrada	111.10	555.50	133.32	266.64		0.90
Total Tardigrada	111.10	555.50	133.32	266.64		0.90
Gastropoda						
Physidae						
Physa sp.	44.44	177.76	199.98	140.73		0.47
Ancylidae						
Ferrissia sp.	22.22	22.22	44.44	29.63		0.10
Total Gastropoda	66.66	199.98	244.42	170.35		0.57
Pelecypoda						
Sphaeriidae						
Eupera cubensis	155.54	22.22	0.00	59.25		0.20
Sphaerium sp.	266.64	22.22	0.00	96.29		0.32
Total Pelecypoda	422.18	44.44	0.00	155.54		0.52
Arachnida						
Acarina	244.42	422.18	711.04	237.01		1.55
Total Arachnida	244.42	422.18	711.04	237.01		1.55

[a]Calculated on station total only

TABLE A-32 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation [a]	Percent Composition
Crustacea						
Ostracoda						
Candona sp.	0.00	22.22	0.00	7.41		0.03
Chlamydotheca sp.	22.22	22.22	0.00	14.81		0.05
Cypridopsis vidua	244.42	1644.28	555.50	814.73		2.75
Limnocythere	22.22	0.00	0.00	7.41		0.03
Stenocypris sp.	22.22	0.00	55.55	25.92		0.09
Copepoda						
Harpacticoida						
Attheyella sp.	133.32	399.96	888.80	474.02		1.59
Copepid	0.00	22.22	0.00	7.41		0.03
Bryocamptus sp.	0.00	0.00	22.22	7.41		0.03
Cyclopoida						
Cyclops vernalis	177.76	22.22	88.88	96.29		0.32
Cyclops sp.	111.10	88.88	0.00	66.66		0.23
Eucyclops agilis	577.72	66.66	199.98	281.45		0.96
Macrocyclops albidus	44.44	44.44	22.22	37.03		0.13
Paracyclops sp.	22.22	44.44	22.22	29.63		0.10
Branchiopoda						
Diplostraca						
Cladocera						
Alona sp.	22.22	66.66	22.22	37.03		0.13
Alonella sp.	0.00	111.10	0.00	37.03		0.13
Chydorus sp.	66.66	0.00	155.54	74.06		0.24
Leydigia sp.	0.00	22.22	0.00	7.41		0.03
Amphipoda						
Talitridae						
Hyalella azteca	111.10	266.64	266.64	214.79		2.27
Total Crustacea	1577.62	2844.16	2299.77	2240.52		9.15

[a]Calculated on station total only

TABLE A-32 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation [a]	Percent Composition
Ephemeroptera						
Baetidae						
Baetis sp.	2866.38	2866.38	5266.14	3666.30		12.51
Caenidae						
Caenis sp.	44.44	133.32	177.76	118.51		0.41
Total Ephemeroptera	2910.82	2999.70	5443.90	3784.81		12.92
Odonata						
Gomphidae						
Gomphus sp.	0.00	22.22	0.00	7.41		0.03
Early Instar	22.22	0.00	0.00	7.41		0.03
Libellulidae						
Brechmorrhoga mendax	0.00	22.22	0.00	7.41		0.03
Coenagrionidae						
Argia sp.	44.44	0.00	0.00	14.81		0.05
Enallagma sp.	44.44	22.22	44.44	37.03		0.13
Total Odonata	111.10	66.66	44.44	74.07		0.27
Plecoptera						
Perlidae						
Perlesta sp.	88.88	133.32	111.10	111.10		0.38
Total Plecoptera	88.88	133.32	111.10	111.10		0.38
Coleoptera						
Dytiscidae						
Agabus sp.	0.00	0.00	22.22	7.41		0.03
Hydrophilidae						
Berosus sp.	0.00	44.44	0.00	14.81		0.05
Elmidae						
Neoelmis caesa	44.44	0.00	0.00	14.81		0.05
Stenelmis sp.	44.44	0.00	0.00	14.81		0.05
Total Coleoptera	88.88	44.44	22.22	51.85		0.18

[a] Calculated on station total only

TABLE A-32 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Trichoptera						
Hydroptilidae						
Hydroptila sp.	66.66	66.66	399.96	177.76		0.61
Ochrotrichia sp.	0.00	0.00	22.22	7.41		0.03
Hydropsychidae						
Cheumatopsyche sp.	88.88	66.66	777.70	311.08		1.05
Limnephilidae						
Hesperophyla sp.	0.00	0.00	22.22	7.41		0.03
Total Trichoptera	155.54	133.32	1222.10	503.65		1.72
Diptera						
Chironomidae	4107.00	9310.18	12065.46	8494.21		28.38
Simuliidae	1422.08	2044.24	34952.06	12806.13		43.12
Tabanidae						
Tabanus sp.	22.22	22.22	66.66	37.03		0.13
Total Diptera	5551.30	11376.64	47084.18	21337.37		71.63
STATION TOTAL	11417.38	18820.34	57405.37	29214.36	24693.20	100.00

[a]Calculated on station total only

TABLE A-33

BENTHIC DATA (EKMAN)
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_2

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Nematoda	75.6	37.8	0.0	37.8		1.08
Total Nemotoda	75.6	37.8	0.0	37.8		1.08
Oligochaeta	0.0	302.4	151.2	151.2		4.32
Total Oligochaeta	0.0	302.4	151.2	151.2		4.32
Tardigrada	37.8	0.0	0.0	12.6		0.36
Total Tardigrada	37.8	0.0	0.0	12.6		0.36
Gastropoda						
Physidae						
Physa sp.	623.7	850.5	151.2	541.8		15.47
Total Gastropoda	623.7	850.5	151.2	541.8		15.47
Arachnida						
Acarina	0.0	0.0	75.6	25.2		0.72
Total Arachnida	0.0	0.0	75.6	25.2		0.72
Crustacea						
Ostracoda						
Cypridae						
Cypridopis vidua	18.9	0.0	0.0	6.3		0.18
Copepoda						
Cyclopoida						
Cyclops vernalis	18.9	94.5	151.2	88.2		2.52
Paracyclops fimbriatus	0.0	18.9	75.6	31.5		0.90
Branchiopoda						
Diplostraca						
Cladocera						
Alona sp.	37.8	75.6	0.0	37.8		1.08
Amphipoda						
Talitridae						
Hyalella azteca	18.9	0.0	0.0	6.3		0.18
Total Crustacea	94.5	189.0	226.8	170.1		4.86

[a]Calculated on station total only

TABLE A-33 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Ephemeroptera						
Caenidae						
Caenis sp.	18.9	18.9	151.2	63.0		1.80
Total Ephemeroptera	18.9	18.9	151.2	63.0		1.80
Coleoptera						
Dytiscidae						
Oreodytes sp.	18.9	75.6	75.6	56.7		1.62
Hydrophilidae						
Enochrus sp.	37.8	37.8	0.0	25.2		0.72
Total Coleoptera	56.7	113.4	75.6	81.9		2.34
Diptera						
Chironomidae	1890.0	2683.8	2570.4	2381.4		67.99
Ceratopogonidae	0.0	37.8	75.6	37.8		1.08
Total Diptera	1890.0	2721.6	2646.0	2419.2		69.07
Station Total	2797.2	4233.6	3477.6	3502.8	718.5	100.00

[a]Calculated on station total only

TABLE A-34

BENTHIC DATA (EKMAN)
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_3

	Number of Organisms Per Meter Squared				Standard	Percent
Organism	Rep. A	Rep. B	Rep. C	Mean	Deviation[a]	Composition
Nematoda	302.4	37.8	37.8	126.0		2.26
Total Nematoda	302.4	37.8	37.8	126.0		2.26
Oligochaeta	529.2	0.0	37.8	189.0		3.39
Total Oligochaeta	529.2	0.0	37.8	189.0		3.39
Tardigrada	151.2	0.0	18.9	56.7		1.02
Total Tardigrada	151.2	0.0	18.9	56.7		1.02
Gastropoda						
Physidae						
Physa sp.	1663.2	37.8	18.9	573.3		10.27
Total Gastropoda	1663.2	37.8	18.9	573.3		10.27
Arachnida						
Acarina	302.4	0.0	0.0	100.8		1.81
Total Arachnida	302.4	0.0	0.0	100.8		1.81
Crustacea						
Ostracoda						
Cypridae						
Cypridopis vidua	529.2	0.0	0.0	176.4		3.16
Copepoda						
Harpacticoida						
Attheyella sp.	226.8	56.7	0.0	94.5		1.69
Cyclopoida						
Cyclops vernalis	378.0	37.8	56.7	157.5		2.82
Paracyclops fimbriatus	151.2	18.9	0.0	56.7		1.02
Macrocyclops albidus	75.6	0.0	0.0	25.2		0.45
Eucyclops agilis	75.6	0.0	0.0	25.2		0.45
Branchiopoda						
Diplostraca						
Cladocera						
Ceriodaphnia sp.	75.6	0.0	0.0	25.2		0.45
Alona sp.	0.0	18.9	18.9	12.6		0.23
Amphipoda						
Talitridae						
Hyalella azteca	302.4	0.0	37.8	113.4		2.03
Total Crustacea	1814.4	132.3	113.4	686.7		12.30

[a]Calculated on station total only

TABLE A-34 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Ephemeroptera						
Baetidae						
Baetis sp.	2116.8	0.0	0.0	705.6		12.64
Caenidae						
Caenis sp.	1436.4	75.6	0.0	504.0		9.03
Total Ephemeroptera	3553.2	75.6	0.0	1209.6		21.67
Plecoptera						
Perlidae						
Perlesta sp.	907.2	0.0	0.0	302.4		5.42
Total Plecoptera	907.2	0.0	0.0	302.4		5.42
Coleoptera						
Elmidae						
Neoelmis caesa	75.6	0.0	0.0	25.2		0.45
Dytiscidae (Unid. sp.)	0.0	18.9	0.0	6.3		0.11
Oreodytes sp.	0.0	0.0	18.9	6.3		0.11
Total Coleoptera	75.6	18.9	18.9	37.8		0.67
Trichoptera						
Hydroptilidae						
Hydroptila sp.	604.8	0.0	0.0	201.6		3.61
Hydropsychidae						
Cheumatopsyche sp.	75.6	0.0	0.0	25.2		0.45
Total Trichoptera	680.4	0.0	0.0	226.8		4.06
Collembola						
Isotomidae						
Isotomarus palastris	0.0	132.3	75.6	69.3		1.24
Total Collembola	0.0	132.3	75.6	69.3		1.24
Diptera						
Chironomidae	2570.4	1285.2	1719.9	1858.5		33.30
Ceratopogonidae	378.0	18.9	37.8	144.9		2.60
Total Diptera	2948.4	1304.1	1757.7	2003.4		35.90
Station Total	12927.6	1738.8	2079.0	5581.8	6363.9	100.00

[a]Calculated on station total only

TABLE A-35

BENTHIC DATA (EKMAN)
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_4

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Nematoda	37.8	18.9	0.0	18.9		0.84
Total Nematoda	37.8	18.9	0.0	18.9		0.84
Oligochaeta	396.9	170.1	37.8	201.6		8.91
Total Oligochaeta	396.9	170.1	37.8	201.6		8.91
Hirudinea						
Glossiphonia sp.	18.9	18.9	0.0	12.6		0.56
Total Hirudinea	18.9	18.9	0.0	12.6		0.56
Tardigrada	0.0	0.0	18.9	6.3		0.28
Total Tardigrada	0.0	0.0	18.9	6.3		0.28
Pelecypoda						
Sphaeriidae						
Sphaerium sp.	0.0	37.8	18.9	18.9		0.84
Total Pelecypoda	0.0	37.8	18.9	18.9		0.84
Arachnida						
Acarina	18.9	37.8	0.0	18.9		0.84
Total Arachnida	18.9	37.8	0.0	18.9		0.84
Crustacea						
Ostracoda						
Cypridae						
Cypridopis vidua	0.0	0.0	18.9	6.3		0.28
Copepoda						
Cyclopoida						
Cyclops vernalis	75.6	18.9	37.8	44.1		1.95
Cyclops sp.	37.8	0.0	0.0	12.6		0.56
Eucyclops speratus	56.7	0.0	0.0	18.9		0.84
Branchiopoda						
Diplostraca						
Cladocera						
Ilyocryptus sp.	18.9	0.0	0.0	6.3		0.28
Amphipoda						
Talitridae						
Hyalella azteca	18.9	151.2	18.9	63.0		2.79
Total Crustacea	207.9	170.1	75.6	151.2		6.70

[a]Calculated on station total only

TABLE A-35 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Ephemeroptera						
Caenidae						
Caenis sp.	75.6	56.7	94.5	75.6		3.34
Total Ephemeroptera	75.6	56.7	94.5	75.6		3.34
Coleoptera						
Elmidae						
Ordobrevia sp.	0.0	18.9	0.0	6.3		0.28
Hydrophilidae						
Berosus sp.	0.0	18.9	37.8	18.9		0.84
Dytiscidae						
Oreodytes sp.	18.9	37.8	37.8	31.5		1.39
Total Coleoptera	18.9	75.6	75.6	56.7		2.51
Collembola						
Isotomidae						
Isotomarus palastris	0.0	18.9	0.0	6.3		0.28
Total Collembola	0.0	18.9	0.0	6.3		0.28
Diptera						
Chironomidae	1001.7	226.8	2986.2	1404.9		62.12
Ceratopogonidae	434.7	302.4	132.3	289.8		12.81
Total Diptera	1436.4	529.2	3118.5	1694.7		74.93
Station Total	2211.3	1134.0	3439.8	2261.7	1153.7	100.00

[a]Calculated on station total only

TABLE A-36

BENTHIC DATA (BOX SAMPLER)
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_2

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Nematoda	122.1	22.2	66.6	70.3		1.15
Total Nematoda	122.1	22.2	66.6	70.3		1.15
Oligochaeta	133.2	11.1	0.0	48.1		0.79
Total Oligochaeta	133.2	11.1	0.0	48.1		0.79
Tardigrada	688.2	44.4	0.0	244.2		4.00
Total Tardigrada	688.2	44.4	0.0	244.2		4.00
Gastropoda						
Physidae						
Physa sp.	577.2	1443.0	721.5	913.9		14.95
Total Gastropoda	577.2	1443.0	721.5	913.9		14.95
Pelecypoda						
Sphaeriidae						
Sphaerium sp.	0.0	11.1	0.0	3.7		0.06
Total Pelecypoda	0.0	11.1	0.0	3.7		0.06
Arachnida						
Acarina	144.3	222.0	932.4	432.9		7.08
Total Arachnida	144.3	222.0	932.4	432.9		7.08
Crustacea						
Ostracoda						
Cypridae						
Cypridopis vidua	199.8	55.5	11.1	88.8		1.45
Copepoda						
Harpacticoida						
Attheyella sp.	155.4	11.1	44.4	70.3		1.15
Bryocamptus sp.	88.8	0.0	0.0	29.6		0.48

[a] Calculated on station total only

TABLE A-36 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Cyclopoida						
Cyclops vernalis	88.8	22.2	11.1	40.7		0.67
Paracyclops fimbriatus	44.4	0.0	0.0	14.8		0.24
Eucyclops agilis	0.0	0.0	22.2	7.4		0.12
Eucyclops speratus	11.1	0.0	0.0	3.7		0.06
Copepid	11.1	0.0	0.0	3.7		0.06
Amphipoda						
Talitridae						
Hyalella azteca	44.4	11.1	11.1	22.2		0.36
Total Crustacea	643.8	99.9	99.9	281.2		4.60
Ephemeroptera						
Baetidae						
Baetis sp.	66.6	144.3	111.0	107.3		1.76
Caenidae						
Caenis sp.	99.9	44.4	0.0	48.1		0.79
Total Ephemeroptera	166.5	188.7	111.0	155.4		2.55
Plecoptera						
Perlidae						
Perlesta sp.	166.5	321.9	421.8	303.4		4.96
Total Plecoptera	166.5	321.9	421.8	303.4		4.96
Coleoptera						
Dytiscidae						
Oreodytes sp.	0.0	11.1	11.1	7.4		0.12
Hydrophilidae						
Berosus sp.	11.1	0.0	0.0	3.7		0.06
Enochrus sp.	0.0	0.0	11.1	3.7		0.06
Elmidae						
Ordobrevia sp.	0.0	0.0	11.1	3.7		0.06
Total Coleoptera	11.1	11.1	33.3	18.5		0.30
Trichoptera						
Hydroptilidae						
Hydroptila sp.	344.1	310.8	333.0	329.3		5.39
Hydropsychidae						
Cheumatopsyche sp.	0.0	11.1	122.1	44.4		0.73
Total Trichoptera	344.1	321.9	455.1	373.7		6.12

[a]Calculated on station total only

TABLE A-36 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Collembola						
Isotomidae						
Isotomurus palastris	0.0	0.0	11.1	3.7		0.06
Total Collembola						0.06
Diptera						
Chironomidae	6293.7	1864.8	1487.4	3215.3		52.60
Simuliidae	66.6	22.2	55.5	48.1		0.79
Total Diptera	6360.3	1887.0	1542.9	3263.4		53.39
Station Total	9357.3	4584.3	4395.6	6112.4	2811.7	100.00

[a]Calculated on station total only

TAI \-37

BENTHIC DATA (BOX SAMPLER)
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_3

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Oligochaeta	44.4	88.8	133.2	88.8		3.82
Total Oligochaeta	44.4	88.8	133.2	88.8		3.82
Tardigrada	0.0	0.0	44.4	14.8		0.64
Total Tardigrada	0.0	0.0	44.4	14.8		0.64
Gastropoda						
Physidae						
Physa sp.	0.0	88.8	44.4	44.4		1.91
Total Gastropoda	0.0	88.8	44.4	44.4		1.91
Arachnida						
Acarina	177.6	399.6	0.0	192.4		8.28
Total Arachnida	177.6	399.6	0.0	192.4		8.28
Crustacea						
Ostracoda						
Cypridae						
Ilyocypris sp.	0.0	0.0	88.8	29.6		1.27
Cypridopsis vidua	0.0	44.4	0.0	14.8		0.64
Copepoda						
Harpacticoida						
Attheyella sp.	88.8	166.5	0.0	85.1		3.66
Bryocamptus sp.	0.0	44.4	44.4	29.6		1.27
Cyclopoida						
Cyclops vernalis	0.0	0.0	266.4	88.8		3.82
Cyclops sp.	0.0	44.4	44.4	29.6		1.27
Eucyclops speratus	0.0	0.0	133.2	44.4		1.91
Eucyclops agilis	0.0	44.4	0.0	14.8		0.64
Macrocyclops albidus	0.0	0.0	44.4	14.8		0.64
Paracyclops fimbriatus	133.2	44.4	44.4	74.0		3.18
Branchiopoda						
Diplostraca						
Cladocera						
Ceriodaphnia sp.	0.0	0.0	44.4	14.8		0.64
Chydorus sp.	0.0	0.0	44.4	14.8		0.64
Simocephalus sp.	0.0	0.0	88.8	29.6		1.27
Amphipoda						
Talitridae						
Hyalella azteca	44.4	222.0	0.0	88.8		3.82
Total Crustacea	266.4	610.5	843.6	573.5		24.67

[a] Calculated on station total only

TABLE A-37 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Ephemeroptera						
Baetidae						
Baetis sp.	577.2	754.8	0.0	444.0		19.11
Caenidae						
Caenis sp.	88.8	222.0	44.4	118.4		5.10
Total Ephemeroptera	666.0	976.8	44.4	562.4		24.21
Odonata						
Coenagrionidae	11.1	0.0	0.0	3.7		0.16
Total Odonata	11.1	0.0	0.0	3.7		0.16
Plecoptera						
Perlidae						
Perlesta sp.	0.0	399.6	0.0	133.2		5.73
Total Plecoptera	0.0	399.6	0.0	133.2		5.73
Trichoptera						
Hydroptilidae						
Hydroptila sp.	355.2	0.0	0.0	118.4		5.10
Total Trichoptera	355.2	0.0	0.0	118.4		5.10
Diptera						
Chironomidae	444.0	0.0	666.0	370.0		15.92
Ceratopogonidae	310.8	0.0	355.2	222.0		9.55
Total Diptera	754.8	0.0	1021.2	592.0		25.47
Station Total	2275.5	2564.1	2131.2	2323.6	220.4	100.00

[a]Calculated on station total only

BENTHIC DATA (BOX SAMPLER)
SITE: SQUAW CREEK
DATE: 04-01-75
SAMPLING LOCATION A_4

	Number of Organisms Per Meter Squared				Standard	Percent
Organism	Rep. A	Rep. B	Rep. C	Mean	Deviation[a]	Composition
Oligochaeta	33.3	0.0	33.3	22.2		0.39
Total Oligochaeta	33.3	0.0	33.3	22.2		0.39
Hirudinea						
Glossiphonia sp.	344.1	177.6	11.1	177.6		3.13
Total Hirudinea	344.1	177.6	11.1	177.6		3.13
Tardigrada	0.0	0.0	11.1	3.7		0.07
Total Tardigrada	0.0	0.0	11.1	3.7		0.07
Gastropoda						
Physidae						
Physa sp.	0.0	44.4	11.1	18.5		0.33
Total Gastropoda	0.0	44.4	11.1	18.5		0.33
Pelecypoda						
Sphaeriidae						
Sphaerium sp.	11.1	44.4	133.2	62.9		1.11
Total Pelecypoda	11.1	44.4	133.2	62.9		1.11
Arachnida						
Acarina	333.0	222.0	233.1	262.7		4.63
Total Arachnida	333.0	222.0	233.1	262.7		4.63
Crustacea						
Ostrocoda						
Cypridae						
Cypridopis vidua	99.9	399.6	66.6	188.7		3.32
Ilyocypris sp.	11.1	0.0	0.0	3.7		0.07
Chlamydotheca sp.	0.0	0.0	11.1	3.7		0.07
Copepoda						
Harpacticoida						
Attheyella sp.	22.2	44.4	44.4	37.0		0.65
Cyclopoida						
Cyclops vernalis	33.3	222.0	111.0	122.1		2.15
Eucyclops speratus	0.0	0.0	144.3	48.1		0.85
Amphipoda						
Talitridae						
Hyalella azteca	22.2	1110.0	111.0	414.4		7.30
Total Crustacea	188.7	1776.0	488.4	817.7		14.41

[a]Calculated on station total only

TABLE A-38 (Cont'd)

Organism	Number of Organisms Per Meter Squared Rep. A	Rep. B	Rep. C	Mean	Standard Deviation[a]	Percent Composition
Ephemeroptera						
Baetidae						
Baetis sp.	277.5	666.0	521.7	488.4		8.60
Caenidae						
Caenis sp.	55.5	0.0	11.1	22.2		0.39
Total Ephemeroptera	333.0	666.0	532.8	510.6		8.99
Odonata						
Coenagrionidae	0.0	0.0	33.3	11.1		0.20
Total Odonata	0.0	0.0	33.3	11.1		0.20
Plecoptera						
Perlidae						
Perlesta sp.	499.5	666.0	366.3	510.6		9.00
Total Plecoptera	499.5	666.0	366.3	510.6		9.00
Coleoptera						
Elmidae						
Ordobrevia sp.	11.1	0.0	22.2	11.1		0.20
Hydrophilidae						
Berosus sp.	11.1	0.0	0.0	3.7		0.07
Total Coleoptera	22.2	0.0	22.2	14.8		0.27
Tricoptera						
Hydroptilidae						
Hydroptila sp.	233.1	133.2	22.2	129.5		2.28
Hydropsychidae						
Cheumatopsyche sp.	55.5	44.4	22.2	40.7		0.72
Odontoceridae						
Marilia sp.	77.7	0.0	77.7	51.8		0.91
Heliocopsychidae						
Helicopsyche sp.	11.1	0.0	22.2	11.1		0.20
Total Tricoptera	377.4	177.6	144.3	233.1		4.11
Diptera						
Chironomidae	188.7	7548.0	765.9	2834.2		49.93
Simulidae	277.5	0.0	44.4	107.3		1.89
Ceratopogonidae	0.0	44.4	55.5	33.3		0.59
Tabanidae						
Tabanus sp.	99.9	44.4	22.2	55.5		0.98
Total Diptera	566.1	7636.8	888.0	3030.3		53.39
Station Total	2708.4	11410.8	2908.2	5675.8	4967.7	100.00

[a]Calculated on station total only

TABLE A-39

BENTHIC DATA (EKMAN)

Site: Squaw Creek
Date: 08-05-75
Sampling Location A2

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Oligochaeta	75.6	0.0	0.0	25.2	-	4.98
Total Oligochaeta	75.6	0.0	0.0	25.2	-	4.98
Ephemenoptera						
Leptoplebiodae						
Cheroterpes sp.	0.0	0.0	226.8	75.6	-	14.97
Baetidae						
Baetis sp.	0.0	18.9	0.0	6.3	-	1.23
Total Ephemenoptera	0.0	18.9	226.8	81.9	-	16.20
Diptera	0.0	37.8	0.0	12.6	-	2.49
Chrionomidae	302.4	170.1	604.8	359.1	-	71.09
Ceratopogonidae	0.0	94.5	0.0	31.5	-	6.24
Total Diptera	302.4	302.4	604.8	403.2	-	79.82
Station Total	378.0	305.7	831.6	505.1	-	100.00

TABLE A-40

BENTHIC DATA (EKMAN)

Site: Squaw Creek
Date: 08-05-75
Sampling Location A3

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Nematoda	56.7	0.0	0.0	18.9	-	1.28
Total Nematoda	56.7	0.0	0.0	18.9	-	1.28
Oligochaeta	170.1	56.7	37.8	88.2	-	5.96
Total Oligochaeta	170.1	56.7	37.8	88.2	-	5.96
Gastropoda						
Physidae						
Physa sp.	18.9	0.0	151.2	56.7	-	3.82
Total Gastropoda	18.9	0.0	151.2	56.7	-	3.82
Pelecypoda						
Sphariidae						
Sphaerium sp.	396.9	0.0	0.0	132.3	-	8.93
Total Pelecypoda	396.9	0.0	0.0	132.3	-	8.93
Arachnida						
Acarina	207.9	0.0	0.0	69.3	-	4.68
Total Arachnida	207.9	0.0	0.0	69.3	-	4.68
Ephemenoptera						
Leptophebiidae						
Cheroterpes sp.	0.0	0.0	18.9	6.3	-	0.42
Baetidae						
Baetis sp.	94.5	0.0	132.3	75.6	-	5.11
Tricorythidae						
Tricorythedes sp.	113.4	18.9	132.3	88.2	-	5.96
Total Ephemenoptera	207.9	18.9	283.5	170.1	-	11.49

TABLE A-40 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Odonata						
Zygoptera	0.0	0.0	37.8	12.6	-	0.85
Anisoptera	0.0	18.9	0.0	6.3	-	0.42
Total Odonata	0.0	18.9	37.8	18.9	-	1.28
Coleoptera						
Hydrophilidae						
Berosus sp.	0.0	0.0	75.6	25.2	-	1.70
Total Coleoptera	0.0	0.0	75.6	25.2	-	1.70
Diptera						
Chironomidae	510.3	359.1	396.9	422.1	-	28.51
Ceratopogunidae	453.6	661.5	321.3	478.8	-	32.34
Total Diptera	963.9	1020.6	718.2	900.9	-	60.85
Station Total	2022.3	1115.1	1304.1	1480.5	-	100.00

[a]Calculated for station total only.

