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BC hydro

BRITISH COLUMBIA

Pygmy Whitefish Studies on Dina Lake #1, 2001

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ABSTRACT

Relatively little is known about the biology of pygmy whitefish (*Prosopium coulteri*). This report contains information on the second year of a two-year study of these fish in a closed lake system (Dina Lake #1) in the Williston watershed near Mackenzie, BC. We collected information on the biology and habitat use of this species by using gill nets, trap nets, a trawl net, and a light trap to capture pygmy whitefish of all age classes. Five separate sampling trips were conducted throughout the summer of 2001 with our major goal being to capture live specimens. Only trap and gill nets were effective for this goal. Our capture success was sporadic and, typically, concentrations of pygmy whitefish were spotty. Usually, we captured only a few fish at a time but occasionally we captured thousands in a single set. For example, one overnight trap net set captured an estimated 2,065 pygmy whitefish. Other such substantial catches occurred sporadically throughout the summer. We interpret this pattern of rare large catches interspersed among many small catches as evidence that pygmy whitefish "school". Our Dina Lake #1 data also indicates that, throughout the summer, pygmy whitefish perform a diel onshore migration at the onset of darkness. This movement pattern appears to be related to nocturnal foraging opportunities in relatively shallow water. They move back offshore and into deeper water at dawn. Although this species appears to be bottom oriented, at certain times they do migrate off the bottom into the pelagic zone of the lake. Presumably, these vertical movements also are a response to foraging opportunities. The stomach contents of 135 pygmy whitefish revealed a wide diversity of prey and contained both benthic and limnetic taxa. The most important food items observed for pygmy whitefish during the summer are copepods and cladocerans. Although pygmy whitefish are typically associated with cool hypolimnetic waters, they can tolerate temperatures up to 17°C for a short time. Young-of-the-year pygmy whitefish are rare in field sampling collections. The smallest fish we caught was 28 mm FL and was captured in late August. Over the following two months (September and October), young-of-the-year fish grew approximately 6 mm per month. Adult males and females differ in size and age. Our largest male was 122 mm FL while our largest female was 132 mm. Also, some females live at least seven years whereas males, it appears, rarely exceed four years. Males reach first maturity in their third year of growth while females obtain maturity in their fourth year. In the future, the life history and habitat use data obtained from Dina Lake #1 will be used in studies designed to determine the distribution and status of this unfamiliar species within the Williston watershed.

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INTRODUCTION

Dina Lake #1 (herein referred to as Dina #1) is the largest lake in a chain of ten lakes. The lake has no outlet. It receives water through an inlet stream draining Dina Lake #2. Since 1980 fish biologists from the Ministry of Water, Land and Air Protection (MWLP) and the Peace/Williston Fish and Wildlife Compensation Program (PWFWCP) have studied Dina #1. The lake contains both indigenous and introduced fish. The native species are lake chub (*Couesius plumbeus*) and longnose suckers (*Catostomus catostomus*). Since 1980, there have been sporadic stockings of brook trout (*Salvelinus fontinalis*) and, in 1987, annual stockings of rainbow trout (*Oncorhynchus mykiss*) began. In 1998, as part of a stock assessment program for the Omineca Region, Dina #1 was designated a high priority for a stocking evaluation. This assessment uncovered a hitherto unrecorded species in the lake. One experimental gill net set perpendicular to the shore captured 80 gravid female pygmy whitefish (*Prosopium coulteri*). Although pygmy whitefish appear to be native to Dina #1, earlier inventories and assessments did not capture this species.

Pygmy whitefish are a species of special concern, and designated a regionally important species for the Omineca and the Peace under the Forest Practices Code; however, their distribution and status within the Williston watershed are unknown. Consequently, the PWFWCP launched a research project in 2000 to learn more about this fish. Before our study, there was virtually no information on the biology and habitat use of this species in these regions. The intent of our study was to fill information gaps relating to age and growth (particularly the young-of-the-year (y-o-y)), spawning and reproduction, diet, and habitat use throughout the summer months. In addition, we sought to develop a reliable field method for separating pygmy whitefish from other whitefish species. At the start of the project, we did not know where or how to capture this species. Consequently, an assortment of capture techniques were tried. As their abundance in Dina #1 was essentially unknown, we were concerned about killing the fish and negatively impacting the population status. Thus, we first attempted to capture the fish alive. We used Gee traps, pole and beach seines, and a zooplankton net. Finally, after much effort and no results, we tried small mesh monofilament gill nets. This gear captured pygmy whitefish but was usually lethal.

The 2000 study consisted of five one-week trips (Table 1). This first year uncovered useful information on field identification, life history, and habits of this species (McPhail and Zemlak 2001). For example, when we examined fin ray counts in the Dina #1 population, we found our pygmy whitefish had 8 or 9 dorsal rays. This conflicted with standard references (i.e., Scott and Crossman 1973) that give dorsal fin counts of 10 to 13 rays but provided us with a reliable regional method of field identification. In addition, over 90% of the fish sampled during the first summer of 2000 were captured just off the bottom; however, we made little effort to sample the upper water column and may have missed fish in this habitat.

Table 1. 2000 field sampling dates and results.

Sampling Dates	Number of pygmy whitefish sampled during each trip	5 Sampling Techniques Used (throughout the entire year)
May 23 to 26	0	Gee traps
June 19 to 23	150	pole seining
July 24 to 28	58	beach seining
September 21 and 22	54	zooplankton net
October 23 to 27	60	small mesh gill nets

Attempts at obtaining life history data were successful. The overall adult sex ratio in Dina #1 samples was roughly 2:1 (females: males) but no y-o-y fish were caught. The oldest male captured was 4 years old while the oldest female was 7 years. Stomach content analysis indicated Dina #1 pygmy whitefish preyed mainly on zooplankton. As summer progressed, different species of zooplankton were observed in their diet. We were not sure if zooplankton were a preferred food or if pygmy whitefish fed opportunistically on whatever prey was seasonally available. As information accumulated, more questions arose than were answered. Therefore, a second year of research was initiated in 2001. The field sampling dates were scheduled similar to the 2000 dates to compare the results. The main objectives in this second summer were as follows:

1. to continue exploring for external characters to aid field identification;
2. to determine food preference by sampling both stomachs and available prey;
3. to identify age at first maturity;
4. to locate and capture y-o-y fish;
5. to standardize net set locations in an attempt to learn more about habitat use (throughout the water column) in the summer months, and
6. to learn more about how physical factors (i.e., temperature and oxygen) constrain habitat use in pygmy whitefish.

This report documents the new methods used in 2001 and the results of our second summer sampling Dina #1. The authors anticipate this biological information will aid in determining the species' distribution within the entire Williston watershed.

Study Area

Dina #1 is located 25 km north-northwest of Mackenzie B.C. (Figure 1). There is no surface outlet. One permanent inlet stream flows into the lake from Dina Lake #2. No inlets flow into Dina Lake #2. Therefore, these two lakes are a closed system. The stream flowing between the two lakes has a non-game fish barrier (60 cm high) installed about 4 m upstream from Dina #1. The barrier was designed to prevent longnose suckers from accessing enhanced trout spawning habitat further upstream. Dina #1 has a surface area of 158.3 ha and a complex shoreline containing two major basins (Figure 2) separated by a 5 m deep sill. Our work in 2001 was confined only to the Northern Basin.