TABLE A-41

BENTHIC DATA (EKMAN)

Site: Squaw Creek
Date: 08-05-75
Sampling Location A4

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Nematoda	0.0	18.9	0.0	6.3	-	0.12
Total Nematoda	0.0	18.9	0.0	6.3	-	0.12
Oligochaeta	340.2	0.0	283.5	207.9	-	4.04
Total Oligochaeta	340.2	0.0	283.5	207.9	-	4.04
Gastropoda						
Phygodae						
Physa sp.	0.0	0.0	37.8	12.6	-	0.24
Helisoma sp.	0.0	0.0	378.0	126.0	-	2.45
Total Gastropoda	0.0	0.0	415.8	138.6	-	2.69
Pelecypoda						
Sphaerridae						
Sphaerium sp.	472.5	0.0	1436.4	636.3	-	12.37
Total Pelecypoda	472.5	0.0	1436.4	636.3	-	12.37
Arachnida						
Acarina	18.9	207.9	75.6	100.8	-	1.96
Total Arachnida	18.9	207.9	75.6	100.8	-	1.96

TABLE A-41 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Crustacea						
Ostrocoda						
Cypridae						
Stenocypris sp.	226.8	75.6	37.8	113.4	-	2.20
Copepoda						
Cyclopoida						
Cyclops sp.	37.8	18.9	18.9	25.2	-	0.49
Eucyclops agilis sp.	18.9	94.5	0.0	37.8	-	0.74
Macrocyclops albidus	0.0	37.8	18.9	18.9	-	0.37
Branehiopoda						
Diplostraca						
Cladcera						
Simocephalus sp.	75.6	113.4	189.0	126.0	-	2.45
Amplipoda						
Talitridae						
Hyalella azteca	18.9	831.6	1965.6	938.7	-	18.25
Total Crustacea	378.0	1171.8	2230.2	1260.0	-	24.50
Ephemenoptera						
Baetidae						
Baetis sp.	75.6	245.7	396.9	239.4	-	4.65
Tricorythidae						
Tricorythades sp.	226.8	1663.2	1908.9	1266.3	-	24.62
Total Ephemenoptera	302.4	1908.9	2305.8	1505.7	-	29.27
Odonata						
Zygoptera	0.0	113.4	0.0	37.8	-	0.74
Anisoptera	0.0	94.5	37.8	44.1	-	0.86
Total Odonata	0.0	207.9	37.8	81.9	-	1.60

TABLE A-41 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Coleoptera						
Hydrophilidae						
Berosus sp.	0.0	0.0	18.9	6.3	-	0.12
Total Coleoptera	0.0	0.0	18.9	6.3	-	0.12
Tricoptera						
Hydroptilidae						
Ochrotrichia sp.	0.0	0.0	37.8	12.6	-	0.24
Heliocopsychidae						
Helicopsyche sp.	0.0	151.2	0.0	50.4	-	0.98
Total Tricoptera	0.0	151.2	37.8	63.0	-	1.22
Diptera						
Chironomidae	737.1	1701.0	1096.2	1178.1	-	22.91
Total Diptera	737.1	1701.0	1096.2	1178.1	-	22.91
Station Total	2249.1	5367.6	7811.1	5142.6	-	100.00

[a]Calculated for station total only.

TABLE A-42

BENTHIC DATA (EKMAN)

Site: Squaw Creek
Date: 08-05-75
Sampling Location A5

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Oligochaeta	18.9	56.7	75.6	50.4	-	6.61
Total Oligochaeta	18.9	56.7	75.6	50.4	-	6.61
Gastropoda						
Physidae						
Helisoma sp.	0.0	0.0	18.9	6.3	-	0.83
Total Gastropoda	0.0	0.0	18.9	6.3	-	0.83
Crustacea						
Copepoda						
Cyclopoida						
Cyclops sp.	0.0	18.9	0.0	6.3	-	0.83
Eucyclops agilis	0.0	37.8	0.0	12.6	-	1.65
Macrocyclops albidus	0.0	18.9	0.0	6.3	-	0.83
Amplipoda						
Talitridae						
Hyalella azteca	0.0	18.9	18.9	12.6	-	1.65
Total Crustacea	0.0	94.6	18.9	37.8	-	4.96
Ephemenoptera						
Tricorythidae						
Tricorythodes sp.	18.9	18.9	0.0	12.6	-	1.65
Total Ephemenoptera	18.9	18.9	0.0	12.6	-	1.65
Odonata						
Anisoptera	37.8	0.0	0.0	12.6	-	1.65
Total Odonata	37.8	0.0	0.0	12.6	-	1.65

TABLE A-42 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Coleoptera						
Hydrophilodae						
Berosus sp.	18.9	0.0	37.8	18.9	-	2.48
Total Coleoptera	18.9	0.0	37.8	18.9	-	2.48
Tricoptera						
Heliocopsychidae						
Helicopsyche sp.	18.9	0.0	0.0	6.3	-	0.83
Total Tricoptera	18.9	0.0	0.0	6.3	-	0.83
Diptera						
Chironomidae	945.0	359.1	548.1	617.4	-	80.99
Total Diptera	945.0	359.1	548.1	617.4	-	80.99
Station Total	1058.4	529.2	699.3	762.3	-	100.00

[a]Calculated for station total only.

TABLE A-43

BENTHIC DATA (BOX SAMPLER)

Site: Squaw Creek
Date: 08-05-75
Sampling Location A2

	NUMBER OF ORGANISMS PER METER SQUARED				Standard	Percent
Organism	Rep A	Rep B	Rep C	Mean	Deviation	Composition
[a]						

[a]Box samples were not taken at this station due to low water flow.

TABLE A-44

BENTHIC DATA (BOX SAMPLER)

Site: Squaw Creek
Date: 08-05-75
Sampling Location A3

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Turbellaria	111.0	0.0	0.0	37.0	-	0.58
Total Turbellaria	111.0	0.0	0.0	37.0	-	0.58
Oligochaeta	22.1	111.0	33.3	55.5	-	0.88
Total Oligochaeta	22.1	111.0	33.3	55.5	-	0.88
Gastropoda						
Physidae						
Physa sp.	0.0	0.0	33.3	11.1	-	0.17
Helisoma sp.	122.1	0.0	66.6	62.9	-	0.99
Ancylidae						
Ferrissia sp.	11.1	0.0	0.0	3.7	-	0.06
Total Gastropoda	133.2	0.0	99.9	77.7	-	1.22
Plecypoda						
Sphaeriidae						
Sphaerium sp.	11.1	0.0	0.0	3.7	-	0.06
Total Plecypoda	11.1	0.0	0.0	3.7	-	0.06
Arachnida						
Acarina	0.0	55.5	133.2	62.9	-	0.99
Total Arachnida	0.0	55.5	133.2	62.9	-	0.99
Crustacea						
Ostracoda						
Cypridae						
Cypridopsis vidua	122.1	0.0	0.0	40.7	-	0.64
Limnocythere sp.	0.0	0.0	122.1	40.7	-	0.64
Stenocypris sp.	0.0	11.1	44.4	18.5	-	0.29

TABLE A-44 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Copepoda						
Cyclopoida						
Macrocyclops albidus	0.0	22.2	11.1	11.1	-	0.18
Diaptomus sp.	11.1	0.0	0.0	3.7	-	0.06
Branchiopoda						
Diplostraca						
Cladocera						
Ilyocryptus spinifer	0.0	11.1	0.0	3.7	-	0.06
Simocephalus sp.	0.0	0.0	11.1	3.7	-	0.06
Amphipoda						
Talitridae						
Hyalella azteca	11.1	11.1	0.0	7.4	-	0.12
Total Crustacea	144.3	55.5	188.7	129.5	-	2.06
Ephemeroptera						
Baetidae						
Baetis sp.	1143.3	843.6	579.2	855.4	-	13.52
Tricorythidae						
Tricorythedes sp.	2730.6	2242.2	2675.1	2549.3	-	40.29
Total Ephemeroptera	3873.9	3085.8	3254.3	3404.7	-	53.81
Odonata						
Zygoptera	22.2	0.0	0.0	7.4	-	0.12
Anisoptera	66.6	0.0	0.0	22.2	-	0.35
Total Odonata	88.8	0.0	0.0	29.6	-	0.47

TABLE A-44 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Coleoptera						
Hydrophilidae						
Berosus sp.	11.1	0.0	0.0	3.7	-	0.06
Elmidae						
Ordobrevia sp.	22.2	0.0	0.0	7.4	-	0.12
Total Coleoptera	33.3	0.0	0.0	11.1	-	0.18
Tricoptera						
Hydroptilidae						
Hydroptila sp.	11.1	233.1	0.0	81.4	-	1.29
Hydropsychidae						
Cheumatopsyche sp.	0.0	122.1	22.2	48.1	-	0.76
Odontoceridae						
Marilina sp.	0.0	0.0	11.1	3.7	-	0.06
Heliocopsychidae						
Helicopsyche sp.	77.7	1576.2	233.1	629.0	-	9.94
Total Tricoptera	88.8	1931.4	266.4	762.2	-	12.05
Diptera						
Chironomidae	2930.4	810.3	1520.7	1753.8	-	27.72
Total Diptera	2930.4	810.3	1520.7	1753.8	-	27.72
Station Total	7436.9	6049.5	5496.5	6327.6	-	100.0

[a]Calculated for station total only.

TABLE A-45

BENTHIC DATA (BOX SAMPLER)

Site: Squaw Creek
Date: 08-05-75
Sampling Location A4

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Nematoda	0.0	0.0	22.2	7.4	-	0.06
Total Nematoda	0.0	0.0	22.2	7.4	-	0.06
Oligochaeta	0.0	11.1	0.0	3.7	-	0.03
Total Oligochaeta	0.0	11.1	0.0	3.7	-	0.03
Gastropoda						
Physidae						
Physa sp.	0.0	11.1	33.3	14.8	-	0.11
Aneylidae						
Ferrissia sp.	0.0	0.0	11.0	3.7	-	0.03
Total Gastropoda	0.0	11.1	44.4	18.5	-	0.14
Pelecypoda						
Sphaeriidae						
Sphaerium sp.	310.8	11.1	66.6	129.5	-	0.99
Total Pelecypoda	310.8	11.1	66.6	129.5	-	0.99
Arachnida						
Acarina	233.1	355.2	188.7	259.0	-	1.98
Total Arachnida	233.1	355.2	188.7	259.0	-	1.98

TABLE A-45 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Crustacea						
Ostraeada						
Cypridae						
Stenocypris sp.	1465.2	1953.6	4195.8	2538.2	-	19.41
Chlamydotheca sp.	0.0	88.8	910.2	333.0	-	2.55
Cypridopsis vidua	0.0	33.3	266.4	99.9	-	0.76
Copepoda						
Cyclopoida						
Eacyclops agilis	0.0	22.2	0.0	7.4	-	0.06
Macrocyclops albidus	0.0	0.0	11.1	3.7	-	0.03
Branchiopoda						
Diplostraea						
Cladocera						
Simoceptalus sp.	0.0	0.0	11.1	3.7	-	0.03
Amphipoda						
Talitridae						
Hyalella azteca	0.0	266.4	77.7	114.7	-	0.88
Total Crustacea	1465.2	2364.3	5472.3	3100.6	-	23.72
Eplemeroptera						
Baetidae						7.98
Baetis sp.	266.4	2253.3	610.5	1043.4	-	
Tricorythidae						
Tricarythodes sp.	1143.3	9479.4	1254.3	3959.0	-	30.28
Total Eplemenoptera	1409.7	11732.7	1864.8	5002.4	-	38.26

TABLE A-45 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Odonata						
Zygoptera	666.0	133.2	910.2	569.8	-	4.36
Anisoptera	710.4	11.1	77.7	266.4	-	2.04
Total Odonata	1376.4	144.3	987.9	836.2	-	6.40
Coleoptera	0.0	0.0	11.1	3.7	-	0.03
Total Coleoptera	0.0	0.0	11.1	3.7	-	0.03
Tricoptera						
Hydroptilidae						
Hydroptila sp.	1010.1	77.7	22.2	370.0	-	2.83
Hydropsychida						
Cheumatopsyche sp.	588.3	0.0	177.6	255.3	-	1.95
Odontoceridae						
Marilia sp.	177.6	22.2	66.6	88.8	-	0.68
Heliocopsychidae						
Helicopsyhe sp.	3352.2	33.3	2519.7	1968.4	-	15.06
Total Tricoptera	5128.2	99.9	2786.1	2671.4	-	20.43
Diptera						
Tabinodae						
Tabanus sp.	0.0	22.2	111.0	44.4	-	0.34
Chironomidae	543.9	1565.1	765.9	958.3	-	7.33
Ceratoposgnidae	0.0	0.0	111.0	37.0	-	0.28
Total Diptera	543.9	1587.3	987.9	1039.7	-	7.95
Station Total	10467.3	16317.0	12432.0	13072.1	-	100.00

[a]Calculated for station total only.

TABLE A-46

BENTHIC DATA (BOX SAMPLER)

Site: Squaw Creek
Date: 08-05-75
Sampling Location A5

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Nematoda	11.1	0.0	33.3	14.8	-	0.64
Total Nematoda	11.1	0.0	33.3	14.8	-	0.64
Oligochaeta	44.4	66.6	0.0	37.0	-	1.60
Total Oligochaeta	44.4	66.6	0.0	37.0	-	1.60
Archnida						
Acarina	11.1	0.0	44.4	18.5	-	0.80
Total Archnida	11.1	0.0	44.4	18.5	-	0.80
Crustacea						
Ostrocoda						
Cypridae						
Cypridopsis vidua	0.0	0.0	22.2	7.4	-	0.32
Copepoda						
Cyclopoida						
Marcoyclops albidus	0.0	0.0	11.1	3.7	-	0.16
Total Crustacea	0.0	0.0	33.3	11.1	-	0.48

TABLE A-46 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Ephemeroptera						
Baetidae						
Baetis sp.	11.1	210.9	155.4	125.8	-	5.44
Tricorythidae						
Tricorythedes sp.	399.6	177.6	610.5	395.9	-	17.12
Total Ephemeroptera	410.7	388.5	765.9	521.7	-	22.56
Odonata						
Zygoptera	88.8	44.4	44.4	59.2	-	2.56
Anisoptera	122.1	33.3	55.5	70.3	-	3.04
Total Odonata	210.9	77.7	99.9	129.5	-	5.60
Tricoptera						
Hydroptilidae						
Hydroptila sp.	0.0	55.5	0.0	18.5	-	0.80
Hydropsychidae						
Cheumatopsyche sp.	0.0	44.4	55.5	33.3	-	1.44
Heliocopsychidae						
Helicopsyche sp.	455.1	632.7	821.7	636.5	-	27.52
Total Tricoptera	455.1	732.6	877.2	688.3	-	29.76

TABLE A-46 (Cont'd)

Organism	NUMBER OF ORGANISMS PER METER SQUARED Rep A	Rep B	Rep C	Mean	Standard Deviation[a]	Percent Composition
Diptera						
Tabinidae						
Tabanus sp.	44.4	111.0	111.0	88.8	-	3.84
Chironomidae	832.5	255.3	810.3	632.7	-	27.36
Ceratopogonidae	88.8	177.6	233.1	166.5	-	7.20
Hemercdonidae						
Hemerodromia sp.	0.0	11.1	0.0	3.7	-	0.16
Total Diptera	965.2	555.0	11154.4	891.5	-	38.55
Station Total	2108.5	1820.4	3008.4	2312.4	-	100.00

[a]Calculated for station total only.

TABLE A-47

FISH SPECIES COLLECTED FROM SQUAW CREEK 1-28-75

Family[1] Scientific Name Common Name	Sampling Locations[2] A_1	 A_2	 A_3	 A_4
Cyprinidae (Minnows)				
Campostoma anomalum (Rafinesque)			X	
Stoneroller				
Notropis emiliae (Hay)	X			
Pugnose Minnow				
Notropis venustus (Girard)	X			X
Blacktail Shiner				
Ictaluridae (Catfishes)				
Ictalurus natalis (Lesueur)	X			
Yellow Bullhead				
Cyprinodontidae (Killifishes)				
Fundulus notatus (Rafinesque)	X	X	X	X
Blackstripe Topminnow				
Poeciliidae (Livebearers)				
Gambusia affinis (Baird and Girard)	X	X	X	X
Mosquitofish				
Centrarchidae (Sunfishes)				
Lepomis cyanellus Rafinesque	X	X	X	X
Green Sunfish				
Lepomis macrochirus Rafinesque	X	X	X	
Bluegill Sunfish				
Lepomis megalotis (Rafinesque)	X	X	X	X
Longear Sunfish				
Micropterus punctulatus (Rafinesque)			X	X
Spotted Bass				
Micropterus salmoides (Lace'pede')				X
Largemouth Bass				
Pericidae (Darters)				
Etheostoma spectabile (Agissiz)			X	X
Orangethroat Darter				

[1]Nomenclature according to Bailey et al., 1970.

[2]X indicates species collected at this station.

TABLE A-48

FISH SPECIES COLLECTED FROM SQUAW CREEK, SPRING, 1975

Family[a] Scientific Name Common Name	Sampling Locations[b] A_0	A_1	A_2	A_3	A_4
Cyprinidae (Minnows)					
Campostoma anomalum (Rafinesque) Stoneroller			X		
Notropis venustus (Girard) Blacktail Shiner		X			X
Pimephales vigilax (Baird and Girard) Bullhead Minnow				X	
Catostomidae (Suckers)					
Moxostoma congestum (Baird and Girard) Gray Redhorse					X
Ictaluridae (Catfishes)					
Ictalurus melas (Rafinesque) Black Bullhead			X		
Ictalurus natalis (Lesueur) Yellow Bullhead	X	X	X	X	X
Ictalurus punctatus (Rafinesque) Channel Catfish					X
Cyprinodontidae (Killifishes)					
Fundulus notatus (Rafinesque) Blackstripe Topminnow		X	X	X	
Poeciliidae (Livebearers)					
Gambusia affinis (Baird and Girard) Mosquitofish	X	X	X	X	
Centrarchidae (Sunfishes)					
Lepomis cyanellus Rafinesque Green Sunfish	X	X	X	X	X
Lepomis humilis (Girard) Orangespotted Sunfish	X	X	X	X	X
Lepomis macrochirus Rafinesque Bluegill Sunfish	X		X		
Lepomis megalotis (Rafinesque) Longear Sunfish	X		X	X	X
Micropterus punctulatus (Rafinesque) Spotted Bass	X	X			X
Pomoxis annularis Rafinesque White Crappie			X		

TABLE A-48 (Cont'd)

Family[a] Scientific Name Common Name	Sampling Locations[b] A_0	A_1	A_2	A_3	A_4
Pericidae (Darters)					
Etheostoma spectabile (Agissiz)				X	
Orangethroat Darter					

[a]Nomenclature according to Bailey et al., 1970.

[b]X indicates species collected at this station.

TABLE A-49

FISH SPECIES COLLECTED FROM SQUAW CREEK, SUMMER 1975

Family[a] Scientific Name Common Name	Sampling Locations[b] A_0	A_1	A_2	A_3	A_4	A_5
Cyprinidae (Minnows)						
Campostoma anomalum (Rafinesque) Stoneroller	X	X	X	X	X	X
Notropis venustus (Girard) Blacktail shiner	X	X	X	X	X	X
Catostomidae (Suckers)						
Carpiodes carpio (Rafinesque) River carpsucker		X				
Ictaluridae (Catfishes)						
Ictalurus melas (Rafinesque) Black bullhead		X				
Ictalurus natalis (Lesueur) Yellow bullhead	X			X	X	
Ictalurus punctatus (Rafinesque) Channel catfish		X				
Cyprinodontidae (Killifishes)						
Fundulus notatus (Rafinesque) Blackstripe topminnow		X	X			X
Poeciliidae (Livebearers)						
Gambusia affinis (Baird and Girard) Mosquitofish	X	X	X	X		
Centrarchidae (Sunfishes)						
Lepomis cyanellus (Rafinesque) Green sunfish	X	X	X	X	X	X
Lepomis macrochirus (Rafinesque) Bluegill	X		X		X	
Lepomis megalotis (Rafinesque) Longear sunfish	X	X	X	X	X	X
Micropterus punctulatus (Rafinesque) Spotted bass	X	X	X	X	X	X
Micropterus salmoides (Lacépède) Largemouth bass		X	X			
Percidae (Darters)						
Etheostoma spectabile (Rafinesque) Orangethroat darter	X		X	X		X

[a]Common and scientific names are according to Bailey, et al., 1970. A list of common and scientific names of fishes from the United States and Canada. 3rd Edition, Special Publication No. 6, American Fisheries Society, Washington, D.C.

[b]X indicates species was collected at this station.

TABLE A-50

CLASSIFICATION OF SEXUAL CONDITION IN FISHES

I. IMMATURE

Young individuals which have not yet engaged in reproduction; gonads of very small size.

II. RESTING STAGE

Sexual products have not yet begun to develop; gonads of very small size; eggs not distinguishable to the naked eye.

III. MATURATION

Eggs distinguishable to the naked eye; a very rapid increase in weight of the gonad is in progress; testes change from transparent to a pale rose colour.

IV. MATURITY

Sexual products ripe; gonads have achieved their maximum weight, but the sexual products are still not extruded when light pressure is applied.

V. REPRODUCTION

Sexual products are extruded in response to very light pressure on the belly; weight of the gonads decreases rapidly from the start of spawning to its completion.

VI. SPENT CONDITION

The sexual products have been discharged; genital aperture inflamed; gonads have the appearance of deflated sacs, the ovaries usually containing a few left-over eggs, and the testes some residual sperm.

VII. RESTING STAGE

Sexual products have been discharged; inflammation around the genital aperture has subsided; gonads of very small size; eggs not distinguishable to the naked eye.

After Nikolsky, 1963.

TABLE A-51

FISHES COLLECTED FROM SQUAW CREEK NEAR GLEN ROSE, SOMERVELL COUNTY, TEXAS DURING THE WINTER, 1975 COLLECTING PERIOD

	Sampling Location and Sampling Method[1]															
	A_1				A_2				A_3				A_4			
Organism[2]	Sd	Sn	E	M	Sd	Sn	E	M	Sd	Sn	E	M	Sd	Sn	E	M
Cyprinidae (Minnows)																
Stoneroller	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Pugnose Minnow	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Blacktail Shiner	1	-	3	-	-	-	-	-	-	-	-	-	2	2	-	-
Ictaluridae (Catfishes)																
Yellow Bullhead	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyprinodontidae (Killifishes)																
Blackstripe Topminnow	-	1	3	-	1	-	-	-	-	-	3	-	5	-	-	-
Poeciliidae (Livebearers)																
Mosquitofish	34	97	3	-	81	56	4	-	8	6	-	-	-	1	6	-
Centrarchidae																
Green Sunfish	2	1	8	-	2	3	3	1	4	-	-	1	1	-	2	-
Bluegill Sunfish	4	-	-	-	2	2	-	1	4	-	-	2	-	-	-	-
Longear Sunfish	3	-	4	-	-	-	-	2	15	1	-	8	25	5	-	-
Lepomis sp.[3]	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Spotted Bass	-	-	-	-	-	-	-	-	1	-	-	-	3	-	-	-
Largemouth Bass	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Percidae																
Orangethroat Darter	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-
Total Fish Caught By Method	45	99	24	0	86	62	7	4	32	7	5	11	39	8	8	0

[1] Sampling Method
Sd = Seine - 25 foot minnow seine or 30 foot bagseine - daylight hours.
Sn = Seine - 25 foot minnow seine or 30 foot bagseine - night.
E = Electroshocker
M = Minnow Trap

[2] Nomenclature according to Bailey, et al., 1970.

[3] Identification to species not possible due to physical condition of the specimen. It is assumed that this specimen is one of the three listed species.

TABLE A-52

FISHES COLLECTED FROM SQUAW CREEK
NEAR GLEN ROSE, SOMERVELL COUNTY, TEXAS
DURING THE SPRING, 1975 COLLECTING PERIOD

Organism[b]	SAMPLING LOCATIONS AND SAMPLING METHODS[a]																				
	A_0				A_1				A_2				A_3				A_4				
	Sd	Sn	E	M	Sd	Sn	E	M	Sd	Sn	E	M	Sd	Sn	E	M	Sd	Sn	E	M	
Cyprinidae (Minnows)																					
Stoneroller	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	
Blacktail Shiner	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	1	2	-	-	
Bullhead Minnow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	
Catostomidae (Suckers)																					
Gray Redhorse	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
Ictaluridae (Catfishes)																					
Black Bullhead	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	
Yellow Bullhead	-	-	2	-	-	-	1	-	-	1	3	-	-	-	1	-	-	-	3	-	
Channel Catfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	
Cyprinodontidae (Killifishes)																					
Blackstripe Topminnow	-	-	-	-	-	-	4	-	1	-	-	-	-	2	-	-	-	-	-	-	
Poeciliidae (Livebearers)																					
Mosquitofish	2	2	-	-	-	224	1	-	20	16	6	-	2	2	-	-	-	-	-	-	
Centrarchidae (Sunfishes)																					
Green Sunfish	-	7	3	-	-	2	14	-	-	-	11	-	-	-	9	-	-	1	7	-	
Orangespotted Sunfish	1	-	1	-	2	-	1	-	-	-	3	-	3	-	1	2	-	3	-	-	
Bluegill Sunfish	5	9	2	-	-	-	-	-	7	-	1	-	-	-	-	-	-	-	-	-	
Longear Sunfish	-	-	4	-	-	-	-	-	-	5	4	-	-	16	-	-	-	8	10	-	
Spotted Bass	1	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	1	4	-	
White Crappie	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	
Percidae (Darters)																					
Orangethroat Darter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	
Total Fish Caught by Method	9	19	12	0	4	227	25	0	28	26	31	0	5	20	13	2	1	15	27	0	
Total Fish Collected	(40)				(256)				(85)				(40)				(43)				(464)

[a] Sampling Method
Sd = Seine - 25 foot minnow seine or 30 foot bagseine - daylight hours.
Sn = Seine - 25 foot minnow seine or 30 foot bagseine - night.
E = Electroshocker
M = Minnow Trap

[b] Common names according to Bailey, R. M., Editor, A List of Common and Scientific Names of Fishes From the United States and Canada, 3rd Edition, 1970, pp. 150.

TABLE A-53

FISHES COLLECTED FROM SQUAW CREEK
NEAR GLEN ROSE, SOMERVELL COUNTY, TEXAS
DURING THE SUMMER, 1975 COLLECTING PERIOD

	SAMPLING LOCATIONS AND SAMPLING METHODS[a]																								
	A_0				A_1				A_2				A_3				A_4				A_5				Total All
Species[b]	Sd	Sn	E	M	Sd	Sn	E	M	Sd	Sn	E	M	Sd	Sn	E	M	Sd	Sn	E	M	Sd	Sn	E	M	Locations
Cyprinidae (Minnows)																									
Stoneroller	-	-	10	-	133	-	-	-	4	6	5	-	-	2	8	-	-	-	1	-	-	5	5	-	179
Blacktail shiner	3	-	-	-	4	-	-	-	8	2	-	-	5	-	-	-	9	1	-	-	78	6	-	-	116
Catostomidae (Suckers)																									
River carpsucker	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Ictaluridae (Catfishes)																									
Black bullhead	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Yellow bullhead	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	3
Channel catfish	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Cyprinodontiadae (Killifishes)																									
Blackstripe topminnow	-	-	-	-	4	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	6
Poeciliidae (Livebearers)																									
Mosquitofish	25	-	-	-	-	35	-	-	31	10	-	-	13	3	-	-	-	-	-	-	-	-	-	-	117
Centrarchidae (Sunfishes)																									
Green sunfish	5	1	8	-	-	-	3	-	-	-	4	-	1	-	2	-	1	-	2	-	-	-	1	-	28
Bluegill sunfish	9	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	11
Longear sunfish	3	6	-	7	-	-	1	3	11	7	2	2	4	-	3	-	3	2	8	-	-	5	-	-	67
Spotted bass	1	1	6	-	9	1	-	1	4	2	-	-	-	-	2	-	3	-	-	-	1	-	-	-	31
Largemouth bass	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Unidentified sunfish	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Percidae (Darters)																									
Orangethroat darter	2	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	-	-	1	-	6
Total Fish Caught by Method	51	8	25	7	152	36	6	4	60	28	13	2	23	6	16	0	17	4	11	0	79	17	7	0	
Total Fish Collected	(91)				(198)				(103)				(45)				(32)				(103)				572

[a] Sampling Method
Sd = Daylight seine with 25 foot minnow seine or 30 foot bagseine.
Sn = Night seine with 25 foot minnow seine or 30 foot bagseine.
E = Electroshocker
M = Minnow Trap

[b] Common names are according to Bailey, *et al.*, 1970. A list of common and scientific names of fishes from the United States and Canada. 3rd Edition, Special Publication No. 6, American Fisheries Society, Washington, D.C.