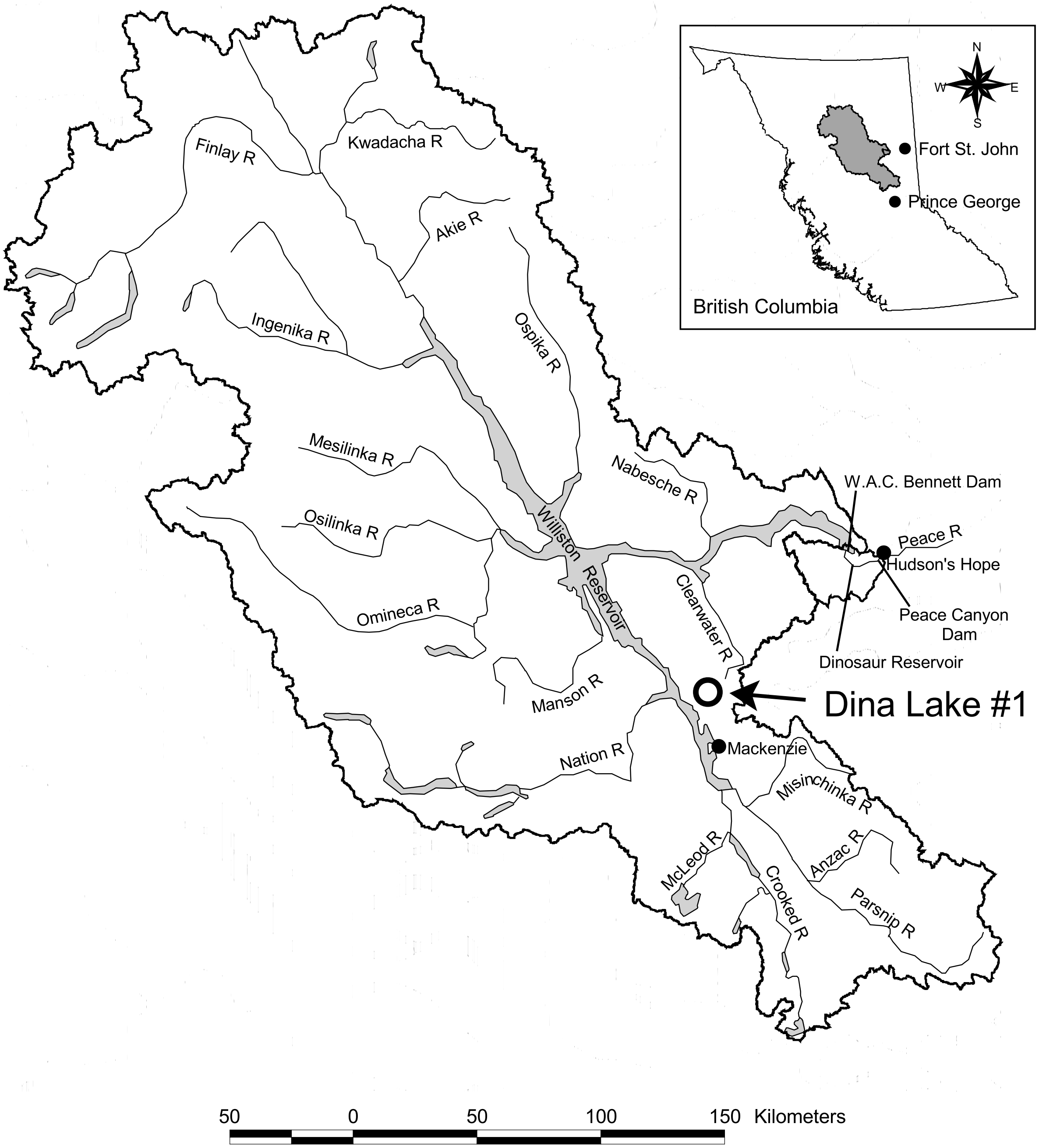

Figure 1. Location of Dina Lake #1.

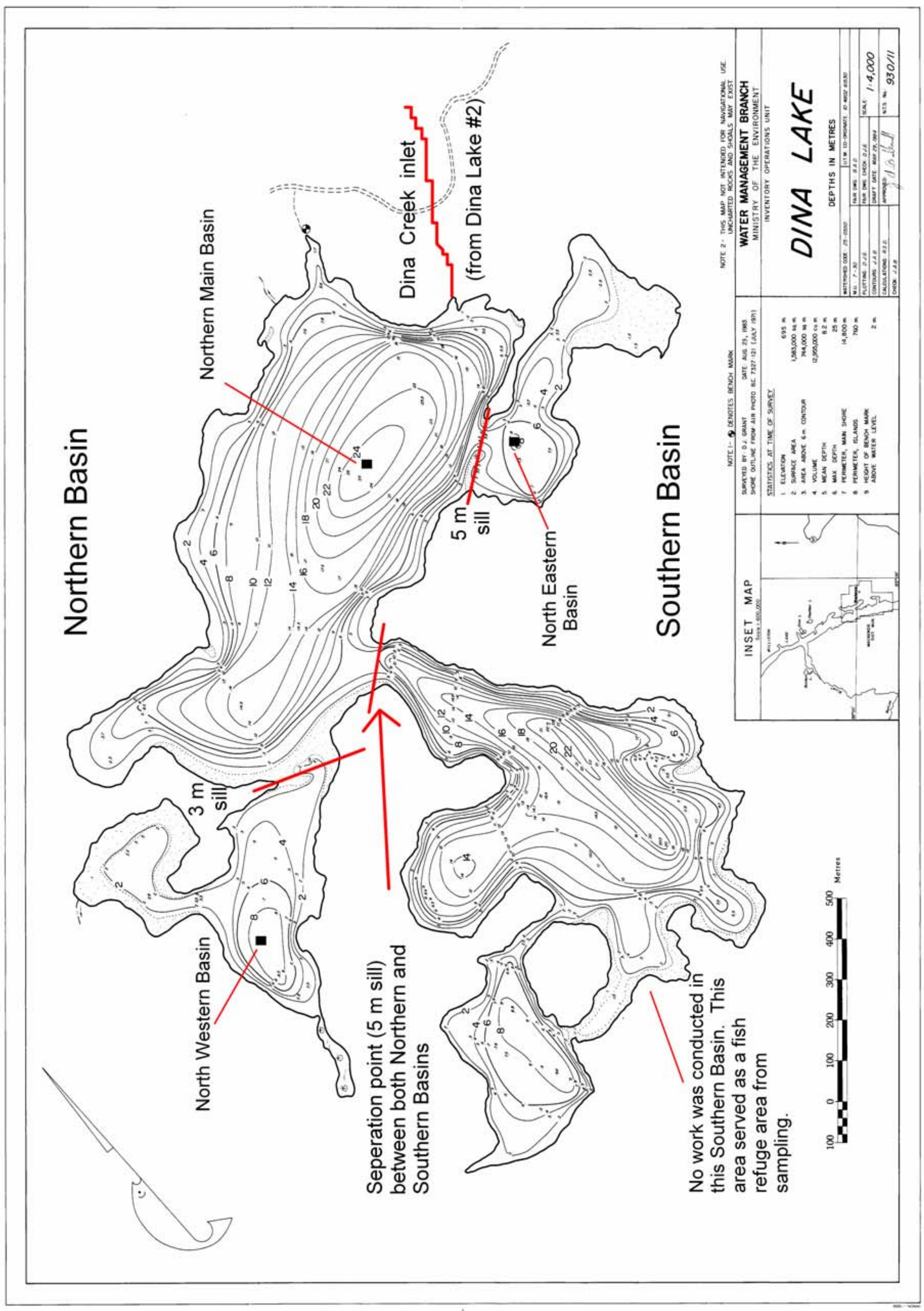

Figure 2. Location of the three sampling basins.

The Northern Basin consists of a large deep (27 m) main basin and two smaller, shallower sub-basins (the north eastern and north western sub-basins). The two sub-basins differ in their degree of isolation from the northern main basin. The north eastern sub-basin has a maximum depth of about 9.6 meters and connects to the northern main basin by a relatively deep (5 m) sill. In contrast, the north western sub-basin is separated from the northern main basin by a shallow sill (3 m) but contains a deep 15 m central region. As such, when the northern main basin is strongly stratified, the sill connecting the north western sub-basin to the northern main basin is above the metalimnion. Consequently, the north western sub-basin is at times limnologically isolated from the northern main basin. In contrast, limnologically, the north eastern sub-basin remains part of the northern main basin. As a precaution against decimating the pygmy whitefish population, we confined our study (fish sampling) to the Northern Basin and kept the Southern Basin as a refuge (Figure 2).

METHODS

Lake and Creek Water Temperature

In 2000, four "Stowaway" water temperature sensors were set at 5 m intervals to record the temperature on the bottom of the lake. Surprisingly, the lake surface temperature (at 1 to 5 m) peaked in early August and then steadily declined over the remainder of the study period; however, the temperature at 10 m did not peak until early September and, at 15 m, the temperature peaked in mid-October. A temperature recorder placed at 20 m was lost or stolen. The entire line attached to this sensor was missing. We captured most of our pygmy whitefish near the bottom in 2000 and this meant we also lost the temperature information for this deep water area.

Also in October 2000, we captured pygmy whitefish moving towards shore at night. We did not know if this movement was a spawning migration or if these fish were moving into the littoral zone to feed. If the movement was spawning related, we wondered if temperature triggered the onshore movement. Consequently, on May 18, 2001 we again installed six "Stowaway" units at 1, 5, 10, 15, and 20 m depths in the lake and one unit in the inlet creek. Curiously, on the June trip, we found the 20 m unit was again moved and was found in about 5 m of water. The May 18-June 6 temperature data at 20 m were lost. The lake and creek units were retrieved on October 26, 2001 and the data downloaded. Daily mean temperatures were calculated and graphed for each unit.

Oxygen/Temperature Profiles

In the northern main basin, oxygen and temperature readings were collected at one-metre intervals (surface to bottom) at the start of each one-week field trip. The known bathymetry of Dina #1 and a depth sounder allowed us to locate and repeatedly sample the deepest part of the northern main basin. Single limnological stations were established in each of the north western and north eastern sub-basins. We periodically sampled a fourth station located on the 5 m sill between the Northern and Southern Basins (Figure 2). We used a YSI model 58 oxygen/temperature meter to collect the data. These data provided information throughout the study period on the state and depth of the metalimnion, and on oxygen levels at different depths. This information was used to examine the influence of water column temperatures and oxygen levels on the depth distribution of pygmy whitefish.