TABLE A-54

FISHERY INFORMATION COLLECTED FROM SQUAW CREEK NEAR GLEN ROSE, SOMERVELL COUNTY, TEXAS, DURING THE WINTER, 1975, COLLECTING PERIOD

Species	Length (mm)	Weight (gm)	Gonadal Condition[3]	Condition Factor	Collection Number
Sampling Location: A_1-A[1]					
Collection Method: 15 min minnow seining					
Collection time: 0730 01-28-75					
Centrarchidae					
Lepomis cyanellus (Green sunfish)	77	5.9	I	1.29	S1A01
Lepomis macrochirus (Bluegill)	30	0.4	I	1.48	S1A02
Ictaluridae					
Ictalurus natalis (Yellow bullhead)	78	6.8	I	1.43	S1A03
Poeciliidae					
Gambusia affinis (Mosquito fish)	Range 11-40 mm	Range 0.1 g to 1.3 g Total weight 9.1 grams	5M 32F	37 Total specimens	
Sampling Location: A_1-B					
Collection Method: 15 min minnow seining					
Collection Time: 0730 01-28-75					
Cyprinidae					
Notropis venustus (Blacktail shiner)	70	3.8	M-II	1.11	S1B01
Sampling Location: A_1-C					
No fish collected					

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_1-D					
Collection Method: 15 min minnow seining					
Collection Time: 0730 01-28-75					
Centrarchidae					
Lepomis cyanellus (Green sunfish)	42	1.5	I	2.02	S1D03
Lepomis macrochirus (Bluegill)	30	0.4	I	1.48	S1D02
Lepomis macrochirus (Bluegill)	97	13.7	F-II	1.50	S1D01
Poeciliidae					
Gambusia affinis (Mosquito fish)	25	0.3	M	1.92	S1D04
Gambusia affinis (Mosquito fish)	30	0.3	F	1.11	S1D05
Sampling Location: A_1-E					
Collection Method: 15 min minnow seining					
Collection Time: 0730 01-28-75					
Centrarchidae					
Lepomis macrochirus (Bluegill)	24	0.3	I	2.17	S1E01
Lepomis megalotis (Longear sunfish)	32	0.8	I	2.44	S1E02
Lepomis megalotis (Longear sunfish)	38	1.2	I	2.19	S1E03
Lepomis megalotis (Longear sunfish)	51	2.5	I	1.88	S1E04

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_1-N					
Collection Method: 15 min minnow seining					
Collection Time: 2150 01-28-75					
Centrarchidae					
Lepomis cyanellus (Green sunfish)	43	1.5	I	1.89	S1N01
Cyprinodontidae					
Fundulus notatus (Blackstripe topminnow)	67	3.5	M	1.16	S1N02
Poeciliidae					
Gambusia affinis (Mosquitofish)	43	1.6	F	2.01	S1N07
Gambusia affinis (Mosquitofish)	46	1.8	F	1.85	S1N06
Gambusia affinis (Mosquitofish)	47	1.8	F	1.73	S1N03
Gambusia affinis (Mosquitofish)	48	1.8	F	1.63	S1N04
Gambusia affinis (Mosquitofish)	49	1.9	F	1.61	S1N05
Gambusia affinis (Mosquitofish)	Range 21-42 mm	Range 0.4 g - 1.6 g	26M 66F	92 Total specimens	

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_1-S					
Collection Method: 15 min electroshocking					
Collection Time: 1100 01-28-75					
Centrarchidae					
Lepomis cyanellus (Green sunfish)	75	9.9	M-II	2.35	S1S11
Lepomis cyanellus (Green sunfish)	83	10.4	M-II	1.82	S1S10
Lepomis cyanellus (Green sunfish)	89	13.7	M-II	1.94	S1S09
Lepomis cyanellus (Green sunfish)	100	18.5	M-II	1.85	S1S08
Lepomis cyanellus (Green sunfish)	105	22.0	F-II	1.90	S1S06
Lepomis cyanellus (Green sunfish)	111	21.0	F-II	1.54	S1S04
Lepomis cyanellus (Green sunfish)	115	24.0	M-II	1.58	S1S07
Lepomis cyanellus (Green sunfish)	146	50.0	M-II	1.61	S1S05
Lepomis megalotis (Longear sunfish)	56	4.0	I	2.28	S1S15
Lepomis megalotis (Longear sunfish)	63	5.0	M-II	2.00	S1S14
Lepomis megalotis (Longear sunfish)	74	7.5	M-II	1.85	S1S13
Lepomis megalotis (Longear sunfish)	79	8.2	M-II	1.66	S1S12
Cyprinidae					
Notropis emiliae (Pugnose minnow)	26	0.4	I	2.28	S1S21
Notropis emiliae (Pugnose minnow)	30	0.5	I	1.85	S1S20
Notropis emiliae (Pugnose minnow)	36	0.7	I	1.50	S1S19
Notropis venustus (Blacktail shiner)	61	2.5	M-II	1.10	S1S17
Notropis venustus (Blacktail shiner)	63	2.8	M-II	1.12	S1S16
Notropis venustus (Blacktail shiner)	73	3.7	M-II	0.95	S1S18

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_1-S Continued					
Cyprinodontidae					
Fundulus notatus (Blackstripe topminnow)	55	1.5	F	0.90	S1S03
Fundulus notatus (Blackstripe topminnow)	56	1.5	F	0.85	S1S02
Fundalus notatus (Blackstripe topminnow)	68	2.0	M	0.64	S1S01
Poeciliidae					
Gambusia affinis (Mosquitofish)	Range 20-37 mm	Range 0.3 g - 0.6 g Total weight 10.0 grams	11M 28F	39 Total specimens	
Sampling Location: A_1-M					
No fish collected					
Sampling Location: A_2-A					
No fish collected					
Sampling Location: A_2-B					
Collection Method: 15 min minnow seining					
Collection Time: 1200 01-28-75					
Centrarchidae					
Lepomis cyanellus (Green sunfish)	56	3.9	I	2.22	S2B04
Lepomis cyanellus (Green sunfish)	201	148.0	M-II	1.82	S2B03
Lepomis macrochirus (Bluegill)	42	1.4	I	1.89	S2B05
Lepomis macrochirus (Bluegill)	124	34.0	M-II	1.78	S2B01

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_2-B Continued					
Cyprinodontidae					
Fundulus notatus (Blackstripe topminnow)	54	1.6	M-II	1.02	S2B02
Poeciliidae					
Gambusia affinis (Mosquitofish)	Range 18-47 mm	Range 0.4 g - 1.8 g Total weight 16.5 grams	5M 37F	42 Total specimens	
Sampling Location: A_2-N					
Collection Method: 15 min minnow seining					
Collection Time: 2100 01-28-75					
Centrarchidae					
Lepomis cyanellus (Green sunfish)	35	1.6	I	3.43	S2N03
Lepomis cyanellus (Green sunfish)	37	1.6	I	3.16	S2N04
Lepomis cyanellus (Green sunfish)	66	6.0	M-II	2.09	S2N03
Lepomis macrochirus (Bluegill)	23	0.5	I	4.11	S2N02
Lepomis macrochirus (Bluegill)	47	1.6	I	1.54	S2N01
Lepomis sp. (Unid. sunfish)	19	0.4	I	5.83	S2N06
Poeciliidae					
Gambusia affinis (Mosquitofish)	Range 18-40 mm	Range 0.2 g - 1.7 g Total weight 25.5 grams	9M 47F	56 Total specimens	

TABLE A-54 (Cont'd)

Sampling Location: A_2-M

Collection Method: 24 hour minnow trapping

Collection Time: 0900 01-28-75

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Centrarchidae					
Lepomis cyanellus (Green sunfish)	80	8.9	F-II	1.74	S2M02
Lepomis macrochirus (Bluegill)	65	5.0	M-II	1.82	S2M01
Lepomis megalotis (Longear sunfish)	71	7.1	I	1.98	S2M04
Lepomis megalotis (Longear sunfish)	76	9.8	I	2.23	S2M03

Sampling Location: A_2-S

Qualitative sampling only

Sampling Location: A_3-A

Collection Method: 15 min minnow seining

Collection Time: 1430 01-28-75

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Centrarchidae					
Lepomis cyanellus (Green sunfish)	50	2.3	I	1.84	S3A11
Lepomis cyanellus (Green sunfish)	57	3.8	I	2.05	S3A10
Lepomis cyanellus (Green sunfish)	175	88.0	M-II	1.64	S3A01
Lepomis macrochirus (Bluegill)	47	1.9	I	1.83	S3A08
Lepomis macrochirus (Bluegill)	49	2.0	I	1.70	S3A09
Lepomis megalotis (Longear sunfish)	100	20.0	M	2.00	S3A07
Lepomis megalotis (Longear sunfish)	125	38.0	F	1.95	S3A05
Lepomis megalotis (Longear sunfish)	125	38.0	F	1.95	S3A06
Lepomis megalotis (Longear sunfish)	126	40.0	F	2.00	S3A04
Lepomis megalotis (Longear sunfish)	128	44.0	F-II	2.10	S3A03
Micropterus punctulatus (Spotted bass)	158	44.0	I	1.12	S3A02

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_3-A Continued					
Poeciliidae					
Gambusia affinis (Mosquitofish)	Range 24-40 mm	Range 0.3 g - 0.8 g Total weight 3.0 grams	2M 6F	8 Total individuals	
Sampling Location: A_3-B					
No fish collected					
Sampling Location: A_3-N					
Collection Method: 15 min minnow seining					
Collection Time: 2330 01-28-75					
Centrarchidae					
Lepomis megalotis (Longear sunfish)	90	16.4	I	2.25	S3N01
Poeciliidae					
Gambusia affinis (Mosquitofish)	Range 23-43 mm	Range 0.2 g - 1.3 g Total weight 2.9 grams	2M 4F	6 Total specimens	

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_3-S					
Collection Method: 15 min electroshocking					
Collection Time: 1530 01-28-75					
Cyprinidae					
Campostoma Anomalum (Stoneroller)	62	3.5	M-II	1.47	S3S04
Cyprinodontidae					
Fundulus notatus (Blackstripe topminnow)	41	1.3	F	1.89	S3S02
Fundulus notatus (Blackstripe topminnow)	54	1.7	F	1.08	S3S02
Fundulus notatus (Blackstripe topminnow)	61	2.2	M	0.97	S3S01
Percidae					
Etheostoma spectabile (Orangethroat darter)	59	3.0	F-IV	1.46	S3S05
Sampling Location: A_3-M					
Collection Method: 24 hour minnow trapping					
Collection Time: 1000 01-29-75					
Centrarchidae					
Lepomis cyanellus (Green sunfish)	79	5.3	I	1.07	S3M03
Lepomis macrochirus (Bluegill)	47	1.3	I	1.25	S3M01
Lepomis macrochirus (Bluegill)	52	1.7	I	1.21	S3M02

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_3-M Continued					
Lepomis megalotis (Longear sunfish)	51	1.5	I	1.13	S3M11
Lepomis megalotis (Longear sunfish)	62	3.3	I	1.38	S3M10
Lepomis megalotis (Longear sunfish)	68	3.4	I	1.08	S3M09
Lepomis megalotis (Longear sunfish)	72	4.4	I	1.18	S3M04
Lepomis megalotis (Longear sunfish)	74	4.4	I	1.09	S3M07
Lepomis megalotis (Longear sunfish)	75	4.6	I	1.09	S3M06
Lepomis megalotis (Longear sunfish)	76	5.0	I	1.14	S3M08
Lepomis megalotis (Longear sunfish)	79	5.3	I	1.12	S3M05
Sampling Location: A_4-A					
Collection Method: 15 min minnow seining					
Collection Time: 1630 01-28-75					
Centrarchidae					
Lepomis cyanellus (Green sunfish)	171	81.6	M-II	1.63	S4A05
Lepomis megalotis (Longear sunfish)	63	4.0	I	1.60	S4A11
Lepomis megalotis (Longear sunfish)	71	7.0	I	1.96	S4A09
Lepomis megalotis (Longear sunfish)	77	9.1	I	1.99	S4A10
Lepomis megalotis (Longear sunfish)	86	13.9	M-II	2.19	S4A07
Lepomis megalotis (Longear sunfish)	86	13.6	I	2.14	S4A28
Lepomis megalotis (Longear sunfish)	87	14.5	I	2.20	S4A08
Lepomis megalotis (Longear sunfish)	88	13.6	F-II	2.00	S4A21
Lepomis megalotis (Longear sunfish)	91	16.5	I	2.19	S4A18
Lepomis megalotis (Longear sunfish)	91	16.7	F-II	2.22	S4A22
Lepomis megalotis (Longear sunfish)	91	15.0	I	1.99	S4A27

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_4-A Continued					
Lepomis megalotis (Longear sunfish)	94	17.0	I	2.05	S4A26
Lepomis megalotis (Longear sunfish)	95	18.5	F-II	2.16	S4A24
Lepomis megalotis (Longear sunfish)	97	21.0	I	2.30	S4A20
Lepomis megalotis (Longear sunfish)	97	19.5	F-II	2.14	S4A23
Lepomis megalotis (Longear sunfish)	99	21.1	F-II	2.17	S4A17
Lepomis megalotis (Longear sunfish)	100	24.9	M-II	2.49	S4A25
Lepomis megalotis (Longear sunfish)	102	23.8	M-II	2.24	S4A15
Lepomis megalotis (Longear sunfish)	103	26.1	M-II	2.39	S4A14
Lepomis megalotis (Longear sunfish)	103	26.4	M-II	2.42	S4A16
Lepomis megalotis (Longear sunfish)	105	26.2	M-II	2.26	S4A19
Lepomis megalotis (Longear sunfish)	106	25.0	M-II	2.10	S4A12
Lepomis megalotis (Longear sunfish)	107	28.5	M-II	2.33	S4A13
Lepomis megalotis (Longear sunfish)	149	60.0	M-II	1.81	S4A06
Micropterus punctulatus (Spotted bass)	171	65.6	M-II	1.31	S4A04
Micropterus punctulatus (Spotted bass)	193	93.6	F-III	1.30	S4A03
Micropterus punctulatus (Spotted bass)	203	93.5	M-II	1.12	S4A-2
Micropterus salmoides (Largemouth bass)	193	102.4	F-II	1.42	S4A01
Cyprinodontidae					
Fundulus notatus (Blackstripe topminnow)	47	1.3	F	1.25	S4A30
Fundulus notatus (Blackstripe topminnow)	53	1.8	M	1.21	S4A33
Fundulus notatus (Blackstripe topminnow)	55	2.1	M	1.26	S4A32
Fundulus notatus (Blackstripe topminnow)	58	2.2	M	1.13	S4A31
Fundulus notatus (Blackstripe topminnow)	61	2.5	M	1.10	S4A29

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_4-B					
Collection Method: 15 min minnow seining					
Collection Time: 1630 01-28-75					
Centrarchidae					
Lepomis megalotis (Longear sunfish)	89	14.0	F-II	1.99	S4B02
Lepomis megalotis (Longear sunfish)	92	18.0	M-II	2.31	S4B01
Cyprinidae					
Notropis venustus (Blacktail shiner)	62	2.3	M-II	0.97	S4B04
Notropis venustus (Blacktail shiner)	63	2.4	M-II	0.96	S4B-3
Poeciliidae					
Gambusia affinis (Mosquitofish)	Range 21-38 mm	Range 0.2 g - 1.0 g Total weight 1.6 grams	OM 4F	4 Total specimens	
Percidae					
Etheostoma spectabile (Orangethroat darter)	50	2.0	F-IV	1.60	S4B05
Etheostoma spectabile (Orangethroat darter)	52	2.0	F-IV	1.42	S4B-6

TABLE A-54 (Cont'd)

Species	Length (mm)	Weight (gm)	Gonadal Condition	Condition Factor	Collection Number
Sampling Location: A_4-N					
Collection Method: 15 min minnow seining					
Collection Time: 2400 01-28-75					
Centrarchidae					
Lepomis megalotis (Longear sunfish)	57	4.9	I	2.65	S4N05
Lepomis megalotis (Longear sunfish)	70	6.8	M-II	1.98	S4N04
Lepomis megalotis (Longear sunfish)	79	10.4	I	2.11	S4N03
Lepomis megalotis (Longear sunfish)	84	11.8	F-II	1.99	S4N02
Lepomis megalotis (Longear sunfish)	150	70.3	M-II	2.08	S4N01
Cyprinidae					
Notropis venustus (Blacktail shiner)	38	1.1	I	2.00	S4N07
Notropis venustus (Blacktail shiner)	55	2.2	M	1.32	S4N06
Poeciliidae					
Gambusia affinis (Mosquitofish)	28	0.8	F	3.64	S4N08

Sampling Location: A_4-S

Qualitative sampling only

Sampling Location: A_4-M

No fish collected

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[1] A_1-A - Samping Location A_1, seine haul A(#1), B(#2), C(#3), D(#4), E(#5), N(Night seine), M(Minnow trap), S(Electro-shocker).

[2] Scientific and common names according to Baily, et al., 1970.

[3] Gonadal Condition generally follows definitions in Nikolsky (1963): I=Immature, M-II=Male stage, etc; M=Male, F=Female; for *Gambusia* sp. 5M=5 males, 32 F=32 Females.

TABLE A-55

FISHERY INFORMATION COLLECTED FROM SQUAW CREEK
NEAR GLEN ROSE, SOMERVELL COUNTY, TEXAS
DURING THE SPRING, 1975 COLLECTING PERIOD

SAMPLING STATION: S-00-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 2055-04-01-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	49.0	1.0	I	0.85	SON08
LEPOMIS CYANELLUS (GREEN SUNFISH)	51.0	2.0	I	1.51	SON06
LEPOMIS CYANELLUS (GREEN SUNFISH)	51.0	2.0	I	1.51	SON07
LEPOMIS CYANELLUS (GREEN SUNFISH)	61.0	3.0	I	1.32	SON05
LEPOMIS CYANELLUS (GREEN SUNFISH)	77.0	6.0	I	1.31	SON04
LEPOMIS CYANELLUS (GREEN SUNFISH)	89.0	8.0	I	1.13	SON03
LEPOMIS CYANELLUS (GREEN SUNFISH)	125.0	28.0	F-2	1.43	SON02
LEPOMIS MACROCHIRUS (BLUEGILL)	34.0	1.0	I	2.54	SON17
LEPOMIS MACROCHIRUS (BLUEGILL)	78.0	7.0	I	1.48	SON16
LEPOMIS MACROCHIRUS (BLUEGILL)	85.0	9.0	I	1.47	SON15
LEPOMIS MACROCHIRUS (BLUEGILL)	89.0	9.0	M-2	1.28	SON13
LEPOMIS MACROCHIRUS (BLUEGILL)	91.0	10.0	M-2	1.33	SON12
LEPOMIS MACROCHIRUS (BLUEGILL)	95.0	12.0	M-2	1.40	SON10
LEPOMIS MACROCHIRUS (BLUEGILL)	95.0	12.0	M-2	1.40	SON14
LEPOMIS MACROCHIRUS (BLUEGILL)	97.0	13.0	M-2	1.42	SON11
LEPOMIS MACROCHIRUS (BLUEGILL)	122.0	32.0	M-2	1.76	SON09
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	103.0	10.0	I	0.92	SON01
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITOFISH)	27.0	0.5	F	2.54	SON18
GAMBUSIA AFFINIS (MOSQUITOFISH)	30.0	0.6	F	2.22	SON19

TABLE A-55 (Cont'd)

SAMPLING STATION: S-00-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 0850 04-02-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	88.0	12.0	I	1.76	S0A07
LEPOMIS MACROCHIRUS (BLUEGILL)	53.0	2.0	I	1.34	S0A06
LEPOMIS MACROCHIRUS (BLUEGILL)	55.0	3.0	I	1.80	S0A05
LEPOMIS MACROCHIRUS (BLUEGILL)	60.0	2.0	I	0.93	S0A04
LEPOMIS MACROCHIRUS (BLUEGILL)	96.0	17.0	M-2	1.92	S0A03
LEPOMIS MACROCHIRUS (BLUEGILL)	104.0	18.0	M-2	1.60	S0A02
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	84.0	7.0	I	1.18	S0A01
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITOFISH)	28.0	0.2	F	0.91	S0A08
GAMBUSIA AFFINIS (MOSQUITOFISH)	38.0	0.5	F	0.91	S0A09

SAMPLING STATION: S-00-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 0900 04-02-75

NO FISH COLLECTED

SAMPLING STATION: S-00-A
COLLECTION METHOD: 12 HOUR MINNOW TRAP
COLLECTION TIME: 2055 04-02-75

NO FISH COLLECTED

TABLE A-55 (Cont'd)

SAMPLING STATION: S-00-A
COLLECTION METHOD: 15 MIN BACK-PACK SHOCKING
COLLECTION TIME: 0810 04-17-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	61.0	4.0	I	1.76	SOS06
LEPOMIS CYANELLUS (GREEN SUNFISH)	91.0	12.0	F-4	1.59	SOS07
LEPOMIS CYANELLUS (GREEN SUNFISH)	116.0	30.0	M-2	1.92	SOS05
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	89.0	10.0	F-4	1.42	SOS08
LEPOMIS MACROCHIRUS (BLUEGILL)	160.0	94.0	M-2	2.29	SOS04
LEPOMIS MACROCHIRUS (BLUEGILL)	176.0	105.0	M-2	1.93	SOS03
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	47.0	3.0	I	2.89	SOS11
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	47.0	2.0	I	1.93	SOS12
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	50.0	4.0	I	3.20	SOS10
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	144.0	70.0	M-2	2.34	SOS09
ICTALURIDAE					
ICTALURUS NATALIS (YELLOW BULLHEAD)	191.0	112.0	M-2	1.61	SOS02
ICTALURUS NATALIS (YELLOW BULLHEAD)	241.0	192.0	M-2	1.37	SOS01

SAMPLING STATION: S-01-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 2215 04-01-75

TABLE A-55 (Cont'd)

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	45.0	2.0	I	2.19	S1N10
LEPOMIS CYANELLUS (GREEN SUNFISH)	77.0	9.0	F-3	1.97	S1N09
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	68.0	4.0	M-2	1.27	S1N11

SAMPLING STATION: S-01-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1010 04-02-75

NO FISH COLLECTED

SAMPLING STATION: S-01-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1015 04-02-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	60.0	2.0	I	0.93	S1B05
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	64.0	4.0	M-2	1.53	S1B04
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	111.0	16.0	I	1.17	S1B03
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	124.0	27.0	I	1.42	S1B02

SAMPLING STATION: S-01-A
COLLECTION METHOD: 12 HOUR MINNOW TRAP
COLLECTION TIME: 2215 04-01-75

NO FISH COLLECTED

SAMPLING STATION: S-01-A
COLLECTION METHOD: 15 MIN BACK-PACK SHOCKING
COLLECTION TIME: 1005 04-17-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	48.0	2.0	I	1.81	S1S34
LEPOMIS CYANELLUS (GREEN SUNFISH)	48.0	2.0	I	1.81	S1S35
LEPOMIS CYANELLUS (GREEN SUNFISH)	60.0	8.0	I	3.70	S1S31
LEPOMIS CYANELLUS (GREEN SUNFISH)	64.0	5.0	I	1.91	S1S33
LEPOMIS CYANELLUS (GREEN SUNFISH)	70.0	6.0	I	1.75	S1S32
LEPOMIS CYANELLUS (GREEN SUNFISH)	87.0	12.0	F-2	1.82	S1S30
LEPOMIS CYANELLUS (GREEN SUNFISH)	92.0	14.0	M-2	1.80	S1S27
LEPOMIS CYANELLUS (GREEN SUNFISH)	111.0	24.0	F-3	1.75	S1S29
LEPOMIS CYANELLUS (GREEN SUNFISH)	114.0	26.0	M-3	1.75	S1S28
LEPOMIS CYANELLUS (GREEN SUNFISH)	123.0	28.0	M-3	1.50	S1S26
LEPOMIS CYANELLUS (GREEN SUNFISH)	128.0	30.0	F-3	1.43	S1S24
LEPOMIS CYANELLUS (GREEN SUNFISH)	143.0	36.0	F-3	1.23	S1S25
LEPOMIS CYANELLUS (GREEN SUNFISH)	160.0	68.0	F-3	1.66	S1S23
LEPOMIS CYANELLUS (GREEN SUNFISH)	174.0	88.0	M-2	1.67	S1S22
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	75.0	10.0	F-4	2.37	S1S36
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	76.0	4.0	F-4	0.91	S1S38
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	79.0	6.0	M-3	1.22	S1S39
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	84.0	7.0	M-3	1.18	S1S37
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	90.0	10.0	M-3	1.37	S1S40
CYPRINODONTIDAE					
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	61.0	3.0	M-2	1.32	S1S41
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	63.0	4.0	F-5	1.60	S1S44
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	67.0	4.0	M-2	1.33	S1S42
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	68.0	4.0	F-5	1.27	S1S43
ICTALURIDAE					
ICTALURUS NATALIS (YELLOW BULLHEAD)	65.0	4.0	I	1.46	S1S46
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITOFISH)	44.0	1.5	F	1.76	S1S45

TABLE A-55 (Cont'd)

SAMPLING STATION: S-02-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 2340 04-01-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	60.0	6.0	I	2.78	S2N15
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	65.0	8.0	I	2.91	S2N13
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	74.0	6.0	I	1.48	S2N14
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	75.0	10.0	I	2.37	S2N12
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	81.0	12.0	I	2.26	S2N11
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	14.0	0.0	I	0.00	S2N17
CAMPOSTOMA ANOMALUM (STONEROLLER)	15.0	-0.0	I	0.00	S2N18
ICTALURIDAE					
ICTALURUS MELAS (BLACK BULLHEAD)	156.0	42.0	M-2	1.11	S2N09
ICTALURUS MELAS (BLACK BULLHEAD)	166.0	54.0	M-2	1.18	S2N10
ICTALURUS NATALIS (YELLOW BULLHEAD)	159.0	49.0	M-2	1.22	S2N08

SAMPLING STATION: S-02-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1140 04-02-75

NO FISH COLLECTED

TABLE A-55 (Cont'd)

SAMPLING STATION: S-02-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1150 04-02-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MACROCHIRUS (BLUEGILL)	32.0	1.0	I	3.05	S2B13
LEPOMIS MACROCHIRUS (BLUEGILL)	33.0	1.0	I	2.78	S2B12
LEPOMIS MACROCHIRUS (BLUEGILL)	38.0	1.0	I	1.82	S2B11
LEPOMIS MACROCHIRUS (BLUEGILL)	41.0	1.0	I	1.45	S2B10
LEPOMIS MACROCHIRUS (BLUEGILL)	42.0	1.5	I	2.02	S2B08
LEPOMIS MACROCHIRUS (BLUEGILL)	42.0	1.0	I	1.35	S2B09
LEPOMIS MACROCHIRUS (BLUEGILL)	50.0	1.5	I	1.20	S2B07
CYPRINODONTIDAE					
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	45.0	2.0	M-2	2.19	S2B14