Light Meter

Predation by fish and invertebrates is the primary driver of cyclomorphosis (seasonal changes in zooplankton shape) and seasonal shifts in zooplankton size (Grant and Bayly 1981). Similarly, diel vertical migrations are often a response to predation by fish. Many zooplankton species respond to changes in light intensity by migrating upward in the evening and downward around dawn. The downward movement may be passive sinking or an active avoidance of light but upward movement requires active swimming. Thus, when a lake is thermally stratified, zooplankton must pass through the metalimnion to graze in the epilimnion during the darker hours and then return to the cooler hypolimnetic waters by day (Goldman and Horne 1981). If pygmy whitefish exploit zooplankton during the day, we hoped that we could measure daytime light levels at different depths and relate this to pygmy whitefish depth distributions.

Thus, during each sampling trip, we used a Li-Cor submersible quantum sensor (Model LI-250 Light Meter) to obtain vertical light profiles (readings) at the northern main basin station. We measured light at 1 m depth intervals (starting at the surface) until the light intensity reached <1% of the surface intensity. Although data from the first year (2000) of the study suggested that pygmy whitefish associate with the bottom of the lake, their stomach contents (mostly plankton) implied water column foraging. Therefore, in the second summer (2001), we focused our sampling effort on the water column. Our previous results indicated that pygmy whitefish stay in deep, low-light areas in the lake during the day but that they may move into shallower water at night, presumably, in search of food. How shallow they go is unknown but light readings combined with capture depths might reveal if light levels influence their daytime habitat use.

Zooplankton Samples

Our first year's data showed that zooplankton were the primary summer food used by pygmy whitefish in Dina #1; however, the plankton species they consumed changed throughout the summer. Since water quality factors such as oxygen, temperature, light, food, and water movements influence the diversity and abundance of zooplankton, stomach contents alone provide no information on prey preference in pygmy whitefish. In an attempt to determine if pygmy whitefish were feeding opportunistically on whatever plankton species were most abundant at any given time, or if they showed a preference for certain types of zooplankton, we collected zooplankton samples during each sampling period. Ideally, we wanted to determine if limnetic prey selection by pygmy whitefish depends on prey abundance in Dina #1.

These samples were collected with a Wisconsin plankton net (50 cm mouth opening; mesh aperture of 80 microns and at the cod end aperture of 74 microns). Vertical hauls (6 in total) started at the surface and sampled towards the bottom in 4 m increments (i.e. 4 to 0 m, then 8 to 4 m, 12 to 8 m etc.). The net was lifted at approximately 0.5 m/sec. Sampling in the northern main basin contained depths of 26 to 27 m. Thus, on each sampling trip, we made six vertical hauls (each sampling a 4 m section of the water column) during the day and six hauls at night. Since many zooplankton species move upwards at night, we thought comparison of our zooplankton and stomach contents samples might reveal something of the diel movement patterns of pygmy whitefish.

We also collected a daytime continuous 24 m vertical haul. The purpose was to compare the abundance (#'s/L) and densities (micrograms/L) of zooplankton with the 4 m hauls. If abundance and densities in the six combined 4 m hauls approximated those in the single 24 m haul, we could assume the 4 m hauls were representative samples of each of their depth increments. If, however, the combined 4 m samples did not approximate the 24 m haul, only the surface samples (0 to 4 m) because of its high productivity, and the 24 m hauls, because of its completeness, are appropriate for further analysis.

In the field, to anesthetize the plankton and prevent egg loss, we placed the samples in a 4% $NaHCO_3$ solution and then preserved them in a 70 % ethanol solution. The Fisheries Research Laboratory (Danusia Dolecki) at the University of British Columbia, (UBC) carried out the identification and enumeration of the sample for species composition, density, and biomass (similar to Stockner et al. 2001). The goal of the analysis was to reveal if pygmy whitefish forage opportunistically or have a preference for certain sizes, or species, of prey.

Fish Capture Techniques

During the first summer sampling session in May of 2001, we found gill nets to be successful in capturing pygmy whitefish; however, they were usually lethal. In addition, approximately 90 % of this first sampling effort was on or near the lake bottom. Hence, we gained little knowledge of the suitability of gill nets for sampling pygmy whitefish in the water column. During the last sampling trip in October 2000, we tried setting the gill nets vertically rather than horizontally. Nets set in this fashion sample a greater vertical depth than nets set horizontally but reduce the width of the capture zone. We reasoned that nets set vertically would capture fewer fish, and thus, reduce mortalities but still provide information on vertical distribution. From our first summer's work (2000), we felt assured we could catch juvenile and adult fish in gill nets. The problem was the capture of y-o-y fish. As such, a 10 mm mesh panel was added to our standard gill nets (14, 19, 25, and 32 mm stretch mesh). Trap nets, trawl nets, and light trap boxes were also employed in an effort to capture live specimens.

Gill net sets

Gill nets were used as the main capture method during the first two (May and June) sampling trips of 2001. Concerted efforts were made to hold these gill net samples to approximately 30 fish per session. With one exception, the gill nets consisted of multiple panels. Each panel was 15.24 m long and 2.4 m deep and consisted of a different mesh size. The one exception was the 10 mm panel. It was 3 m deep. The gill nets were set three different ways: (a) as in the previous year (horizontal and on the bottom); (b) vertically (fishing the entire water column from surface to the bottom); and (c) suspended horizontally at a variety of depths. In addition, one gill net was set in shallow water perpendicular to the shoreline for a 24-hour period during each sample trip.

When fish were caught, the capture depth and mesh size of panel for each fish was recorded. For distribution and abundance sampling, the nets were set for generally less than 2 hours in an effort to limit mortalities. However, to document diel movements, nets were set over night. The number of hours each net panel fished and the catch were also recorded after each set. Any live fish (including species other than pygmy whitefish) were released back into the lake.

Initially, attempts were made to standardise our vertical net sets. On each trip, we fished one net in each of the north eastern, north western, and northern main basins. The nets were set for 24 hours and checked every two hours throughout the day. In October 2000, 24 hour-nets set in this way generally caught only a few fish (<6). Unfortunately, in July 2001, we considered this technique to have too high a mortality rate as 46 pygmy whitefish were captured and killed in a single overnight set. Interestingly, all fish were caught within 3 m of the bottom. Consequently, this technique was abandoned half way through the season. Capture efforts then became concentrated on trap nets as our primary sampling tool. Nonetheless, it was important to verify if pygmy whitefish were inhabiting the pelagic zone. As such, in October 2001 we used vertically set gill nets to sample sections of the water column.

Trap nets

During October of 2000, and the first two sessions in 2001, our sampling suggested that pygmy whitefish move onshore at night. It was not clear if this was a spawning or foraging movement. In order to answer this question, we then started setting inshore trap nets accordingly in June 2001. Trap nets are an effective technique for sampling species that follow shorelines at night (Nielsen and Johnson 1983). The trap nets were set for a 24 hours period (based on how onerous it was to set them up and retrieve them). We used one trap net during the June and July trips and added two more for the August and October trips (for a total of three). The traps were made of fine mesh netting (3.175 mm stretch mesh). The trap was 4.1 m long and the mouth dimensions were 0.9 by 0.9 m. Each trap had 6.1 m side-wings and a 30.5 m centre wing. We recorded the depth of the mouth opening and the depth of the end of the middle wing panel.

The traps were set on the bottom in a variety of locations throughout the Northern Basin. At the beginning of the summer (June and July), the trap was set in shallow water (<4 m) along the shoreline. During August and October the traps were set in deeper water (>5 m). The mouth of the trap faced offshore for the majority of the trap net sets.

Trawl net

As our 2000 stomach content analysis suggested that pygmy whitefish forage in the pelagic zone, we tried a trawl net as a sampling device. A mid-water beam trawl was constructed for towing behind a small (4.2 m) aluminium boat. The trawl net, was approximately 12 m long and made of two different mesh sizes --- 5 cm stretch mesh near the opening and 3.8 cm mesh size near the cod end. The actual cod end had a fine mesh liner attached (9.5 mm stretch mesh) suitable for retaining y-o-y sized fish. The mouth opening measured 3.05 by 3.05 m and was held open by an aluminium beam. The beam kept the top of the net from collapsing while two 4.5 kg weights kept the bottom two corners open. The beam was attached to a large buoy by a known length of rope. This rope and buoy allowed us to determine the depth of the net. Without the buoy, if the towing speed was too slow, the net simply sunk to the bottom. Under tow, the net was attached to a bridle and the bridle to a rope attached to the stern of the boat. The distance from the boat to the trawl net was 102 m.

We standardized our trawl netting to consistently sample the same water column areas throughout each sampling session in 2001. This was intended to generally identify the depths used by pygmy whitefish during each of the summer months. Appropriate sampling transects were selected based on a Dina #1 bathymetric map (Figure 2). Because of the potential for losing the trawl on bottom debris, we never fished in water less than 20 m deep. Consequently, we only trawled the deepest part of the lake (i.e., the northern main basin). We followed the 20 m bathymetric contour for one complete transect. Two large buoys, anchored on the most easterly and westerly side of the 20 m contour line, marked our sample location. During the first sampling trip, we made several one circuit transects to check that the net was fishing properly. This process of checking and resetting required considerable time. Thus, during the rest of our sampling trips, we made three complete circuits around the 20 m contour before checking the net for fish. The linear distance of each circuit was approximately 1 km.

We trawled both in the day and in the night. We knew night time travels would be the most effective but wanted to make sure some day time trawls were conducted. The net was towed at four different depths: surface to 3 m, 5 to 8 m, 10 to 13 m, and 15 to 18 m depths. Time and weather conditions were recorded for each trawl. The speed of the boat (for each trawl) was measured using a Garmin handheld GPS unit. A switch was made halfway through the field season from a 15 hp to a 20 hp engine to obtain the required speed.

Light trap box

There is no published information on the biology or habitat-use of y-o-y pygmy whitefish. Young-of-the-year of other species of whitefish generally inhabit littoral zones in their first summer. Our data from 2000 suggests that y-o-y pygmy whitefish might inhabit water >2 m deep as pole seining and beach seining along the lakeshore in depths up to about 1.5 m produced no y-o-y. To further this finding during the 2001 season, we tried using a light trap to fish in deeper water.

The concept of the light trap has broad potential application and a review of the literature on the subject has been provided by Faber (1981). We used this concept and designed our own trap box. The trap box was approximately 0.75 m x 0.25 m wide and made out of clear Plexiglas. Each of the four sides had a small opening through which fish could enter the box. On the top of the trap, an underwater flashlight was set to shine through the trap to entice young pygmy whitefish into the trap. Since adult pygmy whitefish are associated with the lake bottom, the light trap was set about 0.5 m off the bottom in different locations and depths throughout the Northern Basin. Oxygen levels were checked prior to sampling to ensure fish survival. Generally, the trap was set just before nightfall and the batteries in the flashlight lasted about seven hours. The trap was pulled the next morning and the number of fish recorded.

Biological Information

Age data

Our gill nets killed most of the pygmy whitefish they caught. We used these mortalities to measure fork length (mm) and weight (to the nearest 0.1 gram). We also examined these fish for sex and level of maturity. In addition, otoliths and scales were collected for age determination and growth studies. In 2000, we found that the first year's annulus did not show on many scales. Thus, scales tended to underestimate age. Therefore, we used otoliths as our primary source of age information in 2001. We removed otoliths in the field and stored them in a glycerin/distilled water solution. Occasionally, the otoliths were fractured during removal. When this happened, we used scales to determine the fish's age. We took most of the scales from an area above the lateral line and just posterior to the dorsal fin. *North/South Consultants Inc*. (Winnipeg, Manitoba) analysed both the scales and otoliths.

Diet data

In 2001, we again examined the diet of pygmy whitefish. In addition to determining diet composition, we hoped to glean habitat-use information by dividing the organisms in the stomachs into bottom oriented and limnetic prey. To this end, we removed the entire stomachs of a subsample (approximately 30 per field trip) of pygmy whitefish and preserved them in 70% ethanol for later analysis. Mike Stamford (Zoology Department, UBC) analyzed both the 2000 and 2001 stomach contents. A detailed explanation of the methodology and results is presented in Stamford (2003a). The first year (2000) results indicated that pygmy whitefish in Dina #1 forage mainly on *Daphnia* and Cyclopoida (limnetic prey); however, we did not know if these were preferred foods or the only available prey at the time we sampled. Therefore, in 2001, we collected open water zooplankton samples during each trip for comparison with stomach samples from fish taken at the same time.

Condition factor

We measured mean lengths and weights for each sex in each age class, and calculated the condition factor (weight (g)/length $(cm)^3$ x 100) for each fish from each sampling trip. The condition factor reflects the nutritional state or "well-being" of an individual fish. A condition factor of 1.0 or larger indicates a generally healthy and robust fish.

Other observations

We visually assessed the general external appearance of each fish and took photos (on file). Further, we examined the fish for disease and parasites. In 2000, we preserved samples of an observed parasite in 70% ethanol and sent them to UBC for identification. This unidentified encysted worm was common on the stomachs and livers of pygmy whitefish. Unfortunately, ethanol was not a good preservative for these worms and Amanda Brown (a PhD student in parasitological work) could only classify the worms to the "Class" level. In 2001, we collected additional parasite samples and this time fixed the worms in a better preservative. As a result, these ectoparasite samples could then be identified to "Species" level.

RESULTS

Lake and Creek Water Temperature

The seasonal patterns of temperature change in the lake and inlet creek were similar to those recorded in 2000; however, the temperature peaks occurred somewhat later in 2001 (Appendices 1 and 2; Figure 3). Lake surface (1 and 5 m) temperatures peaked in early to mid-August and declined steadily over the rest of the study period. At 10 m, the temperature did not peak until the beginning of October, and at 15 m, the peak occurred in mid-October. At 20 m, the temperature was still rising when the Stowaway units were removed for the season on October 26. Thus, at 20 m, we did not record a temperature peak. These depth related time lags in temperature peaks reflect the strength and persistence of the metalimnion in Dina #1.

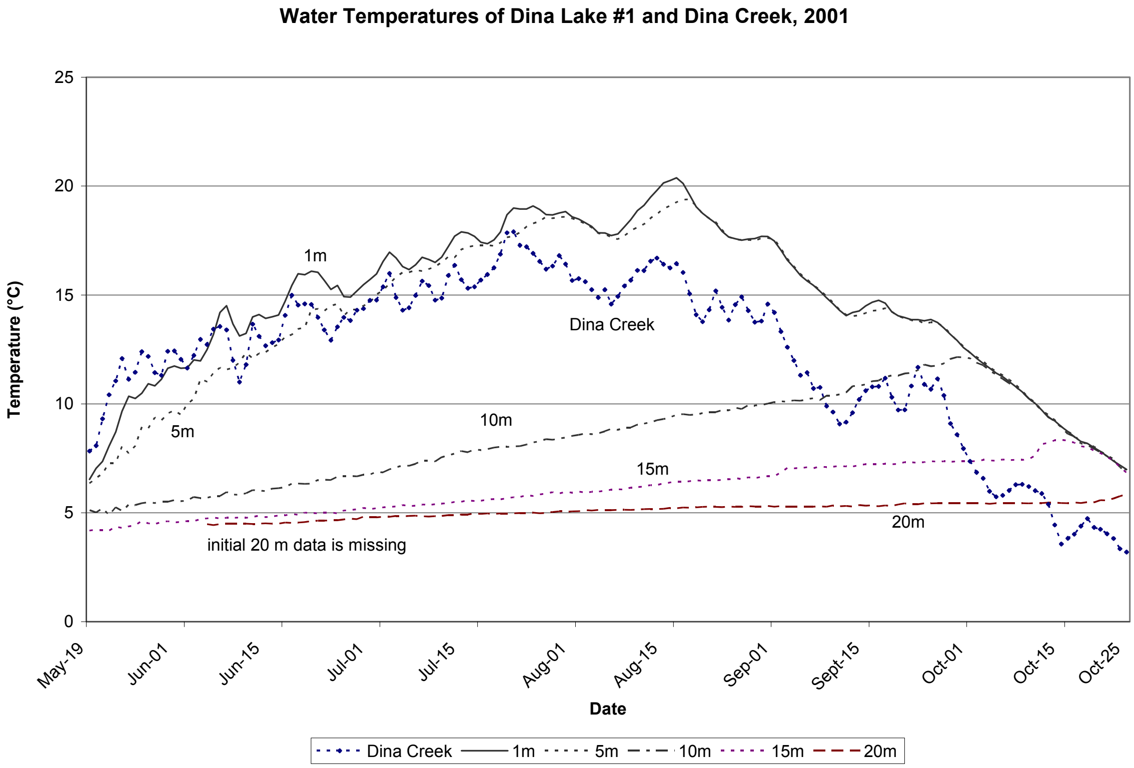

Figure 3. Mean lake and creek water temperatures from May 18 to October 26, 2001.

Oxygen/Temperature Profiles

As the influence of oxygen levels and water temperature on habitat use by pygmy whitefish is unknown, we measured the oxygen and temperature depth profile during each sampling trip. We collected similar data in the first years' study and wanted to compare the two years. We used this information in conjunction with the fish catch results to examine the habitat preferences of pygmy whitefish. Four different stations were used as index sites (Figure 2, Appendix 3).