SAMPLING STATION: S-02-A
COLLECTION METHOD: 12 HOUR MINNOW TRAP
COLLECTION TIME: 2330 04-01-75

NO FISH COLLECTED

TABLE A-55 (Cont'd)

SAMPLING STATION: S-02-A
COLLECTION METHOD: 15 MIN BACK-PACK SHOCKING
COLLECTION TIME: 1222 04-17-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	56.0	4.0	I	2.28	S2S07
LEPOMIS CYANELLUS (GREEN SUNFISH)	68.0	7.0	I	2.23	S2S16
LEPOMIS CYANELLUS (GREEN SUNFISH)	72.0	8.0	I	2.14	S2S15
LEPOMIS CYANELLUS (GREEN SUNFISH)	76.0	8.0	I	1.82	S2S14
LEPOMIS CYANELLUS (GREEN SUNFISH)	78.0	8.0	F-3	1.69	S2S12
LEPOMIS CYANELLUS (GREEN SUNFISH)	80.0	10.0	M-2	1.95	S2S13
LEPOMIS CYANELLUS (GREEN SUNFISH)	99.0	17.0	M-2	1.75	S2S05
LEPOMIS CYANELLUS (GREEN SUNFISH)	103.0	17.0	M-3	1.56	S2S06
LEPOMIS CYANELLUS (GREEN SUNFISH)	108.0	18.0	F-3	1.43	S2S04
LEPOMIS CYANELLUS (GREEN SUNFISH)	173.0	100.0	M-4	1.93	S2S02
LEPOMIS CYANELLUS (GREEN SUNFISH)	178.0	90.0	M-5	1.60	S2S03
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	74.0	8.0	F-3	1.97	S2S20
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	87.0	10.0	M-2	1.52	S2S19
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	95.0	14.0	M-2	1.63	S2S18
LEPOMIS MACROCHIRUS (BLUEGILL)	68.0	4.0	I	1.27	S2S17
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	87.0	10.0	M-2	1.52	S2S10
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	100.0	16.0	F-4	1.60	S2S11
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	104.0	12.0	M-2	1.07	S2S09
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	125.0	46.0	M-5	2.36	S2S08
POMOXIS ANNULARIS (WHITE CRAPPIE)	211.0	102.0	F-4	1.09	S2S01
ICTALURIDAE					
ICTALURUS MELAS (BLACK BULLHEAD)	114.0	16.0	I	1.08	S2S21
ICTALURUS MELAS (BLACK BULLHEAD)	114.0	18.0	I	1.21	S2S22
ICTALURUS NATALIS (YELLOW BULLHEAD)	149.0	40.0	M-2	1.21	S2S25
ICTALURUS NATALIS (YELLOW BULLHEAD)	164.0	58.0	F-5	1.31	S2S23
ICTALURUS NATALIS (YELLOW BULLHEAD)	171.0	68.0	M-2	1.36	S2S24

TABLE A-55 (Cont'd)

SAMPLING STATION: S-03-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 0045 04-02-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	30.0	1.0	I	3.70	S3N18
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	37.0	1.0	I	1.97	S3N17
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	41.0	2.0	I	2.90	S3N16
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	45.0	2.0	I	2.19	S3N15
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	48.0	2.0	I	1.81	S3N12
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	49.0	2.0	I	1.70	S3N13
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	50.0	2.0	I	1.60	S3N14
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	69.0	6.0	I	1.83	S3N11
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	84.0	9.0	I	1.52	S3N10
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	92.0	10.0	I	1.28	S3N09
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	95.0	19.0	F-3	2.22	S3N05
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	101.0	21.0	M-2	2.04	S3N04
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	109.0	26.0	M-2	2.01	S3N07
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	109.0	26.0	M-2	2.01	S3N08
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	122.0	42.0	F-3	2.31	S3N06
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	149.0	69.0	M-3	2.09	S3N03
CYPRINODONTIDAE					
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	46.0	1.5	F-2	1.54	S3N20
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	63.0	3.0	M-2	1.20	S3N19
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITOFISH)	25.0	0.5	F	3.20	S3N21
GAMBUSIA AFFINIS (MOSQUITOFISH)	39.0	1.5	F	2.53	S3N22

TABLE A-55 (Cont'd)

SAMPLING STATION: S-03-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1345 04-02-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	31.0	1.0	I	3.36	S3A15
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	79.0	4.0	F-2	0.81	S3A14
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	83.0	6.0	M-2	1.05	S3A13
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITOFISH)	23.0	0.2	M	1.64	S3A16
GAMBUSIA AFFINIS (MOSQUITOFISH)	25.0	0.2	M	1.28	S3A17

SAMPLING STATION: S-03-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1400 04-02-75

NO FISH COLLECTED

SAMPLING STATION: S-03-A
COLLECTION METHOD: 12 HR MINNOW TRAP
COLLECTION TIME: 0045 04-02-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	78.0	7.0	M-2	1.48	S3M13
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	84.0	8.0	M-2	1.35	S3M12

TABLE A-55 (Cont'd)

SAMPLING STATION: S-03-A
COLLECTION METHOD: 15 MIN BACK-PACK SHOCKING
COLLECTION TIME: 1422 04-17-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	64.0	4.0	I	1.53	S3S12
LEPOMIS CYANELLUS (GREEN SUNFISH)	72.0	6.0	F-2	1.61	S3S13
LEPOMIS CYANELLUS (GREEN SUNFISH)	78.0	8.0	F-2	1.69	S3S11
LEPOMIS CYANELLUS (GREEN SUNFISH)	111.0	18.0	I	1.32	S3S08
LEPOMIS CYANELLUS (GREEN SUNFISH)	120.0	24.0	M-2	1.39	S3S09
LEPOMIS CYANELLUS (GREEN SUNFISH)	126.0	30.0	F-2	1.50	S3S10
LEPOMIS CYANELLUS (GREEN SUNFISH)	163.0	70.0	F-3	1.62	S3S07
LEPOMIS CYANELLUS (GREEN SUNFISH)	78.0	8.0	M-2	1.69	S3S15
LEPOMIS CYANELLUS (GREEN SUNFISH)	89.0	8.0	M-2	1.13	S3S14
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	75.0	6.0	F-2	1.42	S3S16
ICTALURIDAE					
ICTALURUS NATALIS (YELLOW BULLHEAD)	157.0	52.0	F-3	1.34	S3S06
CYPRINIDAE					
PIMEPHALES VIGILAX (BULLHEAD MINNOW)	75.0	6.0	M-2	1.42	S3S18
PERCIDAE					
ETHEOSTOMA SPECTABILE (ORANGETHROAT DARTER)	53.0	2.0	F-3	1.34	S3S17

TABLE A-55 (Cont'd)

SAMPLING STATION: S-04-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 0155 04-02-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	114.0	19.0	F-2	1.28	S4N21
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	67.0	4.0	I	1.33	S4N20
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	78.0	6.0	F-2	1.26	S4N18
LEPOMIS HUMILIS (ORANGESPOTTED SUNFISH)	87.0	12.0	I	1.82	S4N19
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	52.0	3.0	I	2.13	S4N17
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	79.0	8.0	I	1.62	S4N16
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	85.0	12.0	M-2	1.95	S4N14
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	89.0	10.0	F-2	1.42	S4N13
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	90.0	12.0	M-2	1.65	S4N15
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	100.0	18.0	M-2	1.80	S4N12
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	113.0	28.0	M-2	1.94	S4N11
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	132.0	49.0	M-2	2.13	S4N10
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	194.0	82.0	M-2	1.12	S4N09
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	78.0	4.0	M-2	0.84	S4N22
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	97.0	5.0	M-2	0.55	S4N23

SAMPLING STATION: S-04-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1515 04-02-75

NO FISH COLLECTED

TABLE A-55 (Cont'd)

SAMPLING STATION: S-04-A
COLLECTION METHOD: 15 MIN BACK-PACK SHOCKING
COLLECTION TIME: 1545 04-17-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CATOSTOMIDAE					
MOXOSTOMA CONGESTUM (GRAY REDHORSE)	461.0	1132.0	M-5	1.16	S4S01
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	72.0	8.0	I	2.14	S4S12
LEPOMIS CYANELLUS (GREEN SUNFISH)	75.0	10.0	I	2.37	S4S11
LEPOMIS CYANELLUS (GREEN SUNFISH)	103.0	20.0	I	1.83	S4S09
LEPOMIS CYANELLUS (GREEN SUNFISH)	105.0	18.0	M-2	1.55	S4S10
LEPOMIS CYANELLUS (GREEN SUNFISH)	156.0	60.0	F-3	1.58	S4S08
LEPOMIS CYANELLUS (GREEN SUNFISH)	159.0	68.0	M-2	1.69	S4S07
LEPOMIS CYANELLUS (GREEN SUNFISH)	190.0	110.0	M-2	1.60	S4S06
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	83.0	12.0	I	2.10	S4S22
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	87.0	10.0	I	1.52	S4S21
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	91.0	16.0	M-2	2.12	S4S19
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	92.0	14.0	I	1.80	S4S20
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	101.0	18.0	F-3	1.75	S4S18
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	103.0	20.0	I	1.83	S4S17
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	111.0	20.0	I	1.46	S4S16
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	125.0	40.0	M-2	2.05	S4S15
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	143.0	48.0	F-3	1.64	S4S14
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	153.0	88.0	M-3	2.46	S4S13
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	275.0	230.0	M-3	1.11	S4S05
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	295.0	320.0	M-3	1.25	S4S04
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	300.0	330.0	F-4	1.22	S4S03
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	343.0	465.0	F-4	1.15	S4S02
ICTALURIDAE					
ICTALURUS NATALIS (YELLOW BULLHEAD)	184.0	80.0	F-4	1.28	S4S25
ICTALURUS NATALIS (YELLOW BULLHEAD)	205.0	120.0	F-4	1.39	S4S24
ICTALURUS NATALIS (YELLOW BULLHEAD)	245.0	190.0	F-4	1.29	S4S23
ICTALURUS PUNCTATUS (CHANNEL CATFISH)	115.0	18.0	I	1.18	S4S27
ICTALURUS PUNCTATUS (CHANNEL CATFISH)	132.0	20.0	M-2	0.87	S4S26

TABLE A-55 (Cont'd)

SAMPLING STATION: S-04-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1525 04-02-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	61.0	4.0	M-2	1.76	S4B08

SAMPLING STATION: S-04-A
COLLECTION METHOD: 12 HOUR MINNOW TRAP
COLLECTION TIME: 0155 04-02-75

NO FISH COLLECTED

TABLE A-56

FISHERY INFORMATION COLLECTED FROM SQUAW CREEK
NEAR GLEN ROSE, SOMERVELL COUNTY, TEXAS
DURING THE SUMMER, 1975, COLLECTING PERIOD

SAMPLING STATION: A-00-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 0630 08-05-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MACROCHIRUS (BLUEGILL)	32.0	1.1	I	3.36	A0A15
LEPOMIS MACROCHIRUS (BLUEGILL)	34.0	1.2	I	3.05	A0A16
LEPOMIS MACROCHIRUS (BLUEGILL)	37.0	1.4	I	2.76	A0A13
LEPOMIS MACROCHIRUS (BLUEGILL)	38.0	1.3	I	2.37	A0A12
LEPOMIS MACROCHIRUS (BLUEGILL)	38.0	1.3	I	2.37	A0A14
LEPOMIS MACROCHIRUS (BLUEGILL)	40.0	1.5	I	2.34	A0A11
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	111.0	24.0	M-2	1.75	A0A10
LEPOMIS SP. (UNID. SUNFISH)	17.0	0.3	I	6.11	A0A17
LEPOMIS SP. (UNID. SUNFISH)	20.0	0.5	I	6.25	A0A18
LEPOMIS SP. (UNID. SUNFISH)	21.0	0.5	I	5.40	A0A19

SAMPLING STATION: A-00-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 0700 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	41.0	1.5	I	2.18	A0B08
LEPOMIS CYANELLUS (GREEN SUNFISH)	44.0	1.2	I	1.41	A0B05
LEPOMIS CYANELLUS (GREEN SUNFISH)	51.0	2.1	I	1.58	A0B06
LEPOMIS CYANELLUS (GREEN SUNFISH)	52.0	2.2	I	1.56	A0B07
LEPOMIS CYANELLUS (GREEN SUNFISH)	88.0	10.0	I	1.47	A0B04
LEPOMIS MACROCHIRUS (BLUEGILL)	42.0	1.5	I	2.02	A0B10
LEPOMIS MACROCHIRUS (BLUEGILL)	45.0	1.9	I	2.09	A0B12
LEPOMIS MACROCHIRUS (BLUEGILL)	48.0	2.0	I	1.81	A0B11
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	42.0	1.9	I	2.56	A0B13
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	49.0	2.1	I	1.78	A0B14
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	100.0	11.0	I	1.10	A0B03

TABLE A-56 (Cont'd)

CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	51.0	1.5	I	1.13	A0B09
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	80.0	5.0	F-5	0.98	A0B01
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	83.0	6.0	M-2	1.05	A0B02
PERCIDAE					
ETHEOSTOMA SPECTABILE (ORANGETHROAT DARTER)	35.0	0.7	F-2	1.63	A0B15
ETHEOSTOMA SPECTABILE (ORANGETHROAT DARTER)	41.0	0.8	M-2	1.16	A0B16
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITO FISH)	RANGE 20-40	RANGE <0.1-0.8 TOTAL 6.3	2M 23F		25 TOTAL SPECIMENS

SAMPLING STATION: A-00-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING - NIGHT
COLLECTION TIME: 2225 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	97.0	16.0	F-2	1.75	A0A27
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	31.0	0.5	I	1.68	A0A26
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	36.0	0.5	I	1.07	A0A25
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	38.0	0.6	I	1.09	A0A24
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	40.0	0.5	I	0.78	A0A21
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	41.0	0.6	I	0.87	A0A22
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	46.0	0.7	I	0.72	A0A23
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	59.0	2.1	I	1.02	A0A20

TABLE A-56 (Cont'd)

SAMPLING STATION: A-00-A
COLLECTION METHOD: 15 MIN ELECTRO-SHOCK
COLLECTION TIME: 0730 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	40.0	1.6	I	2.50	A0A20
LEPOMIS CYANELLUS (GREEN SUNFISH)	42.0	1.5	I	2.02	A0A19
LEPOMIS CYANELLUS (GREEN SUNFISH)	43.0	1.5	I	1.89	A0A16
LEPOMIS CYANELLUS (GREEN SUNFISH)	45.0	1.6	I	1.76	A0A17
LEPOMIS CYANELLUS (GREEN SUNFISH)	51.0	1.8	I	1.36	A0A18
LEPOMIS CYANELLUS (GREEN SUNFISH)	56.0	2.4	I	1.37	A0A21
LEPOMIS CYANELLUS (GREEN SUNFISH)	85.0	12.0	F-2	1.95	A0A15
LEPOMIS CYANELLUS (GREEN SUNFISH)	105.0	20.0	F-2	1.73	A0A14
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	56.0	2.0	I	1.14	A0A27
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	71.0	4.0	I	1.12	A0A25
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	71.0	4.0	I	1.12	A0A26
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	74.0	5.0	I	1.23	A0A24
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	75.0	5.0	I	1.19	A0A23
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	88.0	8.0	I	1.17	A0A22
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	49.0	1.5	I	1.27	A0A30
CAMPOSTOMA ANOMALUM (STONEROLLER)	51.0	1.6	M-2	1.21	A0A34
CAMPOSTOMA ANOMALUM (STONEROLLER)	54.0	1.7	F-2	1.08	A0A36
CAMPOSTOMA ANOMALUM (STONEROLLER)	55.0	1.7	M-2	1.02	A0A35
CAMPOSTOMA ANOMALUM (STONEROLLER)	55.0	1.8	F-2	1.08	A0A37
CAMPOSTOMA ANOMALUM (STONEROLLER)	56.0	2.0	F-2	1.14	A0A29
CAMPOSTOMA ANOMALUM (STONEROLLER)	56.0	1.4	M-2	0.80	A0A31
CAMPOSTOMA ANOMALUM (STONEROLLER)	56.0	1.7	M-2	0.97	A0A32
CAMPOSTOMA ANOMALUM (STONEROLLER)	57.0	1.8	F-2	0.97	A0A33
CAMPOSTOMA ANOMALUM (STONEROLLER)	70.0	4.0	M-2	1.17	A0A28
ICTALURIDAE					
ICTALURUS NATALIS (YELLOW BULLHEAD)	208.0	108.0	F-6	1.20	A0A13

TABLE A-56 (Cont'd)

SAMPLING STATION: A-00-A
COLLECTION METHOD: 12 HR MINNOW TRAP
COLLECTION TIME: 0630 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	37.0	1.3	I	2.57	A0A07
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	43.0	1.4	I	1.76	A0A06
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	45.0	1.6	I	1.76	A0A05
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	46.0	1.6	I	1.64	A0A04
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	47.0	1.7	I	1.64	A0A02
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	51.0	1.9	I	1.43	A0A03
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	52.0	1.8	I	1.28	A0A01

TABLE A-56 (Cont'd)

SAMPLING STATION: A-01-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 0920 08-05-75

	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
MICROPTERUS SALMOIDES (LARGEMOUTH BASS)	138.0	32.0	I	1.22	A1A01
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	45.0	1.0	I	1.10	A1A06
CAMPOSTOMA ANOMALUM (STONEROLLER)	48.0	1.0	I	0.90	A1A05
CAMPOSTOMA ANOMALUM (STONEROLLER)	66.0	4.0	F-2	1.39	A1A04
CAMPOSTOMA ANOMALUM (STONEROLLER)	67.0	3.0	M-2	1.00	A1A02
CAMPOSTOMA ANOMALUM (STONEROLLER)	83.0	6.0	M-2	1.05	A1A03
CAMPOSTOMA ANOMOLUM (STONEROLLER)	RANGE 45-83	RANGE 1.0-6.0 TOTAL 222.0			128 TOTAL SPECIMENS
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	26.0	0.1	I	0.57	A1A14
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	28.0	0.2	I	0.91	A1A13
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	59.0	2.0	F-2	0.97	A1A12
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	66.0	3.0	M-2	1.04	A1A11
CYPRINODONTIDAE					
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	29.0	0.5	I	2.05	A1A08
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	30.0	0.5	I	1.85	A1A07
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	33.0	0.6	I	1.67	A1A09
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	52.0	1.2	I	0.85	A1A10

TABLE A-56 (Cont'd)

SAMPLING STATION: A-01-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 0940 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CATOSTOMIDAE					
CARPIODES CARPIO(RIVER CARPSUCKER)	80.0	7.0	I	1.37	A1B10
CENTRARCHIDAE					
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	60.0	2.5	I	1.16	A1B04
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	61.0	2.1	I	0.93	A1B06
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	62.0	2.8	I	1.17	A1B05
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	63.0	3.0	I	1.20	A1B07
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	64.0	2.1	I	0.80	A1B09
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	65.0	2.8	I	1.02	A1B08
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	71.0	3.5	I	0.98	A1B01
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	76.0	5.1	I	1.16	A1B02
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	79.0	6.0	I	1.22	A1B03

SAMPLING STATION: A-01-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING - NIGHT
COLLECTION TIME: 2255 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	62.0	3.2	I	1.34	A1A12
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITO FISH)	RANGE 15-37	RANGE <0.1-0.3 TOTAL 8.0	4M 31F		35 TOTAL SPECIMENS

TABLE A-56 (Cont'd)

SAMPLING STATION: A-01-A
COLLECTION METHOD: 15 MIN ELECTRO-SHOCK
COLLECTION TIME: 1010 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	131.0	48.0	M-2	2.14	A1A49
LEPOMIS CYANELLUS (GREEN SUNFISH)	194.0	122.0	M-2	1.67	A1A48
LEPOMIS CYANELLUS (GREEN SUNFISH)	211.0	148.0	M-2	1.58	A1A47
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	136.0	42.0	F-6	1.67	A1A50
ICTALURIDAE					
ICTALURUS MELAS (BLACK BULLHEAD)	186.0	68.0	M-2	1.06	A1A51
ICTALURUS PUNCTATUS (CHANNEL CATFISH)	242.0	102.0	M-2	0.72	A1A52

TABLE A-56 (Cont'd)

SAMPLING STATION: A-01-A
COLLECTION METHOD: 12 HR MINNOW TRAP
COLLECTION TIME: 1000 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	37.0	1.0	I	1.97	A1A03
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	38.0	1.0	I	1.82	A1A04
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	42.0	1.1	I	1.48	A1A02
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	61.0	2.4	I	1.06	A1A01

TABLE A-56 (Cont'd)

SAMPLING STATION: A-02-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1215 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	45.0	1.4	I	1.54	A2A06
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	48.0	1.5	I	1.36	A2A05
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	78.0	5.0	F-5	1.05	A2A03
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	84.0	8.0	F-4	1.35	A2A01
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	90.0	9.0	F-2	1.23	A2A02
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	92.0	12.0	F-4	1.54	A2A04
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	67.0	3.3	I	1.10	A2A08
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	69.0	3.4	I	1.03	A2A07
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	38.0	0.9	I	1.64	A2A11
CAMPOSTOMA ANOMALUM (STONEROLLER)	48.0	1.5	I	1.36	A2A10
CAMPOSTOMA ANOMALUM (STONEROLLER)	66.0	3.5	M-2	1.22	A2A09
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	48.0	1.0	I	0.90	A2A12
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITO FISH)	RANGE 30-50	RANGE 0.5-1.9 TOTAL 13.6	16F		16 TOTAL SPECIMENS

TABLE A-56 (Cont'd)

SAMPLING STATION: A-02-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1230 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MACROCHIRUS (BLUEGILL)	38.0	0.5	I	0.91	A2B23
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	48.0	2.0	I	1.81	A2B22
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	52.0	3.6	I	2.56	A2B21
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	55.0	3.6	I	2.16	A2B19
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	57.0	3.5	I	1.89	A2B20
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	65.0	5.0	I	1.82	A2B18
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	56.0	2.4	I	1.37	A2B17
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	66.0	2.5	I	0.87	A2B16
MICROPTERUS SALMOIDES (LARGEMOUTH BASS)	111.0	3.5	I	0.26	A2B15
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	41.0	1.0	I	1.45	A2B31
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	51.0	1.4	M-2	1.06	A2B28
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	52.0	1.2	M-2	0.85	A2B25
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	54.0	1.4	F-2	0.89	A2B26
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	56.0	1.2	M-2	0.68	A2B24
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	57.0	2.1	M-2	1.13	A2B27
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	62.0	2.9	M-2	1.22	A2B30
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	65.0	3.0	M-2	1.09	A2B29
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITO FISH)	RANGE 18-41	RANGE <0.1-1.0 TOTAL 7.5	5M 10F		15 TOTAL SPECIMENS

TABLE A-56 (Cont'd)

SAMPLING STATION: A-02-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING - NIGHT
COLLECTION TIME: 2330 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	40.0	1.0	I	1.56	A2A27
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	63.0	4.3	I	1.72	A2A24
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	65.0	4.4	I	1.60	A2A26
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	73.0	6.2	I	1.59	A2A25
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	80.0	8.7	I	1.70	A2A22
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	85.0	9.8	I	1.60	A2A23
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	114.0	29.3	F-5	1.98	A2A21
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	92.0	10.0	I	1.28	A2A20
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	106.0	14.8	I	1.24	A2A19
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	45.0	1.6	F-2	1.76	A2A31
CAMPOSTOMA ANOMALUM (STONEROLLER)	53.0	1.3	M-2	0.87	A2A35
CAMPOSTOMA ANOMALUM (STONEROLLER)	57.0	2.0	M-2	1.08	A2A33
CAMPOSTOMA ANOMALUM (STONEROLLER)	59.0	2.0	F-2	0.97	A2A34
CAMPOSTOMA ANOMALUM (STONEROLLER)	71.0	4.0	M-2	1.12	A2A32
CAMPOSTOMA ANOMOLUM (STONEROLLER)	RANGE 51-67	RANGE 1.3-3.0 TOTAL 28.1			15 TOTAL SEPECIMENS
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	47.0	1.6	M-2	1.54	A2A30
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	62.0	2.0	F-2	0.84	A2A29
CYPRINODONTIDAE					
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	52.0	1.1	M-2	0.78	A2A28
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITO FISH)	RANGE 24-48	RANGE 0.1-1.0 TOTAL 5.5	10F		10 TOTAL SPECIMENS

TABLE A-56 (Cont'd)

SAMPLING STATION: A-02-A
COLLECTION METHOD: 15 MIN ELECTRO-SHOCK
COLLECTION TIME: 1245 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	52.0	1.5	I	1.07	A2A28
LEPOMIS CYANELLUS (GREEN SUNFISH)	61.0	28.0	I	12.34	A2A29
LEPOMIS CYANELLUS (GREEN SUNFISH)	71.0	3.0	I	0.84	A2A27
LEPOMIS CYANELLUS (GREEN SUNFISH)	83.0	8.0	I	1.40	A2A26
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	53.0	1.5	I	1.01	A2A30
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	53.0	1.5	I	1.01	A2A31
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	34.0	1.0	I	2.54	A2A36
CAMPOSTOMA ANOMALUM (STONEROLLER)	45.0	1.5	I	1.65	A2A34
CAMPOSTOMA ANOMALUM (STONEROLLER)	54.0	1.9	M-2	1.21	A2A33
CAMPOSTOMA ANOMALUM (STONEROLLER)	55.0	2.2	F-2	1.32	A2A35
CAMPOSTOMA ANOMALUM (STONEROLLER)	57.0	2.0	M-2	1.08	A2A32
PERCIDAE					
ETHEOSTOMA SPECTABILE (ORANGETHROAT DARTER)	35.0	0.9	I	2.10	A2A38
ETHEOSTOMA SPECTABILE (ORANGETHROAT DARTER)	37.0	1.0	I	1.97	A2A37

TABLE A-56 (Cont'd)

SAMPLING STATION: A-02-A
COLLECTION METHOD: 12 HR MINNOW TRAP
COLLECTION TIME: 1300 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	40.0	1.8	I	2.81	A2A02
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	54.0	2.5	I	1.59	A2A01

TABLE A-56 (Cont'd)

SAMPLING STATION: A-03-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1645 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	38.0	1.1	I	2.00	A3A18
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITO FISH)	RANGE 24-34	RANGE 0.2-0.4 TOTAL 2.3	1M 6F		7 TOTAL SPECIMENS

SAMPLING STATION: A-03-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1700 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	45.0	1.5	I	1.65	A3B01
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	38.0	1.1	I	2.00	A3B03
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	47.0	1.8	I	1.73	A3B02
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	48.0	1.8	I	1.63	A3B04
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	31.0	1.0	I	3.36	A3B09
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	33.0	1.1	I	3.06	A3B06
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	33.0	1.1	I	3.06	A3B08
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	35.0	1.2	I	2.80	A3B07
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	44.0	1.5	I	1.76	A3B05
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITO FISH)	RANGE 25-40	RANGE 0.1-0.5 TOTAL 2.1	3M 3F		6 TOTAL SPECIMENS

TABLE A-56 (Cont'd)