Oxygen/temperature profiles were created for all four of the index sites (Appendix 4). The ice cover on Dina #1 disappeared on May 15, 2001. From this time to October, three stations (north eastern, north western, and the northern main basins) were sampled. The fourth station, located between the two largest basins, was sampled only in May and August. In November, only the northern main station was sampled. At this time, the lake was completely isothermal. It is anticipated there was complete ice cover on Dina #1 shortly after the November 15, 2001 sampling session.

A metalimnion forms in Dina #1 in late May and begins to break down in late October. The metalimnion gradually descends during the summer and was much higher in the water column in May (4-5 m) than in October (17 m). This shift in metalimnion depth is similar to that in 2000 except that it was slightly higher in the water column. The readings taken in late October 2001 showed a strong thermal stratification at 17 m but by mid-November, the lake was completely isothermal. The oxygenated epilimnion was then able to mix with the lower (bottom) level of the hypolimnion and recharge the oxygen-depleted zone near the bottom.

Generally, oxygen levels in Dina #1 are adequate for fish but during the summer, as lake temperature rises, oxygen levels near the bottom decline. Thus, by July, almost no oxygen is present at 21 m. By August, and continuing into October, the anoxic layer rose to about the 17 m depth. The effects of low oxygen levels on pygmy whitefish are unknown, however, they are probably similar to those observed in other whitefish. For example in lake whitefish, oxygen concentrations below 4.25 mg L^{-1} are lethal (Ford et al. 1995). In August, this lethal level was reached at about 15 m in Dina #1. By mid-November, however, oxygen concentrations at this depth had doubled.

Zooplankton Samples

The purpose of the zooplankton hauls was to determine if limnetic prey selection by pygmy whitefish depends on prey abundance in Dina #1 (Appendix 5). Relative abundance of zooplankton taxonomic groups was compared between stomach samples and water column samples that were collected concurrently during June, July, August and October of 2001. The main assumption was that relative abundance among prey types would be the same in the fish (stomach samples) and the water column (vertical-haul zooplankton samples) if pygmy whitefish do not select certain prey types. Alternatively, prey types could be selected according to their size (i.e. large calanoid copepods) or their large abundance (i.e. *Daphnia* or *Leptodora*). Consequently, the preferred prey types would compose greater proportions in the pygmy whitefish stomachs compared to their abundance in the water column. Zooplankton samples collected in June, July, and August of 2001 were analysed. As few pygmy whitefish samples were captured in October, no zooplankton samples were analysed for this month. The detailed results of this analysis are presented in Stamford 2003b.

Comparison of the overall proportional abundance between water column and stomach samples suggests that pygmy whitefish select *Eubosmina*, Calanoid copepods, and *Leptodora*: the proportional abundance of these groups was low in the water column compared to their abundance in the stomach samples. Dividing the samples among different months, however, suggest that pygmy whitefish do not select their prey during June and October. High abundance of Cyclopoid copepods in both water column and stomach samples during June suggests that pygmy whitefish forage on these prey (due to their opportunistic abundance). Few other zooplankton were present in the water column during June which suggests that there was limited prey choice available.

The widest range of prey pygmy whitefish foraged on was during October. Specific prey items included *Eubosmina*, *Daphnia*, Cyclopoid copepods, and Calanoid copepods. All of these groups were found in similar proportions in both types of samples in the deep water during both day and night. However, during July and August, the proportional abundance of zooplankton were different between the stomach and water column samples. The data suggest that pygmy whitefish selected *Eubosmina*, Calanoid copepods, and *Leptodora* during July, and selected Calanoid copepods, Cyclopoid copepods, and *Leptodora* during August. Proportional abundance of these groups tended to be greater in the deep water samples at night and greater in the shallow water samples during the day. This suggests that pygmy whitefish forage on them at night, assuming that the fish do not migrate into shallow water to feed during the day. Our capture results with the gill nets suggest this same concept.

Other groups were also present in the stomach samples (i.e. *Daphnia* and Cyclopoid copepods) during July and August but they were also abundant throughout the water column both during the day and night. Overall, the distribution of the zooplankton prey in Dina Lake #1 suggest that pygmy whitefish forage in the water column predominantly at night when their preferred prey (i.e. calanoid copepods and Eubosmina) are abundant in the deep water. Other assumed less sought-after zooplankton (i.e. Cyclopoid copepods and *Daphnia*) offer greater foraging opportunities during the day.

Light Meter

If pygmy whitefish follow the diel movements of the zooplankton, this should be reflected in diel changes in the depth of capture in vertically set gill nets. Thus, there should be few, if any, pygmy whitefish near the surface during the day but as darkness approaches, the fish should move up in the water column. For one day during each of the sampling trips, the Li-Cor light meter was used to determine light intensity at one metre depth increments from the surface downwards until no light (<1% of the surface reading) was measurable.

In Dina #1, light intensity decreased exponentially with depth during the summer and half the light (50% of the surface intensity) did not penetrate beyond the first 2 to 3 m. We compared this data (Figure 4) to the depth of the metalimnion measured during the same sampling period. Although readings varied slightly from day to day because of short term changes in solar intensity, wave action, or water transparency, the depth of the photic zone in Dina #1 was quite consistent in 2001. Throughout the summer, the depth of the bottom of the photic zone ranged from about 12.9 to 16.1 m. Light penetration increased slightly in August and September but during late October, light extinction was still at roughly the same depth as the metalimnion (16 m). With the onset of winter, light penetration is presumed to further decrease with the accumulation of ice.

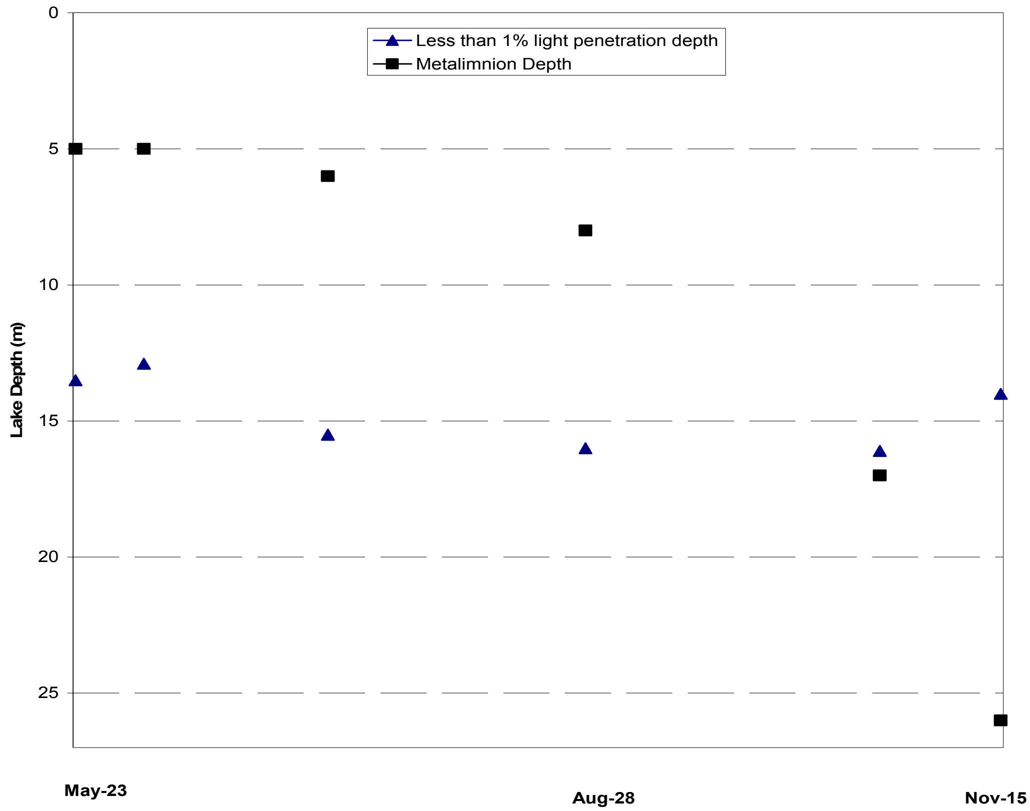

Figure 4. Light meter readings showing the depth of less than 1% light penetration along with the depth of the metalimnion in Dina #1, 2001.