SAMPLING STATION: A-03-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING - NIGHT
COLLECTION TIME: 0012 08-06-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	60.0	2.3	I	1.06	A3A24
CAMPOSTOMA ANOMALUM (STONEROLLER)	73.0	4.1	M-2	1.05	A3A23
PERCIDAE					
ETHEOSTOMA SPECTABILE (ORANGETHROAT DARTER)	37.0	0.9	F-2	1.78	A3A25
POECILIIDAE					
GAMBUSIA AFFINIS (MOSQUITOFISH)	23.0	0.1	F-2	0.82	A3A27
GAMBUSIA AFFINIS (MOSQUITOFISH)	27.0	0.1	F-2	0.51	A3A28
GAMBUSIA AFFINIS (MOSQUITOFISH)	32.0	0.2	F-2	0.61	A3A26

TABLE A-56 (Cont'd)

SAMPLING STATION: A-03-A
COLLECTION METHOD: 15 MIN ELECTRO-SHOCK
COLLECTION TIME: 1715 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	103.0	17.0	M-2	1.56	A3A24
LEPOMIS CYANELLUS (GREEN SUNFISH)	121.0	30.0	M-2	1.69	A3A25
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	51.0	2.0	I	1.51	A3A21
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	52.0	2.1	I	1.49	A3A23
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	53.0	2.1	I	1.41	A3A22
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	61.0	3.0	I	1.32	A3A20
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	88.0	6.0	I	0.88	A3A19
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	65.0	3.5	M-2	1.27	A3A33
CAMPOSTOMA ANOMALUM (STONEROLLER)	67.0	3.1	M-2	1.03	A3A27
CAMPOSTOMA ANOMALUM (STONEROLLER)	68.0	4.0	F-2	1.27	A3A32
CAMPOSTOMA ANOMALUM (STONEROLLER)	70.0	3.5	M-2	1.02	A3A28
CAMPOSTOMA ANOMALUM (STONEROLLER)	70.0	4.0	F-2	1.17	A3A31
CAMPOSTOMA ANOMALUM (STONEROLLER)	74.0	4.0	M-2	0.99	A3A26
CAMPOSTOMA ANOMALUM (STONEROLLER)	94.0	9.0	M-2	1.08	A3A30
CAMPOSTOMA ANOMALUM (STONEROLLER)	95.0	8.0	M-2	0.93	A3A29
ICTALURIDAE					
ICTALURUS NATALIS (YELLOW BULLHEAD)	60.0	4.0	I	1.85	A3A34

SAMPLING STATION: A-03-A
COLLECTION METHOD: 12 HOUR MINNOW TRAP
COLLECTION TIME: 1730 08-05-75

NO FISH COLLECTED

TABLE A-56 (Cont'd)

SAMPLING STATION: A-04-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1835 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	75.0	7.2	M-2	1.71	A4A03
LEPOMIS MACROCHIRUS (BLUEGILL)	29.0	0.6	I	2.46	A4A06
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	42.0	1.5	I	2.02	A4A05
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	77.0	5.5	I	1.20	A4A01
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	80.0	6.7	I	1.31	A4A02
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	33.0	0.6	I	1.67	A4A12
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	44.0	0.9	M-2	1.06	A4A11
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	50.0	1.0	F-2	0.80	A4A10
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	53.0	1.2	M-2	0.81	A4A08
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	56.0	1.5	M-2	0.85	A4A07
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	57.0	1.3	M-2	0.70	A4A09

TABLE A-56 (Cont'd)

SAMPLING STATION: A-04-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1850 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	41.0	1.0	I	1.45	A4B10
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	85.0	12.5	M-2	2.04	A4B09
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	74.0	5.0	I	1.23	A4B11
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	75.0	4.7	M-2	1.11	A4B13
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	76.0	4.8	M-2	1.09	A4B14
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	78.0	5.1	M-2	1.07	A4B12

TABLE A-56 (Cont'd)

SAMPLING STATION: A-04-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING - NIGHT
COLLECTION TIME: 0030 08-06-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	41.0	1.5	I	2.18	A4A25
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	47.0	1.4	I	1.35	A4A26
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	42.0	0.5	I	0.67	A4A27
ICTALURIDAE					
ICTALURUS NATALIS (YELLOW BULLHEAD)	210.0	121.2	F-2	1.31	A4A24

TABLE A-56 (Cont'd)

SAMPLING STATION: A-04-A
COLLECTION METHOD: 15 MIN ELECTRO-SHOCK
COLLECTION TIME: 1900 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	139.0	51.4	M-2	1.91	A4A29
LEPOMIS CYANELLUS (GREEN SUNFISH)	161.0	86.1	M-2	2.06	A4A28
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	49.0	2.2	I	1.87	A4A37
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	66.0	5.9	I	2.05	A4A36
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	74.0	9.9	I	2.44	A4A35
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	87.0	12.3	M-2	1.87	A4A34
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	93.0	15.5	M-2	1.93	A4A33
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	104.0	25.7	F-2	2.28	A4A31
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	106.0	23.6	M-2	1.98	A4A32
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	118.0	36.5	F-3	2.22	A4A30
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	41.0	0.6	I	0.87	A4A38

SAMPLING STATION: A-04-A
COLLECTION METHOD: 12 HOUR MINNOW TRAP
COLLECTION TIME: 1915 08-05-75

NO FISH COLLECTED

TABLE A-56 (Cont'd)

SAMPLING STATION: A-05-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1515 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	45.0	1.3	F-2	1.43	A5A03
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	46.0	1.4	M-2	1.44	A5A05
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	46.0	1.3	I	1.34	A5A09
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	48.0	1.4	F-2	1.27	A5A04
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	48.0	1.4	M-2	1.27	A5A10
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	50.0	1.5	M-2	1.20	A5A02
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	50.0	1.4	F-2	1.12	A5A06
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	51.0	1.5	M-2	1.13	A5A08
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	53.0	1.5	F-2	1.01	A5A07
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	61.0	2.0	M-2	0.88	A5A01
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	RANGE 45-61	RANGE 1.3-2.0 TOTAL 40.0			46 TOTAL SPECIMENS

TABLE A-56 (Cont'd)

SAMPLING STATION: A-05-B
COLLECTION METHOD: 50 FOOT MINNOW SEINING
COLLECTION TIME: 1530 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
MICROPTERUS PUNCTULATUS (SPOTTED BASS)	57.0	2.4	I	1.30	A5B01
CYPRINIDAE					
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	38.0	1.0	I	1.82	A5B10
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	40.0	1.2	I	1.88	A5B08
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	40.0	1.3	I	2.03	A5B11
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	42.0	1.2	I	1.62	A5B07
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	42.0	1.1	I	1.48	A5B09
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	45.0	1.3	I	1.43	A5B06
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	50.0	1.7	M-2	1.36	A5B04
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	52.0	1.9	F-2	1.35	A5B03
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	53.0	1.7	M-2	1.14	A5B05
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	60.0	2.3	M-2	1.06	A5B02
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	RANGE 38-60	RANGE 1.0-2.3 TOTAL 10.1			12 TOTAL SPECIMENS

TABLE A-56 (Cont'd)

SAMPLING STATION: A-05-A
COLLECTION METHOD: 50 FOOT MINNOW SEINING - NIGHT
COLLECTION TIME: 2355 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	41.0	1.5	I	2.18	A5A05
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	51.0	2.4	I	1.81	A5A04
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	52.0	2.4	I	1.71	A5A03
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	57.0	3.5	I	1.89	A5A02
LEPOMIS MEGALOTIS (LONGEAR SUNFISH)	86.0	12.0	F-3	1.89	A5A01
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	44.0	1.1	I	1.29	A5A10
CAMPOSTOMA ANOMALUM (STONEROLLER)	48.0	1.2	I	1.09	A5A09
CAMPOSTOMA ANOMALUM (STONEROLLER)	51.0	1.3	M-2	0.98	A5A08
CAMPOSTOMA ANOMALUM (STONEROLLER)	56.0	1.9	M-2	1.08	A5A07
CAMPOSTOMA ANOMALUM (STONEROLLER)	61.0	2.0	M-2	0.88	A5A06
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	51.0	1.1	I	0.83	A5A11
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	52.0	1.2	I	0.85	A5A14
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	53.0	1.2	I	0.81	A5A12
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	57.0	1.2	M-2	0.65	A5A15
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	62.0	2.1	F-2	0.88	A5A13
NOTROPIS VENUSTUS (BLACKTAIL SHINER)	RANGE 21-52	RANGE 0.1-1.2 TOTAL 16.7			30 TOTAL SPECIMENS
CYPRINODONTIDAE					
FUNDULUS NOTATUS (BLACKSTRIPE TOPMINNOW)	42.0	0.7	I	0.94	A5A16

TABLE A-56 (Cont'd)

SAMPLING STATION: A-05-A
COLLECTION METHOD: 15 MIN ELECTRO-SHOCK
COLLECTION TIME: 1545 08-05-75

SPECIES	LENGTH (MM)	WEIGHT (GM)	GONADAL CONDITION	CONDITION FACTOR	COLLECTION NUMBER
CENTRARCHIDAE					
LEPOMIS CYANELLUS (GREEN SUNFISH)	42.0	0.7	I	0.94	A5A01
CYPRINIDAE					
CAMPOSTOMA ANOMALUM (STONEROLLER)	44.0	0.6	I	0.70	A5A02
CAMPOSTOMA ANOMALUM (STONEROLLER)	51.0	1.4	I	1.06	A5A06
CAMPOSTOMA ANOMALUM (STONEROLLER)	58.0	1.9	F-2	0.97	A5A04
CAMPOSTOMA ANOMALUM (STONEROLLER)	65.0	2.6	M-2	0.95	A5A03
CAMPOSTOMA ANOMALUM (STONEROLLER)	71.0	3.8	M-2	1.06	A5A05
PERCIDAE					
ETHEOSTOMA SPECTABILE (ORANGETHROAT DARTER)	27.0	0.1	I	0.51	A5A07

SAMPLING STATION: A-05-A
COLLECTION METHOD: 12 HOUR MINNOW TRAP
COLLECTION TIME: 1600 08-05-75

NO FISH COLLECTED

TABLE A-57

AVERAGE NUMBER OF ORGANISMS FOUND PER STOMACH IN SQUAW CREEK FISH COLLECTED DURING THE WINTER, 1975 SAMPLING PERIOD

Stomach Contents	No. of Fish Species In Which Organisms Occurred	Stoneroller (1)[a]	Blacktail Shiner (4)	Yellow Bullhead (1)	Green Sunfish (9)	Bluegill (6)	Longear Sunfish (8)	Spotted Bass (3)	Largemouth Bass (1)	Orangethroat Darter (1)
Cladocera (Water fleas)	2	-	-	-	-	7.50	19.88	-	-	-
Copepoda (Copepods)	5	-	1.00	2.00	2.11	4.83	3.13	-	-	-
Ostracoda (Seed shrimp)	2	-	-	-	-	1.67	0.13	-	-	-
Isopoda (Aquatic sow bugs)	1	-	-	-	-	0.17	-	-	-	-
Amphipoda (Scuds, sideswimmers)	3	-	-	-	0.55	3.17	2.75	-	-	-
Ephemeroptera (Mayflies)										
Baetidae	4	-	-	-	0.66	2.17	1.75	0.38	-	-
Caenidae	4	-	-	-	0.11	0.50	0.25	-	-	5.00
Zygoptera (Damselflies)										
Coenagrionidae	1	-	-	-	0.11	-	-	-	-	-
Homoptera (Hoppers)	1	-	-	-	0.11	-	-	-	-	-
Trichoptera (Caddis flies)										
Hydroptilidae	2	-	-	-	0.22	0.17	-	-	-	-
Helicopsychidae	1	-	-	-	-	-	0.50	-	-	-
Odontoceridae	1	-	-	-	-	0.13	-	-	-	-
Coleoptera (Beetles)										
Dytiscidae (Diving beetles)	4	-	-	9.00	0.66	2.33	0.38	-	-	-
Terrestrial beetles	1	-	-	-	-	-	0.13	-	-	-
Diptera (Flies, mosquitoes, midges)										
Simuliidae (Black flies)	4	-	-	-	0.66	0.17	0.38	-	-	5.00
Chironomidae (Midges)	6	-	4.50	61.00	11.78	56.17	28.25	-	-	21.00
Tabanidae (Horseflies)	1	-	-	-	0.11	-	-	-	-	-
Ephydridae (Shore flies)	1	-	-	-	-	0.17	-	-	-	-
Terrestrial dipterans	3	-	-	-	0.33	-	0.13	3.13	-	-
Gastropoda (Snails, limpets)										
Physidae (Pouch snails)	2	-	-	-	0.22	-	0.63	-	-	-
Planorbidae (Orb snails)	1	-	-	-	-	-	0.13	-	-	-
Pelecypoda (Clams, mussels)										
Sphaeriidae (Fingernail Clams)	1	-	-	-	-	-	0.13	-	-	-
Insect parts	8	1.00	1.00	1.00	1.00	0.83	1.00	0.25	-	1.00
Centrarchidae (Fish)	1	-	-	-	-	-	-	0.13	-	-
Unidentified Fish	1	-	-	-	-	-	-	-	1.00	-
Unidentified Algae	1	-	-	-	0.11	-	-	-	-	-

[a]Number of stomachs sampled

TABLE A-58

AVERAGE NUMBER OF ORGANISMS FOUND PER STOMACH
IN SQUAW CREEK FISH COLLECTED DURING THE SPRING, 1975 SAMPLING PERIOD

Stomach Contents	No. of Fish Species In Which Organisms Occurred	Blacktail Shiner (7)[a]	Bullhead Minnow (1)	Gray Redhorse (1)	Black Bullhead (4)	Yellow Bullhead (10)	Channel Catfish (2)	Green Sunfish (42)	Orange-spotted Sunfish (13)	Bluegill (25)	Longear Sunfish (18)	Spotted Bass (8)	White Crappie (1)	Orange-throat Darter (1)
Hirudinea (Leeches)	3	-	-	-	-	-	-	-	-	-	0.07	0.13	1.00	-
Clodocera (Water fleas)	6	-	-	-	0.75	0.10	-	0.18	1.00	5.54	0.21	-	-	-
Copepoda (Copepods)	7	-	-	11.00	4.75	0.90	-	3.25	4.69	9.38	2.43	-	-	-
Ostracoda (Seed shrimp)	4	-	-	-	0.50	-	-	-	0.08	0.04	0.36	-	-	-
Amphipoda (Scuds, sideswimmers)	7	-	-	4.00	1.00	0.30	-	0.39	2.23	2.04	2.07	-	-	-
Decapoda (Crayfish)	2	-	-	-	-	0.10	-	0.02	-	-	-	-	-	-
Hydracarina (Water mites)	5	-	-	2.00	-	-	-	0.71	0.46	0.67	0.14	-	-	-
Arachnida (Spiders)	2	-	-	-	-	-	-	0.02	-	-	0.07	-	-	-
Collembola (Springtails)	1	-	-	-	-	-	-	-	-	0.04	-	-	-	-
Plecoptera (Stoneflies)														
Perlidae	5	-	-	2.00	-	0.10	-	0.41	0.39	-	0.14	-	-	-
Ephemeroptera (Mayflies)														
Baetidae	7	-	-	-	-	0.10	-	0.16	0.54	0.08	1.43	-	-	18.00
Caenidae	7	-	-	3.00	0.25	0.40	-	0.14	0.08	2.67	0.71	-	-	-
Heptageniidae	3	-	-	-	0.50	-	-	0.09	0.46	-	-	-	-	-
Zygoptera (Damselflies)														
Coenagrionidae	5	-	-	-	-	0.20	-	0.05	0.08	0.25	0.14	-	-	-
Trichoptera (Caddis flies)														
Hydroptelidae	7	0.29	-	1.00	-	0.10	-	0.05	0.77	0.04	7.07	-	-	-
Helicopsychidae	1	-	-	-	-	-	-	0.08	-	-	-	-	-	-
Hydropsychidae	1	-	-	-	-	-	-	-	0.08	-	-	-	-	-
Coleoptera (Beetles)														
Haliplidae (Crawling water beetles)	2	-	-	-	-	-	-	0.05	-	-	0.07	-	-	-
Dytiscidae (Diving beetles)	6	-	-	-	7.00	1.00	-	0.86	0.39	0.33	1.43	-	-	-
Hydrophilidae (Water scavenger beetles)	2	-	-	-	-	-	-	0.11	-	0.04	-	-	-	-
Elmidae	1	-	-	-	-	-	-	0.02	-	-	-	-	-	-

[a]Number of stomachs sampled.

TABLE A-58 (Continued)

AVERAGE NUMBER OF ORGANISMS FOUND PER STOMACH
IN SQUAW CREEK FISH COLLECTED DURING THE SPRING, 1975 SAMPLING PERIOD

Stomach Contents	No. of Fish Species In Which Organisms Occurred	Blacktail Shiner (7)[a]	Bullhead Minnow (1)	Gray Redhorse (1)	Black Bullhead (4)	Yellow Bullhead (10)	Channel Catfish (2)	Green Sunfish (42)	Orange-spotted Sunfish (13)	Bluegill (25)	Longear Sunfish (18)	Spotted Bass (8)	White Crappie (1)	Orange-throat Darter (1)
Diptera (Flies, mosquitoes, midges)														
Psychodidae (Moth flies)	1	-	-	-	-	-	-	-	-	0.04	-	-	-	-
Simulidae (Black flies)	6	0.43	-	-	-	0.30	-	0.09	0.31	0.04	0.57	-	-	-
Chironomidae (Midges)	10	2.14	-	31.00	11.25	1.70	-	5.96	134.54	41.00	27.43	0.88	-	2.00
Ceratopogonidae (Biting midges)	2	-	-	-	-	-	-	-	0.31	0.04	-	-	-	-
Ephydridae (Shore flies)	2	-	-	-	-	-	-	-	-	0.04	0,14	-	-	-
Dolicopodidae	1	-	-	-	-	-	-	-	0.08	-	-	-	-	-
Gastropoda (Snails, limpets)														
Physidae (Pouch snails)	7	-	-	1.00	16.25	0.60	-	0.36	3.46	0.50	10.57	-	-	-
Pelecypoda (Clams, mussels)														
Sphaeriidae (Fingernail clams)	1	-	-	-	-	-	-	-	-	0.13	-	-	-	-
Hemiptera (Terrestrial insects)	2	0.14	-	-	-	-	-	0.02	-	-	-	-	-	-
Homoptera (Terrestrial insects)	2	-	-	-	-	-	-	0.09	-	0.29	-	-	-	-
Coleoptera (Terrestrial insects)	3	-	-	-	-	-	-	0.02	-	0.04	0.07	-	-	-
Lepidoptera (Terrestrial insects)	1	-	-	-	-	-	-	0.09	-	-	-	-	-	-
Diptera (Terrestrial insects)	4	-	-	-	-	-	-	0.05	-	0.13	0.14	-	-	-
Hymenoptera (Terrestrial insects)	1	-	-	-	-	-	-	0.02	-	-	-	-	-	-
Insect parts	12	0.71	-	1.00	1.00	0.40	1.00	0.71	0.92	0.63	1.00	0.50	1.00	1.00
Ictaluridae (Fish)	1	-	-	-	-	-	-	-	-	-	-	0.25	-	-
Poeciliidae (Fish)	2	-	-	-	-	-	-	-	-	-	-	0.13	-	-
Centrarchidae (Fish)	2	-	-	-	-	-	-	-	-	-	-	0.13	1.00	-
Unidentified fish	3	-	-	-	-	-	0.50	0.07	-	-	-	0.13	-	-
Unidentified algae	4	0.14	1.00	-	-	-	-	0.02	-	0.04	-	-	-	-
Detritus	3	-	-	-	-	0.40	-	-	-	-	0.14	0.25	-	-
Gravel	1	-	-	-	-	-	-	-	-	-	-	0.13	-	-

[a]Number of stomachs sampled.

TABLE A-59

AVERAGE NUMBER OF ORGANISMS FOUND PER STOMACH IN SQUAW CREEK FISH COLLECTED DURING THE SUMMER, 1975 SAMPLING PERIOD

Stomach Contents	No. of Fish Species In Which Organisms Occurred	Stoneroller (22)[a]	Blacktail Shiner (24)	Black Bullhead (1)	Yellow Bullhead (3)	Channel Catfish (1)	Green Sunfish (21)	Bluegill (7)	Longear Sunfish (27)	Spotted Bass (22)	Largemouth Bass (2)	Orangethroat Darter (5)
Cladocera (Water fleas)	3	-	-	-	-	-	0.43	0.29	0.04	-	-	-
Cyclopidae (Copepods)	4	-	-	-	-	-	0.14	10.7	0.07	-	-	0.20
Ostracoda (Seed shrimp)	4	-	-	-	-	-	0.05	0.14	1.11	-	-	0.20
Asellidae (Aquatic sow bugs)	1	-	-	-	-	-	-	1.14	-	-	-	-
Talitridae (Scuds, sideswimmers)	4	-	-	-	-	-	0.38	1.29	0.41	0.05	-	-
Hydracarina (Water mites)	1	-	-	-	-	-	-	-	0.07	-	-	-
Arachnida (Spiders)	1	-	-	-	-	-	0.05	-	-	-	-	-
Ephemeroptera (Mayflies)												
Baetidae	5	-	-	-	-	-	0.52	2.71	0.67	2.73	-	0.20
Caenidae	3	-	-	-	-	-	0.90	-	0.15	0.05	-	-
Heptageniidae	1	-	-	-	-	-	-	-	0.11	-	-	-
Unidentified mayflies	1	-	-	-	-	-	-	0.71	-	-	-	-
Zygoptera (Damselflies)												
Coenagrionidae	1	-	-	-	-	-	0.05	-	-	-	-	-
Unidentified damselflies	2	-	-	-	-	-	0.05	-	0.04	-	-	-
Hemiptera (Bugs)												
Gerridae (Water striders, pond skaters, wherrymen)	3	-	-	-	-	-	0.05	0.29	-	0.05	-	-
Belostomatidae (Giant water bugs)	2	-	-	-	-	-	P[b]	-	0.04	-	-	-
Megaloptera (Alderflies, dobsonflies, fishflies)												
Corydalidae	1	-	-	-	-	-	0.05	-	-	-	-	-
Trichoptera (Caddis flies)												
Helicopsychidae	2	-	0.04	-	-	-	0.05	-	-	-	-	-
Trichopteran cases	1	-	-	-	-	P	-	-	-	-	-	-
Unidentified caddis flies	5	-	0.04	-	0.33	-	0.05	0.14	0.15	-	-	-
Diptera (Flies, mosquitos, midges)												
Chironomidae (Midges)	4	-	-	-	-	-	0.05	2.71	2.74	0.14	-	-
Stratiomyiidae (Soldier flies)	1	-	-	-	-	-	0.10	-	-	-	-	-
Gastropoda (Snails, limpets)												
Physidae (Pouch snails)	3	-	-	P	-	-	-	0.14	0.15	-	-	-
Planorbidae (Orb snails)	2	-	-	-	-	-	0.10	-	0.04	-	-	-
Ancylidae (Limpets)	1	-	-	-	-	-	0.05	-	-	-	-	-
Pelecypoda (Clams, mussels)												
Sphaeriidae (Fingernail Clams)	1	-	-	-	-	-	-	0.14	-	-	-	-

[a]Number of stomachs sampled.

[b]P = present, but not enumerated.

TABLE A-59 (Continued)

AVERAGE NUMBER OF ORGANISMS FOUND PER STOMACH
IN SQUAW CREEK FISH COLLECTED DURING THE SUMMER, 1975 SAMPLING PERIOD

Stomach Contents	No. of Fish Species In Which Organisms Occurred	Stoneroller (22)[a]	Blacktail Shiner (24)	Black Bullhead (1)	Yellow Bullhead (3)	Channel Catfish (1)	Green Sunfish (21)	Bluegill (7)	Longear Sunfish (27)	Spotted Bass (22)	Largemouth Bass (2)	Orangethroat Darter (5)
Cicadidae (Terrestrial Insects)	1	-	-	-	-	-	0.05	-	-	-	-	-
Insect Parts	8	-	P	-	P	P	P	-	P	P	P	P
Centrarchidae (Fish)	2	-	-	-	-	-	-	-	-	0.05	0.50	-
Poeciliidae (Fish)	2	-	-	-	-	-	-	-	-	0.09	1.00	-
Unidentified Fish	1	-	-	-	-	-	-	-	-	0.05	-	-
Unidentified Frog	1	-	-	-	-	-	0.05	-	-	-	-	-
Chara (Green algae)	1	-	-	-	-	-	P	-	-	-	-	-
Unidentified Algae	2	P	P	-	-	-	-	-	-	-	-	-
Large Seeds	1	-	-	-	0.33	-	-	-	-	-	-	-
Unidentified Plant Material	2	-	-	-	1.00	-	-	-	0.04	-	-	-
Detritus	5	P	P	P	-	P	-	-	P	-	-	-
Gravel	1	-	-	-	-	P	-	-	-	-	-	-

[a]Number of stomachs sampled.
[b]P = present, but not enumerated.

TABLE A-60

PARASITES RECORDED FROM SQUAW CREEK FISHES IN THE VICINITY OF THE CPSES SITE NEAR GLEN ROSE, SOMERVELL COUNTY, TEXAS

Type of Parasite Place of Attachment	Common Name	Scientific Name	Host Fish Species	Observed Occurrence	Approximate Number of Observations
External					
(Body, fins, skin) muscle and body connective tissue	Metacercarial Trematoda Black Spot	Larval Genus *Neascus* sp. (Hughes)	Blacktail Shiner Blackstripe Topminnow Bluegill Sunfish Green Sunfish Longear Sunfish Spotted Bass White Crappie Orangethroat Darter	Common	(100+)
Internal					
(Intestinal Tract)	Nematode	Order Nematoda	Yellow Bullhead Green Sunfish	Infrequent Observation	(3)
(Liver, spleen, kidneys, heart, mesentaries, ovaries)	Metacercarial Trematoda White grub of the liver	Order Trematoda *Posthodiplostomum minimum*	Bluegill Sunfish Green Sunfish Longear Sunfish Orangespotted Sunfish Spotted Bass White Crappie Yellow Bullhead	Common	(40)
(Intestinal Tract)	Tapeworm	Order Cestoda (incomplete speci-man)	Green Sunfish	Infrequent Observation	(1)

TABLE B-1

COMPUTATION OF THE VOLUME PER SWEEP IN EACH AREA FOR TERRESTRIAL INVERTEBRATE SURVEY

Area	Number Sweeps grass	Number Sweeps trees	% vegetation cover of net opening	Volume (m^3)[2] grass	Volume (m^3)[2] trees
1	500	---	80%	58.8	36.8
2	750	200	50%	55.1	36.8
3	600	200	65%	57.3	36.8

[1] Based upon sampling described in text and Table 1. Volume of each sweep determined by calculating the volume of the sweep cylinder ($\pi r^2 h$, where h = 130 cm sweeping length) and multiplying it by the number of sweeps (A) and the percentage of vegetation covered by the net opening (B)[2].

[2] $V = \pi r^2 h = (3.14)(19)^2(130) = 0.147\ m^3$ for each sweep of the sweep net (grass)

$= 0.092\ m^3$ for each sweep of the beating net (tree).

TABLE B-2

APPORTIONMENT OF SWEEP SAMPLES AMONG SAMPLING AREAS AND HABITATS FOR SPRING, 1975 TERRESTRIAL INVERTEBRATE SURVEY, CPSES SITE

		Total Sweeps
Area 1	100 sweeps/replicate	500
Area 2 - grass	250 sweeps/replicate	750
- trees	100 sweeps/replicate	200
Area 3 - grass	200 sweeps/replicate	600
- trees	100 sweeps/replicate	200

TABLE B-3

ESTIMATED AVIAN DENSITIES ON THE CPSES SITE, SPRING 1975

SPECIES SCIENTIFIC NAME[a]	COMMON NAME	DENSITY (Nos./replicate) LOW	MEDIAN	HIGH	$\bar{X}^b$	RELATIVE ABUNDANCE (%)
			GRASSY SLOPES			
Cathartes aura	Turkey vulture	0	0	1	1.3	2.4
Colinus virginianus	Bobwhite	0	0	5	6.5	12.2
Zenaida macroura	Mourning dove	0	0	1	1.3	2.4
Muscivora forficata	Scissor-tailed flycatcher	2	2	2	7.8	14.6
Mimus polyglottos	Mockingbird	0	1	4	6.5	12.2
Sturnella magna	Eastern meadowlark	1	2	2	6.5	12.2
Molothrus ater	Brown-headed cowbird	0	1	3	5.2	9.8
Chondestes grammacus	Lark sparrow	1	3	4	10.4	19.5
Spizella pallida	Clay-colored sparrow	1	2	3	7.8	14.6

TABLE B-3 (Cont'd)

SPECIES		DENSITY (Nos./replicate)				
SCIENTIFIC NAME[a]	COMMON NAME	LOW	MEDIAN	HIGH	$\bar{X}^b$	RELATIVE ABUNDANCE (%)
	JUNIPER WOODLANDS					
Cathartes aura	Turkey vulture	0	1	3	5.2	5.1
Colinus virginianus	Bobwhite	0	1	1	2.6	2.6
Zenaida macroura	Mourning dove	4	5	6	19.5	19.2
Coccyzus americanus	Yellow-billed cuckoo	0	0	2	2.6	2.6
Dendrocopos villosus	Hairy woodpecker	0	0	2	2.6	2.6
Myiarchus crinitus	Great crested flycatcher	0	0	1	1.3	1.3
Psaltriparus minimus	Bushtit	0	0	3	3.9	3.8
Salpinctes obsoletus	Rock wren	0	0	2	2.6	2.6
Mimus polyglottos	Mockingbird	0	0	1	1.3	1.3
Vermivora ruficapilla	Nashville warbler	0	0	2	2.6	2.6
Molothrus ater	Brown-headed cowbird	1	3	6	13.0	12.8
Cardinalis cardinalis	Cardinal	6	6	6	23.3	23.1
Passerina ciris	Painted bunting	1	2	3	7.8	7.7
Chondestes grammacus	Lark sparrow	1	3	6	13.0	12.8

TABLE B-3 (Cont'd)

SPECIES SCIENTIFIC NAME[a]	COMMON NAME	DENSITY (Nos./replicate) LOW	MEDIAN	HIGH	$\bar{x}$[b]	RELATIVE ABUNDANCE (%)
			SQUAW CREEK			
Cathartes aura	Turkey vulture	0	0	1	1.3	1.6
Colinus virginianus	Bobwhite	0	1	1	2.6	3.3
Actitis macularia	Spotted sandpiper	2	2	2	7.8	9.8
Zenaida macroura	Mourning dove	1	3	5	11.7	14.8
Coccyzus americanus	Yellow-billed cuckoo	0	1	2	3.9	4.9
Chordeiles minor	Common nighthawk	0	0	1	1.3	1.6
Megaceryle alcyon	Belted kingfisher	0	0	1	1.3	1.6
Parus carolinensis	Carolina chickadee	0	0	2	2.6	3.3
Parus bicolor	Tufted titmouse	0	2	3	6.5	8.2
Mimus polyglottos	Mockingbird	0	0	1	1.3	1.6
Polioptila caerulea	Blue-gray gnatcatcher	0	0	1	1.3	1.6
Vireo griseus	White-eyed vireo	0	0	1	1.3	1.6
Sturnella magna	Eastern meadowlark	0	1	2	3.9	4.9
Molothrus ater	Brown-headed cowbird	0	0	5	6.5	8.2
Cardinalis cardinalis	Cardinal	2	4	7	16.9	21.3
Passerina ciris	Painted bunting	1	2	3	7.8	9.8
Chondestes grammacus	Lark sparrow	0	0	1	1.3	1.6

[a]Nomenclature follows that of the A.O.U. checklist as revised by the thirty-second supplement, April 1973.

[b]Estimated number of birds per 40 ha (100 a).

TABLE B-4

HERPETOFAUNA OBSERVED ON THE CPSES SITE DURING THE SPRING, 1975 SURVEY[a]

Family Scientific Name Common Name	Number Observed	Location
Chelydridae		
Chelydra serpentina serpentina		
Common snapping turtle	1	Squaw Creek
Testudinidae		
Terrapene ornata ornata		
Ornate box turtle	1	Construction Rd.
Pseudemys concinna texana		
Texas slider	2	Squaw Creek
Trionychidae		
Trionyx spinifer emoryi		
Texas softshell	4	Squaw Creek
Iguanidae		
Crotaphytus collaris collaris		
(Eastern) Collared lizard	3	Rocky Areas
Holbrookia texana texana		
Texas earless lizard	6	Rocky Areas
Sceloporus olivaceus		
Texas spiny lizard	1	Rocky Areas
Colubridae		
Natrix rhombifera rhombifera		
Diamond-backed water snake	2	Squaw Creek
Natrix erythrogaster transversa		
Blotched water snake	6	Squaw Creek
Thamnophis sauritus proximus		
Western ribbon snake	2	Squaw Creek
Coluber constrictor flaviventris		
Eastern yellow-bellied racer	1	Construction Rd.
Masticophis flagellum testaceus		
Western coachwhip	2	Grassy Slope
Elaphe obsoleta lindheimeri		
Texas rat snake	2	Construction Rd.
Viperidae		
Crotalus atrox		
Western diamondback rattlesnake	1	Construction Rd.

TABLE B-4 (Cont'd)

Family Scientific Name Common Name	Number Observed	Location
Bufonidae		
Bufo woodhousei woodhousei		
Rocky mountain toad	1	Construction Rd.
Bufo valliceps		
Gulf coast toad	1	Squaw Creek
Hylidae		
Acris crepitans blanchardi		
Blanchard's cricket frog	1	Squaw Creek
Ranidae		
Rana catesbeiana		
Bullfrog	2	Squaw Creek
Rana pipiens berlandieri		
Rio Grande leopard frog	1	Squaw Creek

[a]Nomenclature follows Conant 1958.

TABLE B-5

NUMBER OF FAMILIES AND SPECIES
OF TERRESTRIAL INVERTEBRATES COLLECTED IN THE
THREE SAMPLE AREAS ON CPSES SITE, SPRING, 1975

Order	Number of families	Number of species
Homoptera	10	66
Hemiptera	11	62
Coleoptera	18	93
Orthoptera	6	39
Diptera	31	96
Hymenoptera	24	117
Lepidoptera	4	15
Misc.	9	13
	113	501

TABLE B-6

NUMBER OF TERRESTRIAL INVERTEBRATE SPECIES IN EACH ORDER AND SAMPLING AREA ON CPSES SITE, SPRING, 1975

	Collection Area							
Order	1	2G	2T	2 Total	3G	3T	3 Total	Grand Total
Homoptera	39	31	6	34	28	6	30	66
Hemiptera	30	36	6	38	22	8	27	62
Coleoptera	34	47	10	55	46	22	56	93
Orthoptera	32	13	1	13	11	1	11	39
Diptera	37	25	13	34	42	17	53	96
Hymenoptera	22	38	18	56	38	16	53	117
Lepidoptera	5	8	3	10	8	0	8	15
Odonata	0	2	1	3	1	0	1	4
Neuroptera	2	1	2	2	1	1	2	3
Plecoptera	0	1	0	1	1	0	1	2
Collembola	1	0	0	0	0	0	0	1
Psocoptera	0	0	2	2	0	0	0	2
Thysanoptera	0	0	1	1	0	0	0	1
Total Species	202	202	64	249	198	71	242	501

TABLE B-7

NUMBER OF INDIVIDUALS OF TERRESTRIAL INVERTEBRATES IN EACH HABITAT, ACCOUNTING FOR TREES AND GRASSLAND COLLECTED ON CPSES SITE, SPRING, 1975

Order	Area 1	2G	2T	3G	3T	Total
Homoptera	325	150	13	149	28	665
Hemiptera	192	255	31	87	33	598
Coleoptera	193	385	17	239	34	866
Orthoptera	104	28	1	34	1	168
Diptera	200	136	18	604	33	991
Hymenoptera	70	123	22	45	17	277
Lepidoptera	17	22	5	17	0	61
Neuroptera	21	25	2	10	1	59
Psocoptera	0	0	10	0	0	10
Odonata	0	3	1	1	0	5
Thysanoptera	0	0	1	0	0	1
Plecoptera	0	1	0	0	2	3
Colembola	1	0	0	0	0	1
Total	1123	1128	121	1184	149	3705

TABLE B-8

DIVERSITY (SHANNON-WEAVER H) OF EACH AREA AND INSECT ORDER ON CPSES SITE, SPRING, 1975

	Area[a]					
Order	1	2G	2	3G	3	Average
Homoptera	1.29	1.24	1.26	1.07	1.09	1.39
Hemiptera	1.17	1.05	1.06	1.01	1.16	1.19
Coleoptera	1.06	0.95	1.00	1.23	1.31	1.11
Orthoptera	1.33	0.96	0.96	0.81	0.80	0.97
Diptera	1.07	0.96	1.09	0.63	0.73	0.89
Hymenoptera	0.99	1.28	1.46	1.56	1.67	1.39
Lepidoptera	0.65	0.82	0.95	0.82	0.82	0.81
Misc.	0.25	0.24	0.59	0.13	0.39	0.32
	0.98	0.94	1.05	0.91	0.99	

[a]Areas 2, 3 represent total diversities per area, including tree samples.

TABLE B-9

EQUITABILITIES (J) FOR EACH AREA
AND INSECT ORDER ON CPSES SITE, SPRING, 1975

Order	Area 1	2G	2	3G	3	Average
Homoptera	0.87	0.83	0.82	0.74	0.74	0.81
Hemiptera	0.79	0.67	0.67	0.75	0.81	0.76
Coleoptera	0.69	0.57	0.58	0.74	0.75	0.67
Orthoptera	0.86	0.86	0.86	0.78	0.77	0.83
Diptera	0.68	0.68	0.71	0.39	0.42	0.61
Hymenoptera	0.74	0.81	0.83	0.98	0.97	0.85
Lepidoptera	0.92	0.91	0.95	0.91	0.91	0.93
Misc.	0.52	0.28	0.62	0.28	0.65	0.60
Average	0.76	0.70	0.76	0.70	0.75	

TABLE B-10

TAXONOMIC REPRESENTATION OF THE ORGANISMS EXTRACTED FROM SOIL SAMPLES (n = 2) FOR THE THREE HABITAT AREAS INVESTIGATED ON CPSES SITE, SPRING, 1975

Class	Order	Taxa	Number of Species
Insecta	Diptera	Chironomidae	1
		Unidentified	3
	Hymenoptera	Formicidae	1
	Coleoptera	Chrysomelidae	1
	Collembola	Poduridae	1
		Entomobryidae	1
	Thysanura	Japygidae	1
	Protura	Protentomidae	1
		Unidentified	1
	Thysanoptera	Unidentified	2
Aracanida	Acarina	Unidentified	6
			19

TABLE B-11

NUMBER OF INSECT SPECIES AND INDIVIDUALS COLLECTED FROM REPLICATE SOIL SAMPLES IN THE THREE AREAS ON CPSES SITE, SPRING, 1975

	1A	1B	2A	2B	3A	3B
Collembola						
Poduridae-1	3	2	2	2	1	4
Entomobryidae-1		1	1			
Protura						
#2				1		
Protentomidae-1	1			1		
Thysanura						
Japygidae-1	1					
Thysanoptera						
#1	1		1		8	
#2		1				
Diptera						
Chironomidae-1	1					
#203		1				
#200						1
#201						1
Coleoptera						
Chrysomelidae						
201	1					
Hymenoptera						
200		2				2
Acarina						
1	3	5	7	1	1	1
2		1	3	2		1
3	1				1	
4			2	2	1	
5			1			
6					3	
Number of Individuals	12	13	17	9	15	10
Number of Species	13		9		10	

TABLE B-12

NUMBER OF INSECT SPECIES (A) AND PERCENT OF TOTAL FAUNA (B) IN EACH TROPHIC LEVEL AND SAMPLING AREA ON CPSES SITE, SPRING, 1975

(A)

Trophic Level	Area 1	2G	2T	∑	3G	3T	∑
Herbivore	149	145	33	165	119	37	138
Detritivore	14	10	12	18	24	11	27
Predator	15	19	4	22	25	12	35
Parasite	27	30	16	45	39	12	48
Scavenger	1	1	0	1	0	4	4

(B)

	1	2G	2T	∑	3G	3T	∑
Herbivore	72.3	70.7	50.8	65.7	57.4	48.7	54.8
Detritivore	6.8	4.9	18.5	7.2	11.6	14.5	10.7
Predator	7.3	9.3	6.2	8.8	12.1	15.8	13.9
Parasite	13.1	14.6	24.6	17.9	18.8	15.8	19.0
Scavenger	0.5	0.5	0.0	0.4	0.0	5.3	1.6

TABLE B-13

DISTINCT SPECIES PER AREA AND INSECT ORDER COLLECTED AT CPSES SITE, SPRING, 1975

	Area			
Order	1	2	3	Σ
Homoptera	16	12	8	36
Hemiptera	10	13	12	35
Coleoptera	8	19	20	47
Orthoptera	18	0	6	24
Diptera	18	15	40	73
Hymenoptera	13	46	47	106
Lepidoptera	1	6	3	10
Misc.	1	8	2	11
Total	85	119	138	
% of total species	42.1	47.8	57.0	

TABLE B-14

SØRENSENS COEFFICIENT OF SIMILARITY
FOR TERRESTRIAL INVERTEBRATES BETWEEN SAMPLING AREAS
(IN PERCENT) ON CPSES SITE, SPRING, 1975

		Area				
		1	2G	2T	3G	3T
	1	100.0				
Area	2G	45.5	100.0			
	2T	12.7	12.8	100.0		
	3G	28.0	31.5	9.2	100.0	
	3T	16.1	16.1	11.9	19.3	100.0

TABLE B-15

FACTOR LOADING OF EACH OF THE HABITAT AREAS ONTO THE FIRST THREE ROTATED PRINCIPAL COMPONENT AXES FOR SWEEP SAMPLES AT THE CPSES SITE, SPRING, 1975

	FACTOR*		
Collection	I	II	III
Area 1	.799	.098	.001
Area 2G	.815	.085	.027
Area 2T	.082	.988	.066
Area 3G	.598	-.063	.347
Area 3T	.086	.080	.959
% explained variation	33.5%	20.1%	20.9%

* The loadings give the correlation or association of a collection with that factor and thus the mutual interrelationships among the five habitat samples. Percent of variance explained by the factor is given at the bottom of the table.

TABLE B-16

SIMILARITY MATRIX OF INVERTEBRATES AMONG THE SOIL SAMPLES UTILIZING SØRENSEN'S COEFFICIENT (IN PERCENT) FOR CPSES SITE, SPRING, 1975

	Sample					
Sample	1a	1b	2a	2b	3a	3b
1a	100					
1b	26.7	100				
2a	40.0	57.1	100			
2b	42.9	46.2	61.5	100		
2a	57.1	30.8	61.5	50.0	100	
2c	28.5	61.5	46.2	50.0	33.3	100

TABLE B-17

FACTOR LOADING OF EACH OF THE HABITAT AREAS ONTO THE FIRST THREE ROTATED PRINCIPAL COMPONENT AXES FOR SOIL SAMPLES AT THE CPSES SITE, SPRING, 1975

Sample	Factor I	Factor II	Factor III
1a	.219	.932	.159
1b	.332	.026	.821
2a	.848	.114	.341
2b	.680	.226	.398
3a	.714	.567	.046
3c	.167	.113	.876
% explained variation	30.8%	21.2%	29.0%

TABLE B-18

ESTIMATED AVIAN DENSITIES ON THE CPSES SITE, SUMMER 1975

SPECIES		DENSITY (Nos./replicate)				
SCIENTIFIC NAME[a]	COMMON NAME	LOW	MEDIAN	HIGH	$\bar{X}^b$	RELATIVE ABUNDANCE (%)
GRASSY SLOPES						
Colinus virginianus	Bobwhite	0	0	17	22.0	50.0
Mimus polyglottos	Mockingbird	0	1	3	5.2	11.8
Sturnella magna	Eastern Meadowlark	0	2	6	10.4	23.5
Chondestes grammacus	Lark Sparrow	0	0	1	1.3	2.9
Spizella pusilla	Field Sparrow	1	1	2	5.2	11.8
JUNIPER WOODLANDS						
Colinus virginianus	Bobwhite	0	0	2	2.6	2.6
Zenaida macroura	Mourning Dove	0	3	6	11.7	11.8
Dendrocopos scalaris	Ladder-backed woodpecker	0	0	1	1.3	1.3
Parus carolinensis	Carolina chickadee	0	2	7	11.7	11.8
Molothrus ater	Brown-headed cowbird	2	2	4	10.4	10.5
Cardinalis cardinalis	Cardinal	3	4	4	14.3	14.5
Passerina ciris	Painted bunting	2	3	4	11.7	11.8
Chondestes grammacus	Lark sparrow	4	5	8	22.0	22.4
Spizella pusilla	Field sparrow	0	2	8	13.0	13.2

TABLE B-18 (Cont'd)

SPECIES SCIENTIFIC NAME[a]	COMMON NAME	DENSITY (Nos./replicate) LOW	MEDIAN	HIGH	$\bar{X}^b$	RELATIVE ABUNDANCE (%)
SQUAW CREEK						
Butorides virescens	Green heron	1	1	1	3.9	4.5
Colinus virginianus	Bobwhite	0	2	5	9.1	10.4
Charadrius vociferus	Killdeer	0	0	2	2.6	3.0
Zenaida macroura	Mourning dove	0	2	3	6.5	7.5
Coccyzus americanus	Yellow-billed cuckoo	1	1	2	5.2	6.0
Megaceryle alcyon	Belted kingfisher	0	0	1	1.3	1.5
Stelgidopteryx ruficollis	Rough-winged swallow	0	2	6	10.4	11.9
Parus carolinensis	Carolina chickadee	0	1	1	2.6	3.0
Molothrus ater	Brown-headed cowbird	1	1	3	6.5	7.5
Cardinalis cardinalis	Cardinal	7	8	8	29.8	34.3
Passerina ciris	Painted bunting	1	3	3	9.1	10.4

TABLE B-19

GAMEBIRD FORAGE ESTIMATES, SUMMER, 1975

Species	Sex	Age Class[b]	CROP CONTENTS[a]: Wooly Bucket Bumelia	Croton	Prickle poppy	Vetch	Sumac	Snow on the Mountain	Sedge	Panic Grass	Insects[c]	Other[d]
Zenaida macroura[e]	-	I		62%	36%			Trace		Trace	Trace	Trace
Zenaida macroura[e]	-	I		38%		54%				Trace	Trace	
Zenaida macroura[e]	-	A		48%		Trace	24%	11%				17%
Zenaida macroura[e]	-	I							93%			7%
Zenaida macroura[e]	-	A		27%			72%					1%
Zenaida macroura[e]	-	A	55%				36%					9%
Zenaida macroura[g]	-	A		24%		37%		5%				24%
Colinus virginianus[f]	M	A		82%							12%	6%
Colinus virginianus[e]	M	I									67%	33%
Colinus virginianus[e]	M	I		99%								1%
Colinus virginianus[e]	M	I	2%	91%				2%			2%	3%
Colinus virginianus[f]	M	A		26%					2%		52%	20%
Colinus virginianus[e]	F	A		8%							89%	3%
Colinus virginianus[e]	F	A		80%							20%	
Colinus virginionus[e]	F	I		Trace								
Colinus virginianus[e]	F	A		3%							94%	3%
Colinus virginianus[e]	F	A		9%						77%	14%	

[a] Expressed in percent volume.

[b] I = Immature
A = Adult

[c] Insects: a multitude of insects mainly representing the following orders were found, however, for the sake of presentation, all have been grouped under this term. (Coleoptera, Hemiptera, Orthoptera, Lepidoptera, Homoptera).

[d] Other: Includes foxtail, vervain, beggerstick, pepperwort, morning glory, as well as vegetative portions of plants, unidentifiable materials.

[e] Collected in grassland habitat.

[f] Collected in Juniper woodlands habitat.

[g] Collected along Squaw Creek.

TABLE B-20

LIST OF FAMILIES AND NUMBER OF SPECIES PER FAMILY COLLECTED OVER ALL THREE AREAS

Order	Family	# species
Coleoptera	Scarabidae	3
	Coccinellidae	3
	Cleridae	2
	Carabidae	2
	Mordellidae	6
	Chrysomelidae	30
	Dasytidae	3
	Curculionidae	23
	Anthribidae	4
	Anthicidae	1
	Byrrhidae	1
	Buprestidae	2
	Meloidae	2
	Phalacridae	6
	Lampyridae	1
	Lyctidae	1
	Cantharidae	1
	Cerambycidae	2
Hemiptera	Reduviidae	7
	Miridae	14
	Pentatomidae	12
	Nabidae	1
	Lygaeidae	6
	Coreidae	8
	Tingidae	8
	Anthocoridae	1
	Berytidae	2
	Corimelaenidae	1
	Cydnidae	2
Homoptera	Acanaloniidae	1
	Issidae	1
	Cicadellidae	54
	Dictyopharidae	1
	Cercopidae	1
	Psyllidae	2
	Fulgoridae	1
	Delphacidae	3
	Aphididae	1
	Membracidae	1

TABLE B-20 (Cont'd)

Order	Family	# species
Orthoptera	Phasmidae	1
	Acrididae	29
	Gryllacrididae	1
	Tettigoniidae	6
	Gryllidae	1
	Mantidae	1
Lepidoptera	Pieridae	2
	Noctuidae	10
	Gelechiidae	1
	Pyralidae	2
Neuroptera	Chrysopidae	1
	Hemerobiidae	1
	Raphidiidae	1
Plecoptera	Perlidae	2
Collembola	Entomobryidae	1
	Sminthuridae	1
Thysanoptera	Thripidae	1
Psocoptera	Psocidae	2
Odonata	Coenagrionidae	3
Diptera	Syrphidae	4
	Tabanidae	3
	Asilidae	8
	Tachinidae	10
	Chamaemyiidae	3
	Bombyliidae	3
	Anthomyiidae	3
	Nemestrinidae	1
	Tephritidae	6
	Chloropidae	11
	Sepsidae	3
	Milichiidae	2
	Sciaridae	4
	Tipulidae	2
	Stratiomyiidae	3
	Sarcophagidae	2
	Muscidae	2
	Calliphoridae	1
	Lauxaniidae	1
	Empididae	4

TABLE B-20 (Cont'd)

Order	Family	# species
Diptera (Cont.)	Pipunculidae	2
	Ephydridae	2
	Dolichopodidae	3
	Sciomyzidae	1
	Mycetophilidae	3
	Cecidomyiidae	1
	Anthomyzidae	1
	Chironomidae	2
	Otitidae	1
	Therevidae	1
	Bibionidae	1
Hymenoptera	Apidae	2
	Halictidae	6
	Braconidae	32
	Ichneumonidae	13
	Torymidae	1
	Pteromalidae	16
	Eurytomidae	10
	Perilampidae	3
	Vespidae	1
	Formicidae	5
	Chrysididae	1
	Sphecidae	3
	Cynipidae	4
	Platygasteridae	3
	Colletidae	2
	Tiphiidae	2
	Andrenidae	3
	Scelionidae	3
	Chalcididae	4
	Eupelmidae	1
	Figitidae	2
	Eulophidae	1
	Pompilidae	1
	Encyrtidae	1

TABLE B-21

LIST OF SPECIES COLLECTED, IDENTIFIED TO FAMILY AND THEIR PUTATIVE TROPHIC PLACEMENT

DIPTERA

Species Number	Family	Trophic Placement
1	Syrphidae	Detritivore/Phytophagous
2	Tabanidae	Phytophagous
3	Asilidae	Predator
4	Tachinidae	Parasite
5	Chamaemyiidae	Predator
6	Bombyliidae	Phytophagous
7	Anthomyiidae	Detritivore
8	Tachinidae	Parasite
9	Nemestrinidae	
10	Tephritidae	Phytophagous
11	Tephritidae	Phytophagous
12	Chloropidae	Phytophagous
13	Sepsidae	Detrivore
14	Chloropidae	Phytophagous
15	---	---
16	Chloropidae	Phytophagous
17	Milichiidae	Detritivore
18	Sciaridae	Detritivore
19	Tephritidae	Phytophagous
20	Tachinidae	Parasite
21	Tipulidae	Detritivore
22	Stratiomyiidae	Phytophagous
23	Asilidae	Predator
24	Sarcophagidae	Detritivore
25	Muscidae	Detritivore
26	Sepsidae	Detrivore
27	Chloropidae	Phytophagous
28	Chamaemyiidae	Predator
29	Sciariade	Detritivore
30	---	---
31	Tachinidae	Parasitic
32	Tabanidae	Phytophagous
33	Bombyliidae	Phytophagous
34	Sciaridae	Detrivore
35	Bombyliidae	Phytophagous
36	Chloropidae	Phytophagous
37	Tachinidae	Parasite
38	Stratiomyidae	Phytophagous
39	Calliphoridae	Detrivore
40	Tephritidae	Phytophagous

TABLE B-21 (Cont'd)

Diptera (Cont.)

Species Number	Family	Trophic Placement
41	Tephritidae	Phytophagous
42	Asilidae	Predator
43	Asilidae	Predator
44	Lauxaniidae	Detrivore
45	Syrphidae	Detritivore/Phytophagous
46	Sepsidae	Detrivore
47	Chlorophidae	Phytophagous
48	Chlorophidae	Phytophagous
49	Empididae	Predator
50	Pipunculidae	Parasite
51	Tachinidae	Parasite
52	Tachinidae	Parasitie
53	Tachinidae	Parasitic
54	Ephydridae	Detritivore
55	Chloropidae	Phytophagous
56	Dolichopididae	Detritivore/Predator
57	Chloropidae	Phytophagous
58	Anthomyiidae	Detrivore
59	Syrphidae	Detrivore/Phytophagous
60	Muscidae	Detrivore
61	---	---
62	Sciomyzidae	Predator
63	Mycetophilidae	Detrivore
64	Mycetophilidae	Detritivore
65	Syrphidae	Detrivore/Phytophagous
66	Pipunculidae	Parasite
67	Tephritidae	Phytophagous
68	Asilidae	Predator
69	Cecidiomyiidae	Phytophagous
70	Ephydrididae	Detritivore
71	Sciaridae	Detritivore
72	Milichiidae	Detritivore
73	Anthomyzidae	Detrivore
74	Chironomidae	Detrivore
75	Tachinidae	Parasitic
76	Tipulidae	Detrivore
77	Asilidae	Predator
78	Anthomyiidae	Detrivore
79	Sarcophagidae	Detrivore
80	Otitidae	Detrivore/Phytophagous
81	Therevidae	Predaceous
82	Stratiomyidae	Phytophagous
83	Dolichopididae	Detrivore/Predator
84	Mycetophilidae	Detritivore
85	Chamaemyiidae	Predator
86	Chloropidae	Phytophagous
87	Chironomidae	Detrivore
88	Asilidae	Predator

TABLE B-21 (Cont'd)

Diptera (Cont.)