Gill Nets

The June vertical sets caught very few fish: the 10 mm net caught no fish, the 14 mm panel caught one fish, and the 25 mm panel caught 19 pygmy whitefish. Most of these fish were captured in the lower third of the water column and half of them were within 2 m or less of the bottom. One fish, however, was taken 6 m from the bottom. The 25 mm panel caught mainly females and, since over 95 % of the June samples came from this panel, the sample consists mostly of females. In June, we set two nets (19 mm and 25 mm mesh) perpendicular to the shore. The nets were attached to shore and ran out to a depth of 4.1 m. They were checked during the afternoon and towards nightfall and caught no pygmy whitefish; however, by the next morning there were 25 pygmy whitefish in the nets (11 in the 19 mm net and 14 in the 25 mm net). All the pygmy whitefish were located within 0.30 m from the bottom and were captured in the deeper half of the nets (2.5 m to

4.1 m deep). The nets also caught other fish species and strangely were all located at the shallow ends of the nets (1.5 m to 2.5 m deep).

In July, we added a 10 mm and a 32 mm panel to our nets. The 10 mm and 32 mm nets were set horizontal to the bottom but the other mesh sizes remained vertically set. In the north eastern basin, this combination of nets caught 32 pygmy whitefish. Again, all the fish were close (within one metre) to the bottom. Ten of the fish were taken in the early afternoon and the rest were caught overnight. The 10 mm panel caught eight y-o-y pygmy whitefish, the smallest of which was 52 mm FL. The 32 mm net caught no large sized pygmy whitefish.

The same nets (except for the 32 mm panel) were set in the northern main basin and checked in late afternoon. Together they captured four pygmy whitefish all within 1.8 m of the bottom. We checked the nets again just before nightfall and found that two presumed "schools" of pygmy whitefish had hit the nets. There were 27 fish in the 25 mm net (all captured within 2 m of the bottom) and 46 pygmy whitefish in the 19 mm net (all within 3 m of the bottom). The north western basin was sampled briefly (2.5 hours) with all five net panels but no pygmy whitefish were captured.

The 19 mm shore net was also set in July. Again, this net caught no fish during the day (morning and afternoon); however, it caught one pygmy whitefish overnight (0.30 m from the bottom in 2.5 m of water). The net was reset again and captured no pygmy whitefish during the day. The net then fished for three hours in the dark and caught three pygmy whitefish (0.20 m from the bottom in the deepest part of the net).

During August, we focused most of our capture efforts on live capture techniques (i.e. trap netting). At the same time, we still wanted to document the onshore/offshore movement patterns of the pygmy whitefish throughout the summer months. Only a single 19 mm gill net was set twice during this trip. Again, this was our shore net. It caught one pygmy whitefish late in the morning (0.10 m from the bottom in 2.3 m of water) and no pygmy whitefish during the remainder of the day. The net was set again at night and was checked approximately 2.5 hours after nightfall. It contained 17 pygmy whitefish (all 0.15 m from the bottom; one fish in 2.0 m of water and the rest at the deep end of the net).

During the latter part of the October trip, we attempted to selectively sample parts of the pelagic zone. A 19 mm gill net (2.4 m deep) was set horizontally and suspended in the water column at three depths: 0, 5, and 10 m from the surface. The surface net set captured no fish during either the day or overnight. The net set in the middle of the water column captured no fish during the day but captured 12 pygmy whitefish overnight. These fish were equally scattered throughout the net and two thirds of the fish were males. The net set nearest to, but not on the bottom, captured no fish during the day but 174 pygmy whitefish over night. Most of these (85%) were 0.5 m from the lead line, or about 2.5 to 3.0 m off the bottom. This catch was concentrated near the middle of the net (very few were located at the ends of the net). This sample contained both males and females.

In November, three gill nets were fished during the day. The purpose was to determine if the pygmy whitefish had already spawned. We examined nine fish. None had spawned but the egg diameter in females was slightly larger than the egg diameter in the October females. These fish probably would have spawned over the next few months. Our gill net catches are summarized in Appendices 6 and 7.

Trap Nets

Except for the November trip, trap nets were set during all our 2001 sampling trips (Appendices 8 and 9). One trap net was set per sampling trip in May, June, and July of 2001. Three trap nets were set in both the August and October 2001. Initially, the trap nets were set on the bottom near the shore where they could be easily checked from time to time. The single trap net used in May was set on a shallow, sandy ridge. The net fished for two days and captured no pygmy whitefish. During June and July, the net was moved to an area next to the temperature recorders. This site was used as an index site throughout the summer. The trap net was effective at capturing lake chub and longnose suckers (30-60 of each species); although no pygmy whitefish were captured. A gill net was then set approximately 15 m from the trap net. A few pygmy whitefish were later captured. Thus, pygmy whitefish were using this area but somehow avoiding the trap net. One observation was that there was no lead line on the trap wing walls. This resulted in the net being about 0.30 m off the bottom (due to the floats) in some areas of the net near the mouth.

A heavy lead line was then attached to the wing walls and used on the July trip. During this month, we fished the trap net for three days in shallow water (1.75 m). It caught thousands of lake chub, hundreds of longnose suckers, few rainbow trout, and one pygmy whitefish. The use of the lead line had increased the capture efficiency of the trap.

By August, we had three trap nets. One net was used in the index location (shore trap set). The other two nets were moved to different depths in the northern main basin. The index net fished for 4 days and captured seven pygmy whitefish. These fish ranged in size from 37 mm to 84 mm. Some of these fish were captured during the day. The two deeper trap nets captured varying numbers of pygmy whitefish. These traps were fished for 24 hours at four different locations. The first site was a shoal by the north eastern basin. The mouth depths for the two traps were 3.0 m and 6.5 m. Both traps caught pygmy whitefish: 6 in the shallower trap and 27 in the deeper trap. The majority of fish were juveniles but there were a few adults and one y-o-y.

The nets were moved to another site located between the North and South Basins. Both nets were set in a shoal area with a mud substrate. The mouth depth of one trap was 5.4 m and the other was set at 7.3 m. Over night, the shallower trap captured 43 y-o-y and 3 adult pygmy whitefish. The deeper trap caught an enormous presumed "school" (estimated at 2,065) of pygmy whitefish (Appendix 9). The oxygen level at these trap sites was 8.7 mg L^{-1} and the temperature was 17.5° C. Apparently, both traps captured fish migrating from each of the deep part of the basins and moving towards the shallow shoals, presumably during the night.

On the last day of the August trip, one trap was set in the north east basin and one in the north west basin. Neither trap captured any pygmy whitefish. In the north east basin, the oxygen level was 8.0 mg L^{-1} and the temperature was 17° C, while in the north west basin, oxygen levels were lower at 3.6 mg L^{-1} and the temperature was 10.5° C. Our first year's research on this species suggested a preference for cool water (<9° C); however, our 2001 trap nettings indicate that pygmy whitefish can tolerate higher temperatures. Fish were caught in areas where the oxygen level was 3.6 mg L^{-1}. Although this is below the lethal level for lake whitefish, our results show that pygmy whitefish can enter anoxic areas of the lake, at least for short periods of time (McPhail and Zemlak 2001).

If there are onshore movements associated with the approach of the spawning season, we anticipated that the shoreline (index) trap would capture large schools in October. We fished the trap for two complete days. No pygmy whitefish were caught. On the last sampling day in October, the shoreline trap was moved approximately 30 m off shore. The depth of the mouth was now 6.0 m deep (from 1.75 m). The trap fished overnight and captured 11 pygmy whitefish. The other two traps did not capture any big "schools" of pygmy whitefish in October. They were set at a variety of depths (3 m to 15 m) in the northern main basin and fished for 24 hours. Their combined catch was 52 pygmy whitefish (a range from 4 to 23 fish in any single set).

Trawling

We trawled for pygmy whitefish during the May, June, July, and August sampling trips (Appendices 10 and 11). During June, we did three trawls during the day and three at night. The trawls covered three different depths (surface, 10 m, and 15 m). No fish of any species were captured during this trip. In July, we trawled in slightly deeper water (15 m to 18 m) and for longer sampling distances. Our day trawls produced no fish, but at night, we caught eight adult longnose suckers at the 10 m depth. During August, we trawled at 5 m, 10 m, and 15 m at night. We caught lake chub and longnose suckers but no pygmy whitefish.

Light Trap Box

From July to October, we set the light box trap at a variety of locations (Appendix 12 and 13). Most sample sites (6 out of 8) were located in the northern main basin. During the July and August trips, no fish of any species were captured. In October, the box managed to finally capture two lake chub. The light trap also caught large quantities of zooplankton. No pygmy whitefish were captured by the light trap box throughout 2001.

Biological Data

Length-frequency

During each sampling trip, subsamples of the captured fish were examined for length (Appendix 14). In an attempt to follow growth throughout the summer, we tried to catch all available sizes of pygmy whitefish on each trip. Unfortunately, setting four vertical gill nets at a site captured more fish then anticipated. Consequently, we then switched to setting only single nets at a time. Further to this switch, gill net size selectivity biases the numbers of fish in the different size classes. For example, the 9.0 cm to 10.5 cm size class was the most frequent class in our total sample (Figure 5). The 10 mm net captured fish as small as 2.8 cm.