Species Number	Family	Trophic Placement
89	Dolichopodidae	Detrivore/Predator
90	Bibionidae	Detrivore
91	Empididae	Detritivore/Predator
92	Empididae	Detrivore/Predator
93	Tachinidae	Parasite
94	Tabanidae	Phytophagous
95	---	---
96	Empididae	Detrivore/Predator
97	Asilidae	Predator
98	Chloropidae	Phytophagous

TABLE B-21 (Cont'd)

HOMOPTERA

Species Number	Family	Trophic Placement
1	Acanaloniida	Phytophagous
2	Issidae	"
3	Cicadellidae	"
4	Cicadellidae	"
5	Cicadellidae	"
6	Dictyopharidae	"
7	Cicadellidae	"
8	Cercopidae	"
9	Cicadellidae	"
10	Cicadellidae	"
11	Psyllidae	"
12	Cicadellidae	"
13	Psyllidae	"
14	Cicadellidae	"
15	Fulgoridae	"
16	Cicadellidae	"
17	Cicadellidae	"
18	Cicadellidae	"
19	Aphididae	"
20	Cicadellidae	"
21	Delphacidae	"
22	Cicadellidae	"
23	"	"
24	"	"
25	"	"
26	Delphacidae	"
27	Cicadellidae	"
28	"	"
29	"	"
30	"	"
31	"	"
32	"	"
33	"	"
34	"	"
35	"	"
36	"	"
37	---	---
38	Cicadellidae	"
39	Membracidae	"
40	Cicadellidae	"
41	"	"
42	---	---
43	Cicadellidae	"
44	Delphacidae	"
45	---	---
46	Cicadellidae	"
47	"	"
48	"	"

TABLE B-21 (Cont'd)

Homoptera (Cont.)

Species Number	Family	Trophic Placement
49	Cicadellidae	Phytophagous
50	"	"
51	"	"
52	"	"
53	"	"
54	---	---
55	Cicadellidae	"
56	"	"
57	"	"
58	"	"
59	"	"
60	"	"
61	"	"
62	"	"
63	"	"
64	---	---
65	---	---
66	Cicadellidae	"
67	"	"
68	"	"
69	"	"
70	"	"
71	"	"
72	"	"

TABLE B-21 (Cont'd)

HEMIPTERA

Species Number	Family	Trophic Placement
1	Reduviidae	Predator
2	Miridae	Phytophagous
3	Pentatomidae	"
4	Nabidae	Predator
5	Lygaeidae	Phytophagous
6	Miridae	"
7	Miridae	"
8	Coreidae	Predator
9	Reduviidae	Predator
10	Tingidae	Phytophagous
11	Anthocoreidae	"
12	Lygaeidae	"
13	Pentatomidae	"
14	"	"
15	"	"
16	Miridae	"
17	Tingidae	"
18	Tingidae	"
19	Lygaeidae	"
20	Tingidae	"
21	Miridae	"
22	Berytidae	"
23	Corimelaenidae	"
24	Coreidae	Predator
25	Miridae	Phytophagous
26	---	---
27	Coreidae	Predator
28	Cydnidae	Phytophagous
29	Reduviidae	Predaceous
30	---	---
31	Tingidae	Phytophagous
32	Lygaeidae	"
33	Cydnidae	"
34	Lygaeidae	"
35	Tingidae	"
36	Pentatomidae	"
37	Miridae	"
38	Pentatomidae	"
39	"	"
40	"	"
41	Miridae	"
42	Coreidae	Predator
43	Miridae	Phytophagous
44	Miridae	"
45	Pentatomidae	"
46	Tingidae	"
47	Tingidae	"

TABLE B-21 (Cont'd)

Hemiptera (Cont.)

Species Number	Family	Trophic Placement
48	Miridae	Phytophagous
49	Miridae	"
50	Berytidae	"
51	Pentatomidae	"
52	Pentatomidae	"
53	---	---
54	Reduviidae	Predator
55	Miridae	Phytophagous
56	Pentatomidae	"
57	Reduviidae	Predator
58	Lygaeidae	Phytophagous
59	Coreidae	Predator
60	Reduviidae	Predator
61	Reduviidae	Predator
62	Coreidae	Predator
63	Miridae	Phytophagous
64	Coreidae	Predator
65	Coreidae	Predator

TABLE B-21 (Cont'd)

COLEOPTERA

Species Number	Family	Trophic Placement
1	Coccinellidae	Predator
2	Chrysomelidae	Phytophagous
3	Cleridae	Predator
4	Carabidae	Predator
5	Mordellidae	Phytophagous
6	Mordellidae	"
7	Mordellidae	"
8	Chrysomelidae	"
9	Dasytidae	"
10	Chrysomelidae	"
11	Mordellidae	"
12	Chrysomelidae	"
13	Curculionidae	"
14	Curculionidae	"
15	Curculionidae	"
16	Anthribidae	Detritivore (fungus)
17	Curculionidae	Phytophagous
18	Curculionidae	"
19	Anthribidae	Detritivore (fungus)
20	Chrysomelidae	Phytophagous
21	Byrrhidae	"
22	---	---
23	Dasytidae	"
24	Curculionidae	"
25	Buprestidae	"
26	Chrysomelidae	"
27	Chrysomelidae	"
28	Chrysomelidae	"
29	Chrysomelidae	"
30	Cantharidae	"
31	Meloidae	Parasite
32	Carabidae	Predator
33	Phalacridae	Phytophagous
34	Chrysomelidae	"
35	Curculionidae	"
36	Curculionidae	"
37	Chrysomelidae	"
38	Chrysomelidae	"
39	Cleridae	Predator
40	Scarabidae	Phytophagous
41	Coccinellidae	Predator
42	Cerambycidae	Phytophagous
43	Buprestidae	Detritivore
44	Chrysomelidae	Phytophagous
45	Coccinellidae	Predator
46	Curculionidae	Phytophagous
47	Curculionidae	"
48	Dasytidae	"

TABLE B-21 (Cont'd)

Coleoptera (Cont.)

Species Number	Family	Trophic Placement
49	Curculionidae	Phytophagous
50	Curculionidae	"
51	Mordellidae	"
52	Chrysomelidae	"
53	Phalacridae	"
54	Chrysomelidae	"
55	Chrysomelidae	"
56	Dasytidae	"
57	Phalacridae	"
58	Chrysomelidae	"
59	Phalacridae	"
60	Chrysomelidae	"
61	Chrysomelidae	"
62	Sarabidae	"
63	Chrysomelidae	"
64	Chrysomelidae	"
65	Anthribidae	"
66	Cerambycidae	"
67	Curculionidae	"
68	Curculionidae	"
69	Curculionidae	"
70	Curculionidae	"
71	Anthribidae	"
72		
73		
74	Chrysomelidae	"
75	Chrysomelidae	"
76	Chrysomelidae	"
77	Curculionidae	"
78	Lampyridae	Predator
79	Curculionidae	Phytophagous
80	Chrysomelidae	"
81	Chrysomelidae	"
82	Chrysomelidae	"
83	Phalacridae	"
84	Curculionidae	"
85	Lyctidae	Detritivore
86	Chrysomelidae	Phytophagous
87	Curculionidae	"
88	Meloidae	Parasite
89	Phalacridae	Phytophagous
90	Anthribidae	Detritivore (fungus)
91	Scarabidae	Phytophagous
92	Mordellidae	"
93	Chrysomelidae	"
94	Chrysomelidae	"
95	Curculionidae	"
96	Curculionidae	"
97	Curculionidae	"

TABLE B-21 (Cont'd)

ORTHOPTERA

Species Number	Family	Trophic Placement
1	Phasmatidae	Phytophagous
2	Acrididae	"
3	"	"
4	"	"
5	"	"
6	"	"
7	"	"
8	"	"
9	"	"
10	"	"
11	"	"
12	Gryllacrididae	"
13	Tettigoniidae	"
14	Tettigoniidae	"
15	Acrididae	"
16	Tettigoniidae	"
17	Acrididae	"
18	"	"
19	"	"
20	"	"
21	"	"
22	"	"
23	"	"
24	"	"
25	"	"
26	"	"
27	"	"
28	"	"
29	Gryllidae	Scavenger
30	Acrididae	Phytophagous
31	Tettigoniidae	"
32	Tettigoniidae	"
33	Acrididae	"
34	"	"
35	"	"
36	Tettigoniidae	"
37	Mantidae	Predator
38	Tetrigidae	Phytophagous
39	Acrididae	"
40	Acrididae	"

TABLE B-21 (Cont'd)

LEPIDOPTERA

Species Number	Family	Trophic Placement
1	Pieridae	Phytophagous
2	Noctuidae	"
3	Noctuidae	"
4	Pieridae	"
5	Noctuidae	"
6	Gelechiidae	"
7	Noctuidae	"
8	"	"
9	"	"
10	"	"
11	"	"
12	"	"
13	Pyralidae	"
14	Noctuidae	"
15	Pyralidae	"

TABLE B-21 (Cont'd)

NEUROPTERA

Species Number	Family	Trophic Placement
1	Chrysopidae	Predator
2	Hemerobiidae	"
3	Raphidiidae	"

TABLE B-21 (Cont'd)

PLECOPTERA

Species Number	Family	Trophic Placement
1	Perlidae	Predator
2	Perlidae	Predator

TABLE B-21 (Cont'd)

COLLEMBOLA

Species Number	Family	Trophic Placement
1	Entomobryidae	Detrivore
2	Sminthuridae	"

TABLE B-21 (Cont'd)

THYSANOPTERA

Species Number	Family	Trophic Placement
1	Thripidae	Phytophagous

TABLE B-21 (Cont'd)

PSOCOPTERA

Species Number	Family	Trophic Placement
1	Psocidae	Phytophagous
2	Psocidae	Phytophagous

TABLE B-21 (Cont'd)

ODONATA

Species Number	Family	Trophic Placement
1	Coenagrionidae	Predator
2	"	"
3	"	"

TABLE B-21 (Cont'd)

HYMENOPTERA

Species Number	Family	Trophic Placement
1	Apidae	Phytophagous
2	Halictidae	Phytophagous
3	Braconidae	Parasite
4	Torymidae	"
5	Pteromalidae	"
6	Pteromalidae	"
7	Braconidae	"
8	Halictidae	Phytophagous
9	Halictidae	Phytophagous
10	Halictidae	Phytophagous
11	Eurytomidae	Parasite/Phytophagous
12	Perilampidae	Parasite
13		
14		
15		
16		
17		
18	Ichneumonidae	Parasite
19	Braconidae	"
20	Braconidae	"
21	Vespidae	Predator
22	Formicidae	Scavenger
23	Chrysididae	Parasite
24	Sphecidae	"
25	Braconidae	"
26	Braconidae	"
27	Cynipidae	Phytophagous
28	Pteromalidae	Parasite
29	Eurytomidae	Parasite/Phytophagous
30	Braconidae	Parasite
31	Braconidae	"
32	Braconidae	"
33	Platygasteridae	"
34	Eurytomidae	Parasite/Phytophagous
35	Braconidae	Parasite
36	Colletidae	Phytophagous
37	Braconidae	Parasite
38	Tiphiidae	"
39	Sphecidae	"
40	Colletidae	Phytophagous
41	Andrenidae	Phytophagous
42	Andrenidae	Phytophagous
43	Halictidae	Phytophagous
44	Sphecidae	Parasite
45	Braconidae	"
46	Braconidae	"
47	Ichneumonidae	"
48	Formicidae	Scavenger

TABLE B-21 (Cont'd)

Hymenoptera (Cont.)

Species Number	Family	Trophic Placement
49	Braconidae	Parasite
50		
51	Perilampidae	Parasite
52	Platygasteridae	"
53	Scelionidae	"
54	Braconidae	"
55	Braconidae	"
56	Braconidae	"
57	Chalcididae	"
58	Chalcididae	"
59	Pteromalidae	"
60	Eurytomidae	Parasite/Phytophagous
61	Pteromalidae	Parasite
62	Pteromalidae	"
63	Ichneumonidae	"
64	Formicidae	Scavenger
65	Eupelmidae	Parasite
66	Figitidae	"
67	Eulophidae	"
68	Scelionidae	"
69	Braconidae	"
70	Pteromalidae	"
71	Apidae	Phytophagous
72	Ichneumonidae	Parasite
73	Ichneumonidae	"
74	Halictidae	Phytophagous
75	Ichneumonidae	Parasite
76	Ichneumonidae	"
77	Ichneumonidae	"
78	Braconidae	"
79	Braconidae	"
80		
81	Braconidae	"
82	Andrenidae	Phytophagous
83	Pteromalidae	Parasite
84	Pteromalidae	"
85	Encyrtidae	"
86	Pteromalidae	"
87	Pteromalidae	"
88	Pteromalidae	"
89	Perilampidae	"
90	Eurytomidae	Parasite/Phytophagous
91	Cynipidae	Phytophagous
92	Eurytomidae	Parasite/Phytophagous
93	Scelionidae	Parasite
94	Platygasteridae	"
95	Braconidae	"
96	Figitidae	"

TABLE B-21 (Cont'd)

Hymenoptera (Cont.)

Species Number	Family	Trophic Placement
97	Cynipidae	Phytophagous
98	Ichneumonidae	Parasite
99	Chalcididae	"
100	Braconidae	"
101	Formicidae	Scavenger
102	Formicidae	Scavenger
103	Pteromalidae	Parasite
104	Pteromalidae	"
105	Ichneumonidae	"
106	Braconidae	"
107	Braconidae	"
108	Eurytomidae	Parasite/Phytophagous
109	Braconidae	Parasite
110	Ichneumonidae	"
111	Pompilidae	"
112	Ichneumonidae	"
113	Tiphiidae	"
114	Chalcididae	"
115	Eurytomidae	Parasite/Phytophagous
116	Pteromalidae	Parasite
117	Eurytomidae	Parasite/Phytophagous
118	Pteromalidae	Parasite
119		
120	Eurytomidae	Parasite/Phytophagous
121	Cynipidae	Phytophagous
122	Braconidae	Parasite
123	Braconidae	"
124	Braconidae	"
125	Braconidae	"
126	Ichneumonidae	"
127	Braconidae	"
128	Braconidae	"

TABLE B-22

TROPHIC STRUCTURE OF AREA 1 BY NUMBER OF SPECIES AND PERCENT OF FAUNA PER ORDER AND TROPHIC LEVEL

	H		D		Pr.		Pa.		S	
Order	#	%	#	%	#	%	#	%	#	%
Homoptera	39	26.2								
Hemiptera	24	16.1			6	40.0				
Coleoptera	27	18.1	2	14.3	3	20.0	2	7.4		
Orthoptera	31	20.8								
Diptera	17	11.4	11	78.6	4	26.7	7	25.9		
Hymenoptera	6	4.0					18	66.7	1	100.0
Lepidoptera	5	3.4								
Misc.	0	0.0	1	7.1	2	13.3				
Total	149		14		15		27		1	

TABLE B-23

TROPHIC STRUCTURE OF AREA 2 BY NUMBER OF SPECIES AND PERCENT OF FAUNA PER ORDER AND TROPHIC LEVEL

	H		D		Pr.		Pa.		S	
Order	#	%	#	%	#	%	#	%	#	%
Homoptera	34	20.6								
Hemiptera	31	18.8			7	31.8				
Coleoptera	48	29.1	3	16.7	3	13.6				
Orthoptera	13	7.9								
Diptera	14	8.5	13	72.2	5	22.7	2			
Hymenoptera	14	8.5			1	4.5	43	95.6	1	100.0
Lepidoptera	10	6.1								
Misc.	1	0.6	2	11.1	6	27.3		4.4		
Total	165		18		22		45		1	

TABLE B-24

TROPHIC STRUCTURE OF AREA 3 BY NUMBER OF SPECIES AND PERCENT OF FAUNA PER ORDER AND TROPHIC LEVEL

	H		D		Pr.		Pa.		S	
Order	#	%	#	%	#	%	#	%	#	%
Homoptera	30	21.7								
Hemiptera	19	13.7			8	22.9				
Coleoptera	46	33.3	5	18.5	9	25.7				
Orthoptera	11	8.0								
Diptera	15	10.9	22	81.5	14	40.0	6	12.5		
Hymenoptera	9	6.5					42	87.5	4	100.0
Lepidoptera	8	5.8								
Misc.	0	0.0	0		4	11.4				
Total	138		27		35		48		4	

TABLE B-25

NUMBER OF SPIDERS COLLECTED PER COLLECTING AREA

		# spiders
Area	1	96
	2G	108
	2T	23
	3G	63
	3T	32

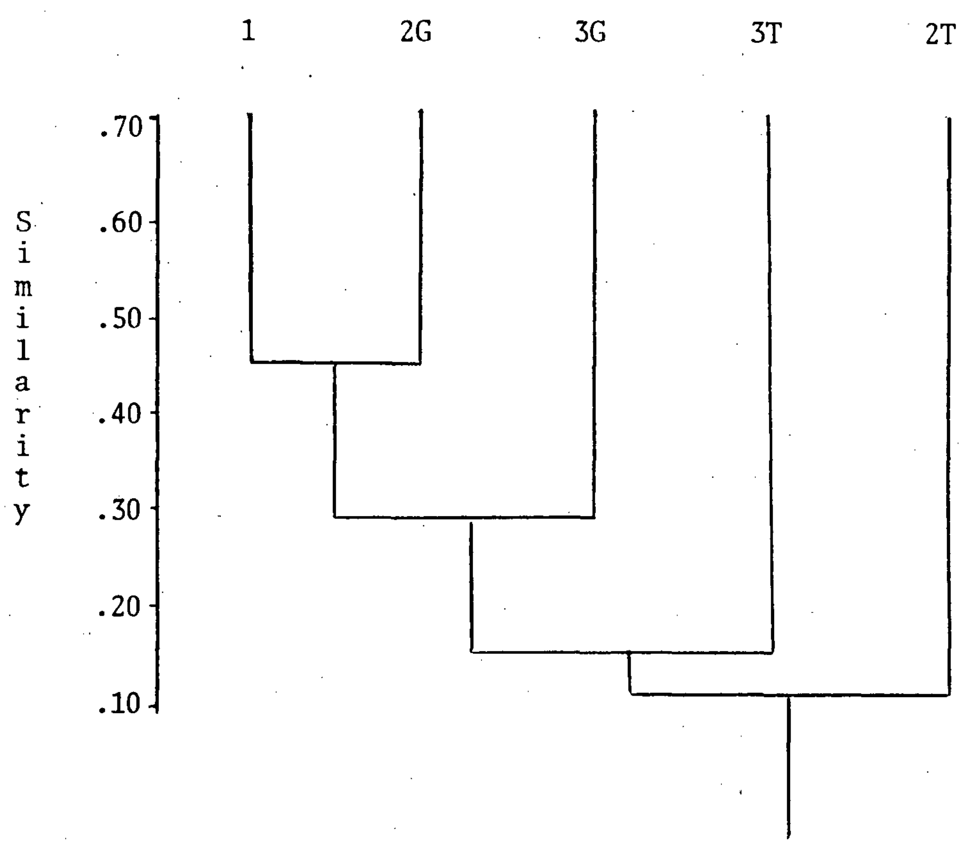

Figure B-1 DENDOGRAM OF INSECT RELATIONSHIPS AMONG OTHER AREAS RESULTING FROM CLUSTERING PROCEDURE AT THE CPSES SITE SPRING, 1975

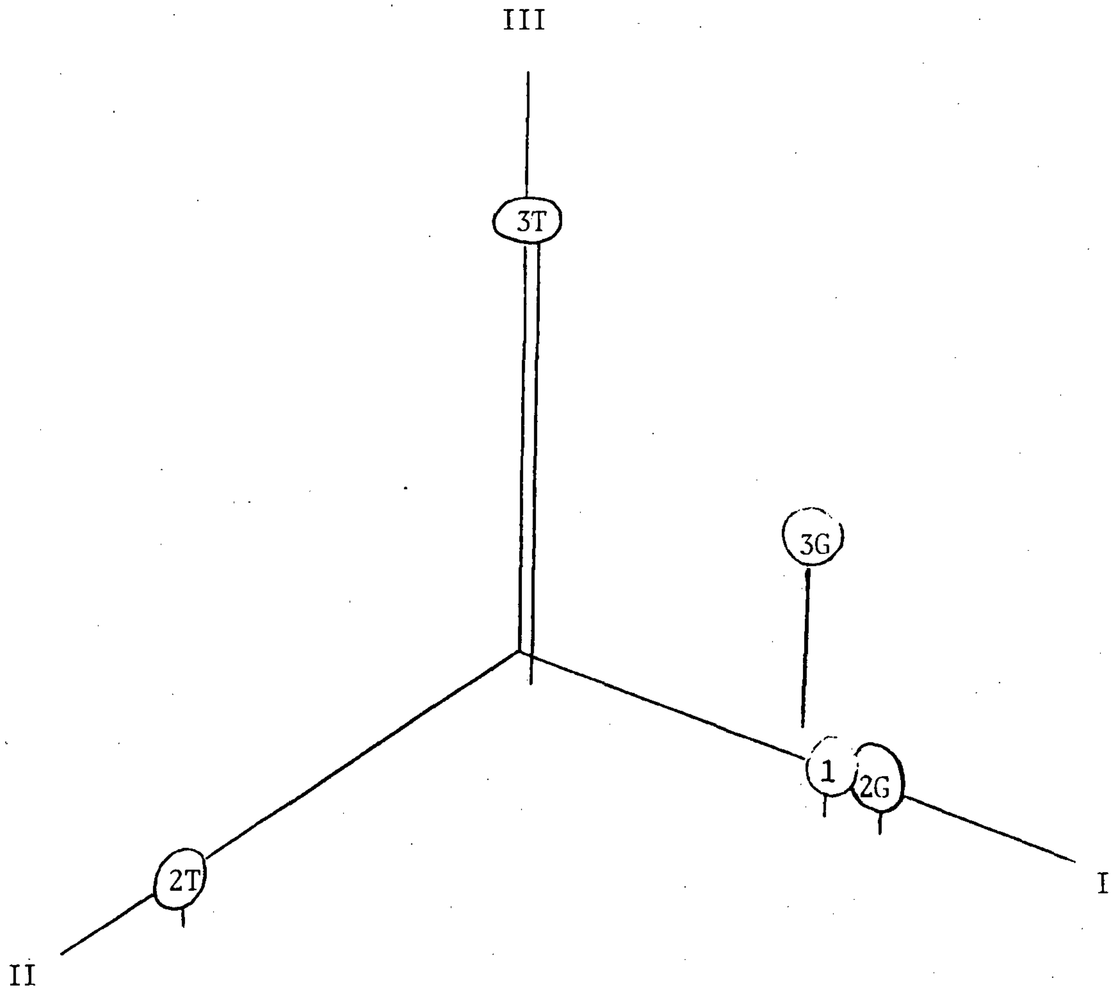

Figure B-2 ORDINATION OF THE COLLECTING AREAS ONTO THE FIRST THREE ROTATED PRINCIPAL COMPONENTS. EACH AXIS CAN BE INTERPRETED BY THE STUDY AREAS WHICH ARE ASSOCIATED WITH IT.

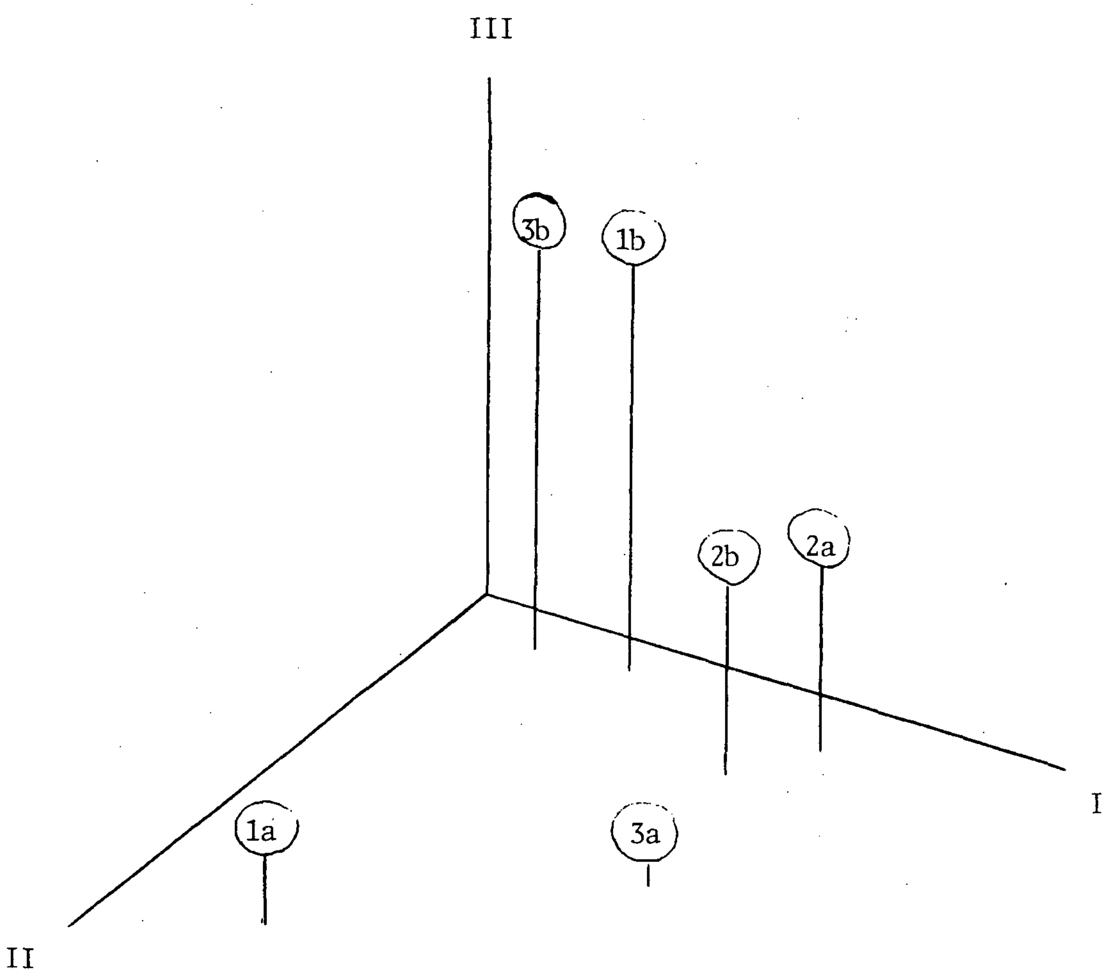

Figure B-3 ORDINATION OF THE COLLECTING AREAS ONTO THE FIRST THREE ROTATED PRINCIPAL COMPONENTS FOR THE SOIL ORGANISMS ONLY

TABLE C-1

In-Situ Water Quality Data

Comanche Peak Steam Electric Station

Sampling Location S_0

Parameter	Date (1975) 1/13	1/27	2/14	2/28	3/11	4/1	4/16	5/1	5/16	6/2	7/2	8/6	9/4	10/7	11/5	12/9
Temperature (°C)	---	---	18.0	17.5	13.0	21.0	23.0	24.0	26.0	25.5	25.0	30.0	31.0	20.0	23.5	15.0
Dissolved Oxygen (ppm)	---	---	12.8	9.8	11.0	11.0	11.2	9.4	9.8	10.1	7.1	10.2	6.7	9.4	8.2	6.8
pH	---	---	10.0	9.6	9.0	7.7	8.8	7.6	7.6	7.8	7.4	7.3	7.4	7.3	6.8	7.5
Conductivity (μmhos/cm)	---	---	610	750	600	650	350	600	600	550	625	625	575	550	450	525
Alkalinity (msl)	---	---	140	170	145	150	155	185	180	160	170	165	195	155	165	165
Turbidity (FTU)	---	---	10	15	---	---	>5	>5	>5	10	25	10	15	25	15	15
App. Streamflow	---	---	Above Avg.	Avg.	Above Avg.	---	Med.	Med.	Avg.	Avg.	Avg.	Avg.	Low	Low	None	None