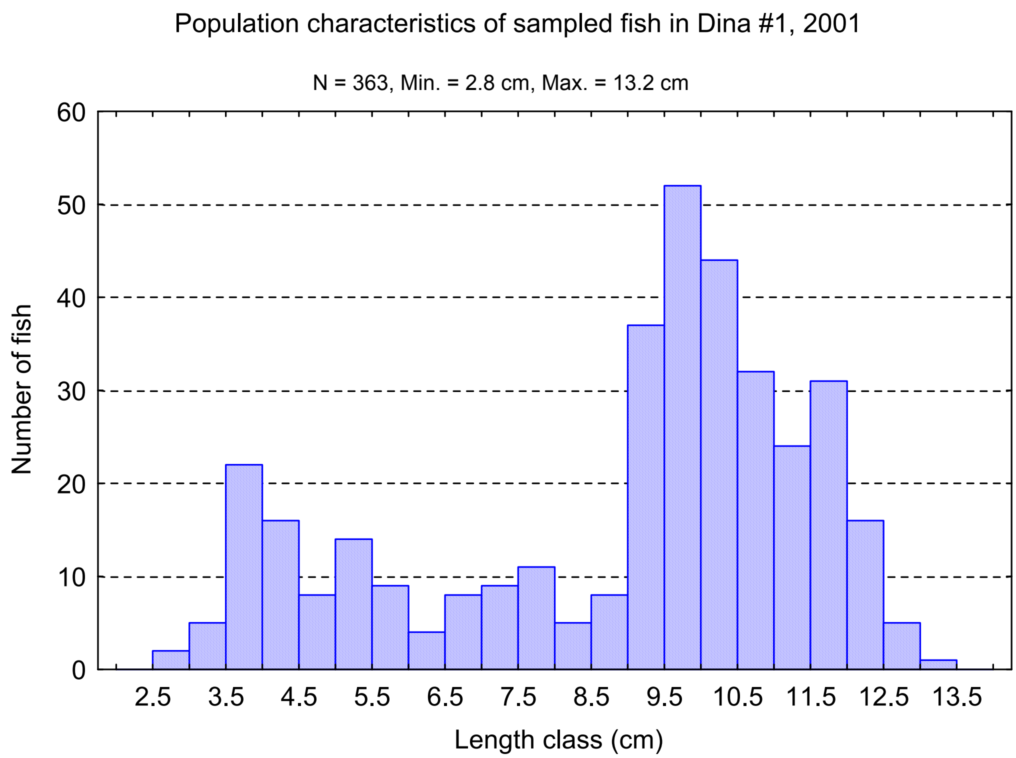

Figure 5. Length-frequency of sampled fish in Dina #1, 2001.

Sex ratio

The overall sex ratio in our 2001 samples was close to 2:1 (171 females to 97 males). With a 10-power hand lens, we could accurately identify the sex of fish as small as 5.7 cm; however, early in the season, the gonads of most of the y-o-y were too small to identify without a microscope. Among adults, there was a clear size difference between the sexes (Figure 6): seventy-two (over 42%) of the females captured exceeded 11.0 cm whereas only three (3%) of the males were over 11.0 cm in fork length. The largest fish we caught was a 13.2 cm female. In 2001, we observed a few larger (longer) males than in

2000 (i.e. in 2000, the largest male was 10.4 cm but in 2001, the largest male was 12.2 cm). We found that the 25 mm net almost exclusively captured females but that the sex ratio in the 19 mm net was closer to 1:1.

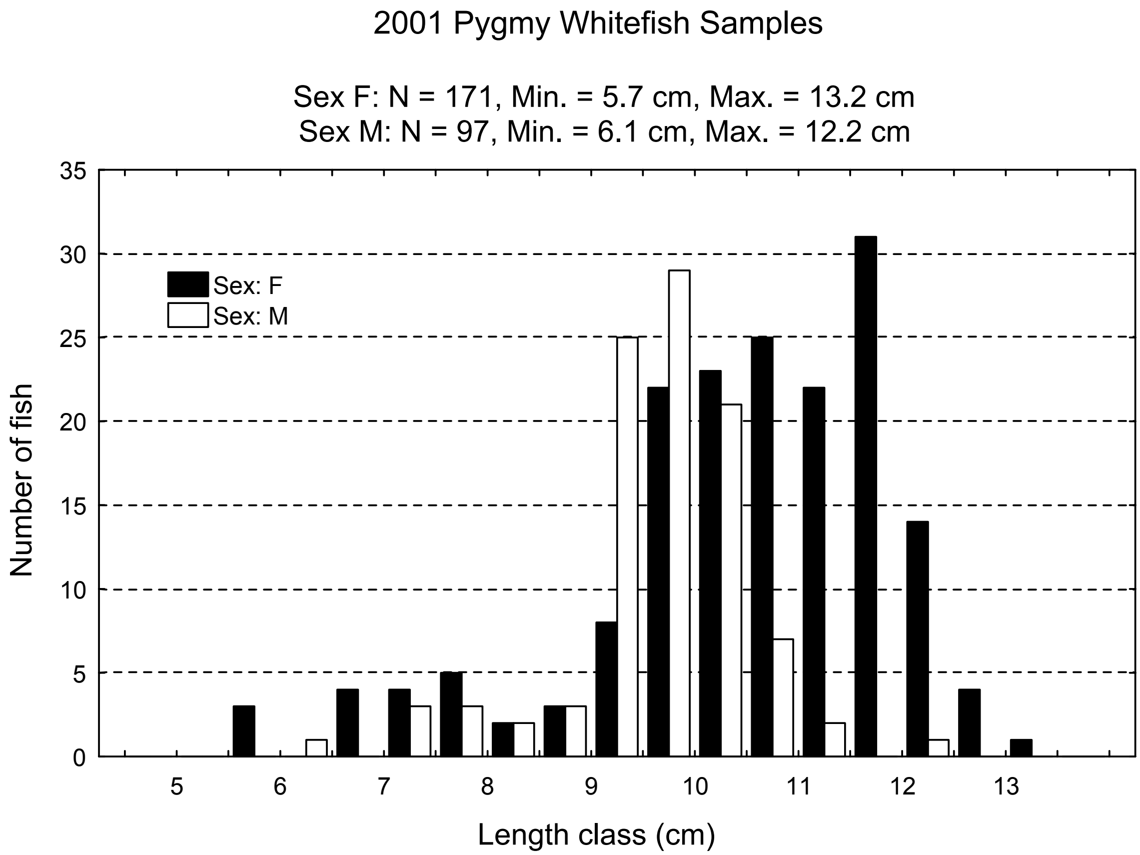

Figure 6. Size comparison of male and female pygmy whitefish sampled in 2001.

Age

North/South Consultants Inc. used both scales and otoliths to age our pygmy whitefish. In 2000, they found that scales generally underestimated age in juveniles and adults; consequently, otoliths were the primary structure used to age the fish in 2001. Unfortunately, the otoliths in y-o-y pygmy whitefish are small and fragile and it was not always possible to read them. In these cases, we used scales. Thus, we collected both scales and otoliths from 27 y-o-y fish and found that in 23 (85%) there was agreement between scale age and otolith age, however, in four fish (15%) scales underestimated age.

We followed the growth of the 2001 age 0+ cohort from August through October (Figure 7). During the August trip, we sampled 49 y-o-y fish (all but 6 from a single school). *North/South Consultants Inc.* aged a sub sample (10) of them. Later, based on their size, we assigned the remaining 39 fish in the y-o-y group. In August, the fork lengths of y-o-y fish ranged from 2.8 to 4.8 cm (mean = 3.9 cm). For the October samples, *North/South Consultants* aged all (8) of the y-o-y. These 8 cohorts averaged 5.1 cm (range

= 4.8 to 5.6 cm). The average length increment of the y-o-y group over the two-month span was approximately 1.2 cm (or about 0.6 cm per month). Based on this 2001 age analysis of young fish, our 2000 report (McPhail and Zemlak 2001) suggestion that a 7.0 cm fish captured in September of 2000 represented a y-o-y fish is incorrect. *North/South Consultants Inc.* correctly aged this fish as a one year old fish.