TABLE C-2

In-Situ Water Quality Data

Comanche Peak Steam Electric Station

Sampling Location S_1

Parameter	Date (1975) 1/13	1/27	2/14	2/28	3/11	4/1	4/16	5/1	5/16	6/2	7/2	8/6	9/4	10/7	11/5	12/9
Temperature (^oC)	10.5	15.0	16.0	14.0	12.0	19.0	21.0	23.0	25.0	25.0	27.0	28.0	28.0	21.0	21.0	14.0
Dissolved Oxygen (ppm)	11.2	10.0	9.1	10.2	10.8	10.9	10.8	8.9	8.7	9.1	7.4	8.1	7.0	8.7	5.4	7.2
pH	9.7	9.7	---	10.0	9.2	7.6	9.0	7.6	7.4	7.8	7.5	7.7	7.9	7.5	6.8	7.3
Conductivity (μmhos/cm)	550	575	680	600	625	525	375	650	625	575	525	425	475	575	450	500
Alkalinity (msl)	240	150	300	180	160	155	165	180	195	180	150	135	190	160	145	160
Turbidity (FTU)	145	50	---	40	20	---	>5	>5	>5	10	10	30	20	20	25	15
App. Streamflow	Avg.	Avg.	Above Avg.	Avg.	Above Avg.	---	Med.	Med.	Avg.	Avg.	Avg.	Avg.	Low	Low	None	None

TABLE C-3

In-Situ Water Quality Data

Comanche Peak Steam Electric Station

Sampling Location S_2

Parameter	Date (1975)															
	1/13	1/27	2/14	2/28	3/11	4/1	4/16	5/1	5/16	6/2	7/2	8/6	9/4	10/7	11/5	12/9
Temperature (°C)	---	15.5	16.0	16.0	13.0	22.8	22.0	23.0	25.0	27.0	24.0	35.0	32.0	20.0	23.5	15.0
Dissolved Oxygen (ppm)	---	11.2	11.0	10.0	10.4	9.3	18.8	8.6	8.9	8.9	7.7	13.0	9.1	8.9	8.4	8.1
pH	---	9.2	9.6	9.8	---	7.5	8.9	7.6	7.4	7.7	7.3	8.4	8.1	7.6	7.3	7.4
Conductivity (μmhos/cm)	---	600	680	700	650	590	375	650	625	575	550	450	475	575	625	525
Alkalinity (msl)	---	170	180	160	160	150	160	185	190	180	160	155	200	165	180	155
Turbidity (FTU)	---	10	20	20	---	---	>5	>5	>5	>5	10	15	15	15	15	10
App. Streamflow	---	Avg.	Above Avg.	Avg.	Above Avg.	---	Med.	Med.	Avg.	Avg.	Avg.	Avg.	Low	Low	None	None

TABLE C-4

In-Situ Water Quality Data

Comanche Peak Steam Electric Station

Sampling Location S_3

Parameter	Date (1975)															
	1/13	1/27	2/14	2/28	3/11	4/1	4/16	5/1	5/16	6/2	7/2	8/6	9/4	10/7	11/5	12/9
Temperature (°C)	---	16.0	17.5	17.0	14.0	21.7	23.0	25.0	28.0	28.5	29.0	27.5	29.0	23.0	25.0	16.0
Dissolved Oxygen (ppm)	---	11.2	11.4	9.7	10.4	10.1	11.0	8.8	9.2	7.9	9.1	9.9	7.2	8.9	11.0	7.9
pH	---	9.3	10.0	9.4	---	7.8	8.9	7.8	7.5	7.9	7.5	7.4	7.7	7.8	7.4	7.4
Conductivity (µmhos/cm)	---	600	650	675	650	550	375	625	625	600	525	625	600	550	450	550
Alkalinity (msl)	---	160	175	160	165	160	165	190	195	180	170	210	185	180	135	160
Turbidity (FTU)	---	10	40	10	---	---	>5	>5	>5	>5	10	30	20	15	5	10
App. Streamflow	---	Avg.	Above Avg.	Avg.	Above Avg.	---	Med.	Med.	Avg.	Avg.	Avg.	Avg.	Low	Low	None	None

TABLE C-5

In-Situ Water Quality Data

Comanche Peak Steam Electric Station

Sampling Location S_4

Parameter	1/13	1/27	2/14	2/28	3/11	4/1	4/16	5/1	5/16	6/2	7/2	8/6	9/4	10/7	11/5	12/9
Temperature (°C)	---	---	---	---	---	---	---	---	26.0	26.0	26.0	34.0	33.0	21.0	23.0	---
Dissolved Oxygen (ppm)	---	---	---	---	---	---	---	---	8.1	8.9	6.5	10.0	6.1	8.1	5.2	---
pH	---	---	---	---	---	---	---	---	7.9	7.9	7.8	7.3	7.6	7.6	7.2	---
Conductivity (µmhos/cm)	---	---	---	---	---	---	---	---	675	600	600	525	550	600	625	---
Alkalinity (msl)	---	---	---	---	---	---	---	---	195	180	165	165	170	170	160	---
Turbidity (FTU)	---	---	---	---	---	---	---	---	10	10	20	20	25	20	200	---
App. Streamflow	---	---	---	---	---	---	---	---	Avg.	Avg.	Avg.	Avg.	Low	Low	None	No Water

TABLE C-6

WATER QUALITY VALUES

Sampling Location S_0

CPSES CONSTRUCTION PHASE MONITORING PROGRAM

Parameters	Sampling Dates (1975) 3/11	6/16	9/15	12/09
Specific Conductance (μmhos/cm)	784.0	709.0	522.0	541.0
Turbidity (FTU)	[a]<1.0	0.3	1.9	3.0
Total Alkalinity (as $CaCO_3$)(mg/l)	242.0	190.0	190.0	192.0
Total Dissolved Solids (mg/l)	465.0	480.0	398.5	360.0
Total Suspended Solids (mg/l)	1.0	7.3	26.3	2.5
Potassium (mg/l)	4.6	3.3	7.8	5.4
Fluoride (mg/l)	0.2	0.3	0.3	0.4
Ammonia (mg/l)	<1.0	1.2	1.8	<0.1
Nitrate (mg/l)	<0.1	<0.1	0.2	2.2
Ortho-phosphate (mg/l)	<0.1	0.1	<0.1	0.2
Total Phosphate (mg/l)	0.2	0.1	<0.1	0.2
Total Iron (mg/l)	0.1	<0.1	0.1	<0.1
Sodium (mg/l)	28.1	41.6	29.8	32.6
Sulfide (mg/l)	<0.1	<0.1	<0.1	<0.1
Chloride (mg/l)	64.0	87.0	60.0	42.4
Kjeldahl Nitrogen (mg/l)	<1.0	0.99	3.0	0.4
Silica (mg/l)	6.8	0.4	8.1	8.0
Manganese (mg/l)	<0.1	<0.05	<0.05	<0.05
Biochemical Oxygen Demand (mg/l)	3.0	5.4	6.0	4.2
Chemical Oxygen Demand (mg/l)	14.0	8.9	12.5	5.6
Nitrate (mg/l)	<0.1	<0.1	<0.1	0.1
Sulfate (mg/l)	38.33	70.4	42.0	30.8

[a]Less than.

TABLE C-7

WATER QUALITY VALUES

Sampling Location S_1

CPSES CONSTRUCTION PHASE MONITORING PROGRAM

Parameters	Sampling Dates (1975) 3/11	6/16	9/15	12/09
Specific Conductance (μmhos/cm)	732.0	595.0	412.0	539.0
Turbidity (FTU)	30.0	0.2	0.4	8.0
Total Alkalinity (as $CaCO_3$)(mg/l)	240.0	198.0	132.0	204.0
Total Dissolved Solids (mg/l)	431.0	360.5	275.0	346.0
Total Suspended Solids (mg/l)	21.2	5.7	3.4	6.2
Potassium (mg/l)	3.3	2.1	5.2	5.8
Fluoride (mg/l)	0.2	0.2	0.3	0.4
Ammonia (mg/l)	[a]<1.0	2.0	0.9	<0.1
Nitrate (mg/l)	0.5	0.3	<0.1	2.2
Ortho-phosphate (mg/l)	<0.1	0.1	<0.1	0.1
Total Phosphate (mg/l)	0.2	0.1	<0.1	0.2
Total Iron (mg/l)	0.1	<0.1	<0.1	<0.1
Sodium (mg/l)	20.3	28.1	20.9	27.8
Sulfide (mg/l)	<0.1	<0.1	<0.1	<0.1
Chloride (mg/l)	41.0	51.0	38.0	32.4
Kjeldahl Nitrogen (mg/l)	<1.0	1.65	1.4	0.3
Silica (mg/l)	7.0	6.3	9.8	7.2
Manganese (mg/l)	<0.1	<0.05	<0.05	<0.05
Biochemical Oxygen Demand (mg/l)	2.1	2.4	1.8	4.2
Chemical Oxygen Demand (mg/l)	8.0	2.5	6.0	9.2
Nitrate (mg/l)	<0.1	<0.1	<0.1	0.2
Sulfate (mg/l)	23.0	45.6	27.5	30.0

[a]Less than.

TABLE C-8

WATER QUALITY VALUES

Sampling Location S_2

CPSES CONSTRUCTION PHASE MONITORING PROGRAM

Parameters	Sampling Dates (1975) 3/11	6/16	9/15	12/09
Specific Conductance (μmhos/cm)	686.0	592.0	606	634.0
Turbidity (FTU)	[a]<1.0	0.2	<0.1	2.0
Total Alkalinity (as $CaCO_3$)(mg/l)	238.0	220.0	218.0	284.0
Total Dissolved Solids (mg/l)	403.0	350.0	417.5	417.0
Total Suspended Solids (mg/l)	3.0	1.3	1.2	2.3
Potassium (mg/l)	3.8	2.2	4.7	4.7
Fluoride (mg/l)	0.1	0.2	0.2	0.4
Ammonia (mg/l)	<1.0	2.0	1.0	<0.1
Nitrate (mg/l)	0.6	0.3	<0.1	0.88
Ortho-phosphate (mg/l)	<0.1	0.1	<0.1	<0.1
Total Phosphate (mg/l)	0.2	0.1	<0.1	0.1
Total Iron (mg/l)	0.3	<0.1	<0.1	<0.1
Sodium (mg/l)	19.9	27.7	21.8	29.2
Sulfide (mg/l)	<0.1	<0.1	<0.1	<0.1
Chloride (mg/l)	39.0	48.0	34.0	35.9
Kjeldahl Nitrogen (mg/l)	<1.0	1.65	1.6	0.2
Silica (mg/l)	6.9	6.6	11.9	12.4
Manganese (mg/l)	<0.1	<0.05	<0.05	<0.05
Biochemical Oxygen Demand (mg/l)	2.1	2.1	1.2	4.5
Chemical Oxygen Demand (mg/l)	8.8	2.4	7.4	6.3
Nitrate (mg/l)	<0.1	<0.1	<0.1	<0.1
Sulfate (mg/l)	23.3	42.9	30.2	29.0

[a]Less than.

TABLE C-9

WATER QUALITY VALUES

Sampling Location S_3

CPSES CONSTRUCTION PHASE MONITORING PROGRAM

Parameters	Sampling Dates (1975) 3/11	6/16	9/15	12/09
Specific Conductance (μmhos/cm)	708.0	559.0	449.0	484.0
Turbidity (FTU)	<[a] 1.0	0.1	0.2	2.0
Total Alkalinity (as $CaCO_3$)(mg/l)	240.0	198.0	172.0	210.0
Total Dissolved Solids (mg/l)	397.0	301.5	313.5	309.5
Total Suspended Solids (mg/l)	1.0	4.2	2.0	1.4
Potassium (mg/l)	3.3	2.2	4.8	4.2
Fluoride (mg/l)	< 0.1	0.2	0.3	0.4
Ammonia (mg/l)	< 1.0	1,7	0.8	<0.1
Nitrate (mg/l)	0.4	0.1	< 0.1	2.0
Ortho-phosphate (mg/l)	< 0.1	< 0.1	< 0.1	0.1
Total Phosphate (mg/l)	< 0.1	< 0.1	< 0.1	0.2
Total Iron (mg/l)	< 0.1	< 0.1	< 0.1	<0.1
Sodium (mg/l)	20.2	29.4	26.2	31.1
Sulfide (mg/l)	< 0.1	< 0.1	< 0.1	<0.1
Chloride (mg/l)	36.0	47.0	37.8	24.9
Kjeldahl Nitrogen (mg/l)	< 1.0	1.39	1.5	0.4
Silica (mg/l)	6.8	4.0	12.3	9.0
Manganese (mg/l)	< 0.1	< 0.05	< 0.05	<0.05
Biochemical Oxygen Demand (mg/l)	2.1	2.7	2.7	3.9
Chemical Oxygen Demand (mg/l)	10.0	5.6	8.0	4.7
Nitrate (mg/l)	< 0.1	< 0.1	< 0.1	0.1
Sulfate (mg/l)	22.8	44.6	27.5	27.4

[a]Less than.

TABLE C-10

WATER QUALITY VALUES

Sampling Location S_4

CPSES CONSTRUCTION PHASE MONITORING PROGRAM

Parameters	Sampling Dates (1975)			
	3/11[a]	6/16	9/15	12/09
Specific Conductance (μmhos/cm)		588.0	522.0	-
Turbidity (FTU)		0.2	1.9	-
Total Alkalinity (as $CaCO_3$)(mg/l)		205.0	190.0	-
Total Dissolved Solids (mg/l)		399.0	398.5	-
Total Suspended Solids (mg/l)		5.4	26.3	-
Potassium (mg/l)		2.1	7.8	-
Fluoride (mg/l)		0.2	0.3	-
Ammonia (mg/l)		3.4	1.8	-
Nitrate (mg/l)		0.4	0.2	-
Ortho-phosphate (mg/l)		0.2	< 0.1	-
Total Phosphate (mg/l)		0.2	< 0.1	-
Total Iron (mg/l)		[b]< 0.1	0.1	-
Sodium (mg/l)		26.9	29.8	-
Sulfide (mg/l)		< 0.1	< 0.1	-
Chloride (mg/l)		49.0	60.0	-
Kjeldahl Nitrogen (mg/l)		2.80	3.0	-
Silica (mg/l)		4.4	8.1	-
Manganese (mg/l)		< 0.05	< 0.05	-
Biochemical Oxygen Demand (mg/l)		3.6	6.0	-
Chemical Oxygen Demand (mg/l)		2.5	12.5	-
Nitrate (mg/l)		< 0.1	< 0.1	-
Sulfate (mg/l)		44.3	42.0	-

[a]Station added after this date.

[b]Less than.

TABLE C-11

TRUCE METAL VALUES COLLECTED

06/16/75

CPSES CONSTRUCTION PHASE - MONITORING PROGRAM

Parameter	Sampling Location	
	S_0	S_1
Arsenic	0.01[a]	0.07
Chromium	ND[b] <0.1	ND <0.1
Copper	ND <0.1	ND <0.1
Zinc	0.05	0.06
Cadmium	ND <0.02	ND <0.02
Cobalt	ND <0.1	ND <0.1
Lead	ND <0.1	ND <0.1
Molybdenum	ND <0.1	ND <0.1
Mercury	ND <0.005	ND <0.005

[a]Numerical values in mg/l.

[b]None Dected (ND). Less than (<) detection limits as given by numerical value.

TABLE C-12

WATER WELL G_1

CIRCLE S RANCH ON EAST END

TYPE OF ANALYSES		PARAMETER	DATE OF MEASUREMENT (1975)												
			01/30	02/11	03/01	03/31	05/30	06/11	07/04	08/06	09/04	09/10	10/23	11/11	12/09
GROUNDWATER PHYSICAL	1	Static Level (ft)	-	-	44.9	41.6	-	42.3	63.7	45.7	-	51.2	52.0	52.2	52.0
	2	Temperature (°C)	-	-	-	-	-	25.0	26.0	26.0	-	26.0	27.0	26.0	20.0
	3	Conductivity (μmhos/cm)	-	-	-	-	628	600	625	600	560	550	650	600	675
GROUNDWATER CHEMICAL	4	Silica mg/l	-	-	-	-	10.5	-	-	-	13.3	-	-	-	14.3
	5	Calcium (dissolved) mg/l	-	-	-	-	11.2	-	-	-	13.0	-	-	-	14.4
	6	Magnesium (dissolved) mg/l	-	-	-	-	4.9	-	-	-	4.8	-	-	-	2.9
	7	Sodium mg/l	-	-	-	-	141.3	-	-	-	126.0	-	-	-	155.0
	8	Potassium mg/l	-	-	-	-	12.2	-	-	-	10.0	-	-	-	10.9
	9	Carbonate mg/l	-	-	-	-	ND < 0.1	-	-	-	ND < 0.1	-	-	-	<0.1
	10	Sulfate mg/l	-	-	-	-	29.2	-	-	-	30.0	-	-	-	22.0
	11	Chloride mg/l	-	-	-	-	20.0	-	-	-	12.0	-	-	-	16.9
	12	Fluoride mg/l	-	-	-	-	0.2	-	-	-	0.2	-	-	-	0.4
	13	Phosphate mg/l	-	-	-	-	0.3	-	-	-	ND < 0.1	-	-	-	<0.1
	14	Total suspended solids mg/l	-	-	-	-	56.2	-	-	-	0.9	-	-	-	6.5
	15	Total dissolved solids mg/l	-	-	-	-	359.4	-	-	-	408.0	-	-	-	456.2
	16	Total hardness mg/l	-	-	-	-	50.0	-	-	-	52.3	-	-	-	47.0
	17	Magnesium (total) mg/l	-	-	-	-	4.9	-	-	-	4.8	-	-	-	2.9
	18	Calcium (total) mg/l	-	-	-	-	11.2	-	-	-	13.0	-	-	-	14.4
	19	Nitrate mg/l	-	-	-	-	ND < 0.1	-	-	-	0.2	-	-	-	<0.1
	20	Iron mg/l	-	-	-	-	0.2	-	-	-	ND < 0.1	-	-	-	<0.1
	21	Non-carbonate hardness mg/l	-	-	-	-	0.0	-	-	-	ND < 0.1	-	-	-	<0.1
	22	Sodium absorption ratio	-	-	-	-	8.90	-	-	-	7.59	-	-	-	9.73
	23	pH	-	-	-	-	8.3	-	-	-	8.0	-	-	-	7.8

TABLE C-13

WATER WELL G_2
SOUTH END WELL
PHYSICAL AND CHEMICAL PARAMETERS

ANALYSES		PARAMETER	DATE OF MEASUREMENT (1975)												
			01/30	02/11	03/01	03/31	05/30	06/11	07/06	08/06	09/04	09/10	10/23	11/11	12/09
GROUNDWATER PHYSICAL	1	Static Level (ft)	–	–	189.8	196.25	–	195.3	191.3	196.1	–	202.3	203.0	203.2	204.0
	2	Temperature (°C)	–	–	–	–	–	23.0	24.0	25.0	–	26.0	24.0	24.0	20.0
	3	Conductivity (μmhos/cm)	–	–	–	–	–	600	600	600	588	575	1300	800	700
GROUNDWATER CHEMICAL	4	Silica mg/l	–	–	–	–	–	–	–	–	14.9	–	–	–	6.1
	5	Calcium (dissolved) mg/l	–	–	–	–	–	–	–	–	16.2	–	–	–	12.8
	6	Magnesium (dissolved) mg/l	–	–	–	–	–	–	–	–	8.7	–	–	–	8.8
	7	Sodium mg/l	–	–	–	–	–	–	–	–	125.0	–	–	–	144.0
	8	Potassium mg/l	–	–	–	–	–	–	–	–	9.7	–	–	–	13.4
	9	Carbonate mg/l	–	–	–	–	–	–	–	–	< 0.1	–	–	–	1.2
	10	Sulfate mg/l	–	–	–	–	–	–	–	–	42.0	–	–	–	22.0
	11	Chloride mg/l	–	–	–	–	–	–	–	–	22.0	–	–	–	23.9
	12	Fluoride mg/l	–	–	–	–	–	–	–	–	0.3	–	–	–	0.4
	13	Phosphate mg/l	–	–	–	–	–	–	–	–	ND < 0.1	–	–	–	<0.1
	14	Total suspended solids mg/l	–	–	–	–	–	–	–	–	1.5	–	–	–	14.5
	15	Total dissolved solids mg/l	–	–	–	–	–	–	–	–	433.0	–	–	–	455.0
	16	Total hardness mg/l	–	–	–	–	–	–	–	–	76.0	–	–	–	67.0
	17	Magnesium (total) mg/l	–	–	–	–	–	–	–	–	8.7	–	–	–	8.8
	18	Calcium (total) mg/l	–	–	–	–	–	–	–	–	16.2	–	–	–	12.8
	19	Nitrate mg/l	–	–	–	–	–	–	–	–	ND < 0.1	–	–	–	<0.1
	20	Iron mg/l	–	–	–	–	–	–	–	–	ND < 0.1	–	–	–	5.4
	21	Non-carbonate hardness mg/l	–	–	–	–	–	–	–	–	ND < 0.1	–	–	–	<0.1
	22	Sodium absorption ratio	–	–	–	–	–	–	–	–	6.23	–	–	–	7.6
	23	pH	–	–	–	–	–	–	–	–	8.1	–	–	–	8.5

TABLE C-14

WATER WELL G3
HOWARD WELL ON WEST END
PHYSICAL AND CHEMICAL PARAMETERS

ANALYSES		PARAMETER	DATE OF MEASUREMENT (1975)												
			01/30	02/11	03/01	03/31	05/30	06/11	07/06	08/06	09/04	09/10	10/23	11/11	12/09
GROUNDWATER PHYSICAL	1	Static Level (ft)	212.0	212.13	218.07	214.62	-	214.9	217.1	218.3	-	221.2	222.0	222.2	222.2
	2	Temperature (°C)	-	-	-	-	-	26.0	25.0	26.0	-	26.0	23.0	23.0	22.0
	3	Conductivity (μmhos/cm)	-	-	-	-	594	600	575	600	565	575	575	600	725
GROUNDWATER CHEMICAL	4	Silica mg/l	-	-	-	-	8.7	-	-	-	13.6	-	-	-	14.0
	5	Calcium (dissolved) mg/l	-	-	-	-	20.8	-	-	-	18.3	-	-	-	22.4
	6	Magnesium (dissolved) mg/l	-	-	-	-	12.2	-	-	-	11.2	-	-	-	10.7
	7	Sodium mg/l	-	-	-	-	111.4	-	-	-	120.0	-	-	-	127.0
	8	Potassium mg/l	-	-	-	-	12.6	-	-	-	10.6	-	-	-	12.3
	9	Carbonate mg/l	-	-	-	-	ND < 0.1	-	-	-	ND < 0.1	-	-	-	<0.1
	10	Sulfate mg/l	-	-	-	-	49.6	-	-	-	48.0	-	-	-	41.0
	11	Chloride mg/l	-	-	-	-	27.0	-	-	-	16.0	-	-	-	22.9
	12	Fluoride mg/l	-	-	-	-	0.3	-	-	-	0.2	-	-	-	0.4
	13	Phosphate mg/l	-	-	-	-	ND < 0.1	-	-	-	ND < 0.1	-	-	-	<0.1
	14	Total suspended solids mg/l	-	-	-	-	0.6	-	-	-	2.0	-	-	-	6.7
	15	Total dissolved solids mg/l	-	-	-	-	314.9	-	-	-	416.0	-	-	-	467.0
	16	Total hardness mg/l	-	-	-	-	102.0	-	-	-	91.8	-	-	-	99.0
	17	Magnesium (total) mg/l	-	-	-	-	12.2	-	-	-	11.2	-	-	-	10.7
	18	Calcium (total) mg/l	-	-	-	-	20.8	-	-	-	18.3	-	-	-	22.4
	19	Nitrate mg/l	-	-	-	-	ND < 0.1	-	-	-	ND < 0.1	-	-	-	<0.1
	20	Iron mg/l	-	-	-	-	ND < 0.1	-	-	-	ND < 0.1	-	-	-	1.0
	21	Non-carbonate hardness mg/l	-	-	-	-	0	-	-	-	ND < 0.1	-	-	-	<0.1
	22	Sodium absorption ratio	-	-	-	-	4.85	-	-	-	5.45	-	-	-	5.53
	23	pH	-	-	-	-	8.1	-	-	-	8.1	-	-	-	7.6

TABLE C-15

WATER WELL G_4
NORTH END WELL
PHYSICAL AND CHEMICAL PARAMETERS

TYPE OF ANALYSES		PARAMETER	DATE OF MEASUREMENT (1975)												
			01/30	02/11	03/01	03/31	05/30	06/11	07/06	08/06	09/04	09/10	10/23	11/11	12/09
GROUNDWATER PHYSICAL	1	Static Level (ft)	-	-	-	-	-	197.7	192.0	199.3	-	219.0	219.5	219.8	221.0
	2	Temperature (°C)	-	-	-	-	-	23.0	24.0	26.0	-	25.0	24.0	25.0	22.0
	3	Conductivity (μmhos/cm)	-	-	-	-	-	600	600	575	575	595	650	600	725
GROUNDWATER CHEMICAL	4	Silica mg/l	-	-	-	-	-	-	-	-	25.9	-	-	-	14.0
	5	Calcium (dissolved) mg/l	-	-	-	-	-	-	-	-	5.0	-	-	-	11.2
	6	Magnesium (dissolved) mg/l	-	-	-	-	-	-	-	-	1.2	-	-	-	1.9
	7	Sodium mg/l	-	-	-	-	-	-	-	-	14.7	-	-	-	150.0
	8	Potassium mg/l	-	-	-	-	-	-	-	-	14.8	-	-	-	10.1
	9	Carbonate mg/l	-	-	-	-	-	-	-	-	ND < 0.1	-	-	-	<0.1
	10	Sulfate mg/l	-	-	-	-	-	-	-	-	41.0	-	-	-	22.1
	11	Chloride mg/l	-	-	-	-	-	-	-	-	20.0	-	-	-	16.9
	12	Fluoride mg/l	-	-	-	-	-	-	-	-	ND < 0.1	-	-	-	0.4
	13	Phosphate mg/l	-	-	-	-	-	-	-	-	ND < 0.1	-	-	-	0.1
	14	Total suspended solids mg/l	-	-	-	-	-	-	-	-	258.0	-	-	-	29.0
	15	Total dissolved solids mg/l	-	-	-	-	-	-	-	-	432.0	-	-	-	447.8
	16	Total hardness mg/l	-	-	-	-	-	-	-	-	17.4	-	-	-	35.0
	17	Magnesium (total) mg/l	-	-	-	-	-	-	-	-	1.2	-	-	-	1.9
	18	Calcium (total) mg/l	-	-	-	-	-	-	-	-	5.0	-	-	-	11.2
	19	Nitrate mg/l	-	-	-	-	-	-	-	-	0.1	-	-	-	<0.1
	20	Iron mg/l	-	-	-	-	-	-	-	-	12.1	-	-	-	0.3
	21	Non-carbonate hardness mg/l	-	-	-	-	-	-	-	-	ND < 0.1	-	-	-	<0.1
	22	Sodium absorption ratio	-	-	-	-	-	-	-	-	15.32	-	-	-	10.91
	23	pH	-	-	-	-	-	-	-	-	9.1	-	-	-	8.2