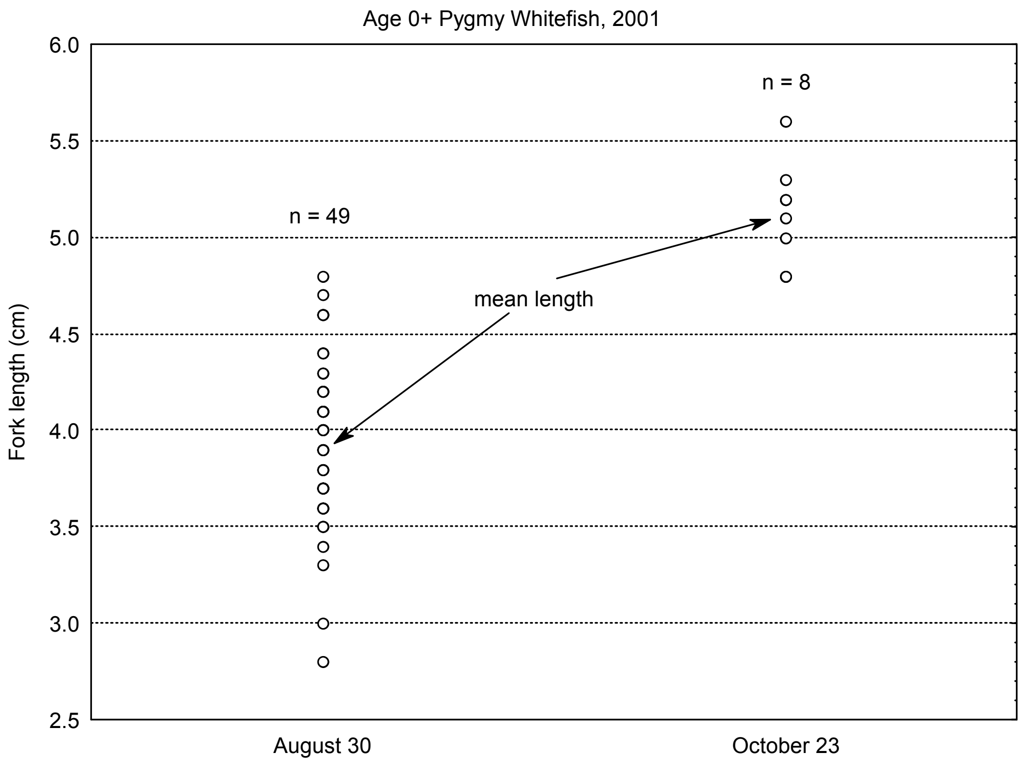

Figure 7. Change in length of y-o-y pygmy whitefish over 54 days in the autumn.

The pygmy whitefish population in Dina #1 contains several age classes. Fork lengths for the different age groups (females and males treated separately) are plotted (Figure 8). The 2000 data report pooled males and females. Since we now know females grow larger than males, this produced a wider range in lengths at age than occurs in our 2001 data. There is still overlap between the sexes in length at age in the 2001 data; however, it is not as pronounced as in the 2000 data. The May and November samples were too small to include in the analysis.

Although we sampled more females than males, examination of the lengths of the supposedly age 1 fish (males and females) suggests that, in the June 2001 sample, the *North/South Consultants Inc.* underestimated the ages of fish over 9.0 cm. In our later sampling trips, age 1 fish never reached this size. The age 2 data, however, is consistent throughout the summer. Thus, the most frequent age class in our samples ranged in size from 8.0 to 11.9 cm. Fish older than 2 were too rare to make any comparisons. Nevertheless, while there are discrepancies in our age data, it is clear that the population of pygmy whitefish in Dina #1 consists of several age classes.

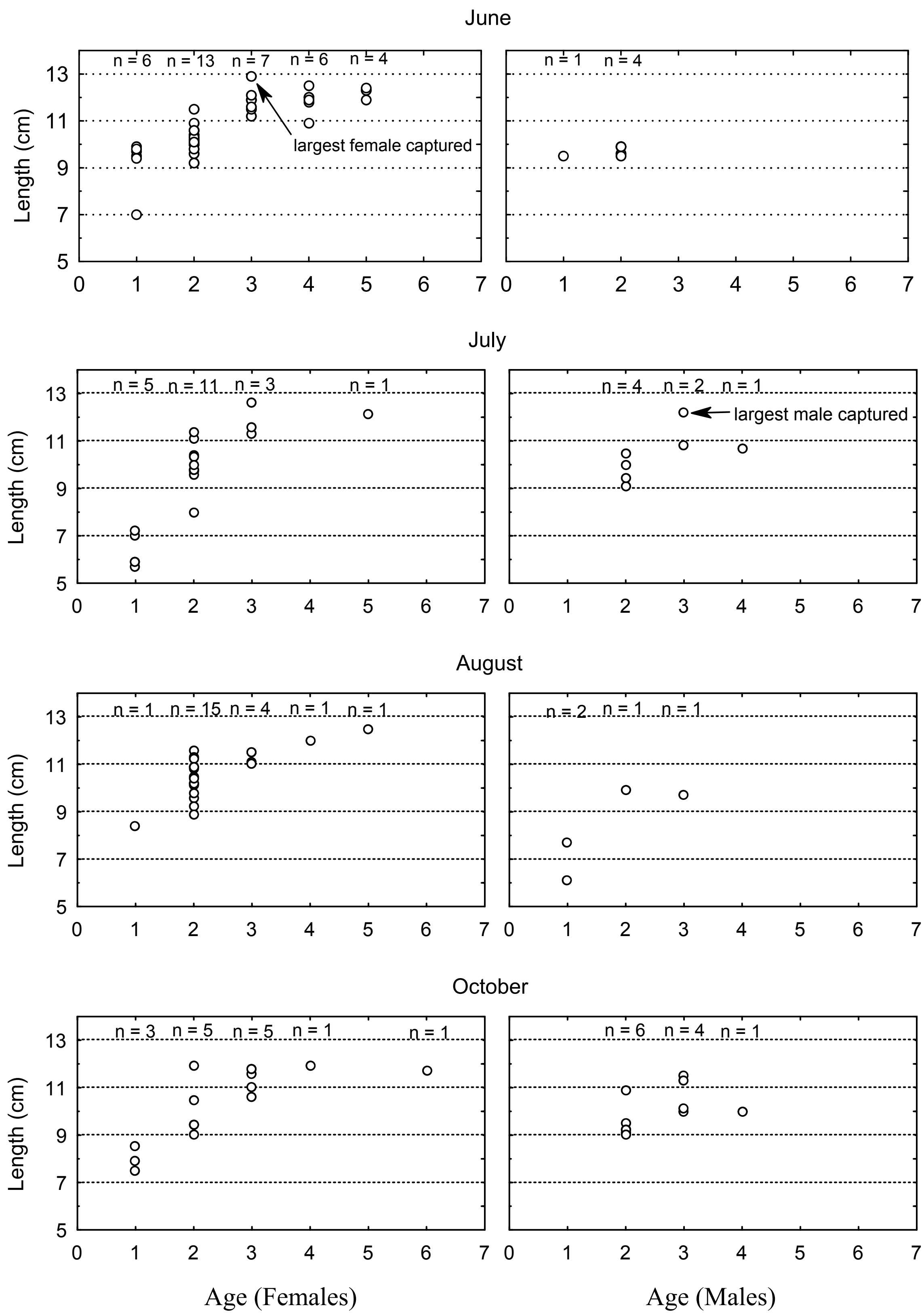

Figure 8. Length at age comparison of female and male pygmy whitefish, 2001.

The oldest female captured was 7 years while the oldest male was 4 years. After age 2 growth appears to slow to the point that it obscures any clear differences among older age classes. We suspect that the largest male we captured (12.2 cm) was older than the otolith reading of a 3 year old fish. This male was substantially larger than any other male captured during the two years of this study.

Length and weight

We used the power function ($W = aL^b$) to describe the weight-length relationship (Nielsen and Johnson 1992) in these fish. In general, a “b” value of less than 3.0 indicates a reduction in weight-gain per increment of length while a “b” value greater than 3.0 indicates an increase in weight-gain per increment of length. We analysed each sampling trip separately (Figure 9, Appendix 14). The difference in “b” values between the sexes is noticeable in adults.

Overall, the robustness of pygmy whitefish changed throughout the summer. As females grew, their “b” value increased (from 2.7 in June to 3.08 in October). Presumably, this increase reflects the adult females maturing eggs throughout the summer as they are presumed to be early winter spawners. The “b” value in males also increased as summer progressed. Again, adult males enlarge their gonads too throughout the summer.

Condition factor

Condition factors were calculated (by two separate indices) for each individual male and female pygmy whitefish. The first index calculated was the Fulton-type condition factor (Appendix 14). This index describes the general well being of each individual fish. Since the robustness of these fish changes from month to month (i.e., different “b” values; Figure 9), this index does not allow comparison of fish of different lengths. Therefore, we used a second index --- the relative condition factor (Kn) --- to compare the fish for each sample trip.

The relative condition factor suggests that the means and standard deviations of Kn provide a better basis for statistical comparison (Table 2). With the 255 condition factors calculated, 114 of them had the same value, 113 of them had the Fulton-type condition factor slightly higher than the relative condition factor, and 28 of them had the relative condition factor (Kn) slightly higher than the Fulton-type.

Although almost twice as many females as males were captured, the mean condition factors between sexes were similar (close to 1.000). Nonetheless, males consistently showed a slightly higher condition factor for each sample period than females. Mean condition factors were similar throughout the four sample trips for each sex.

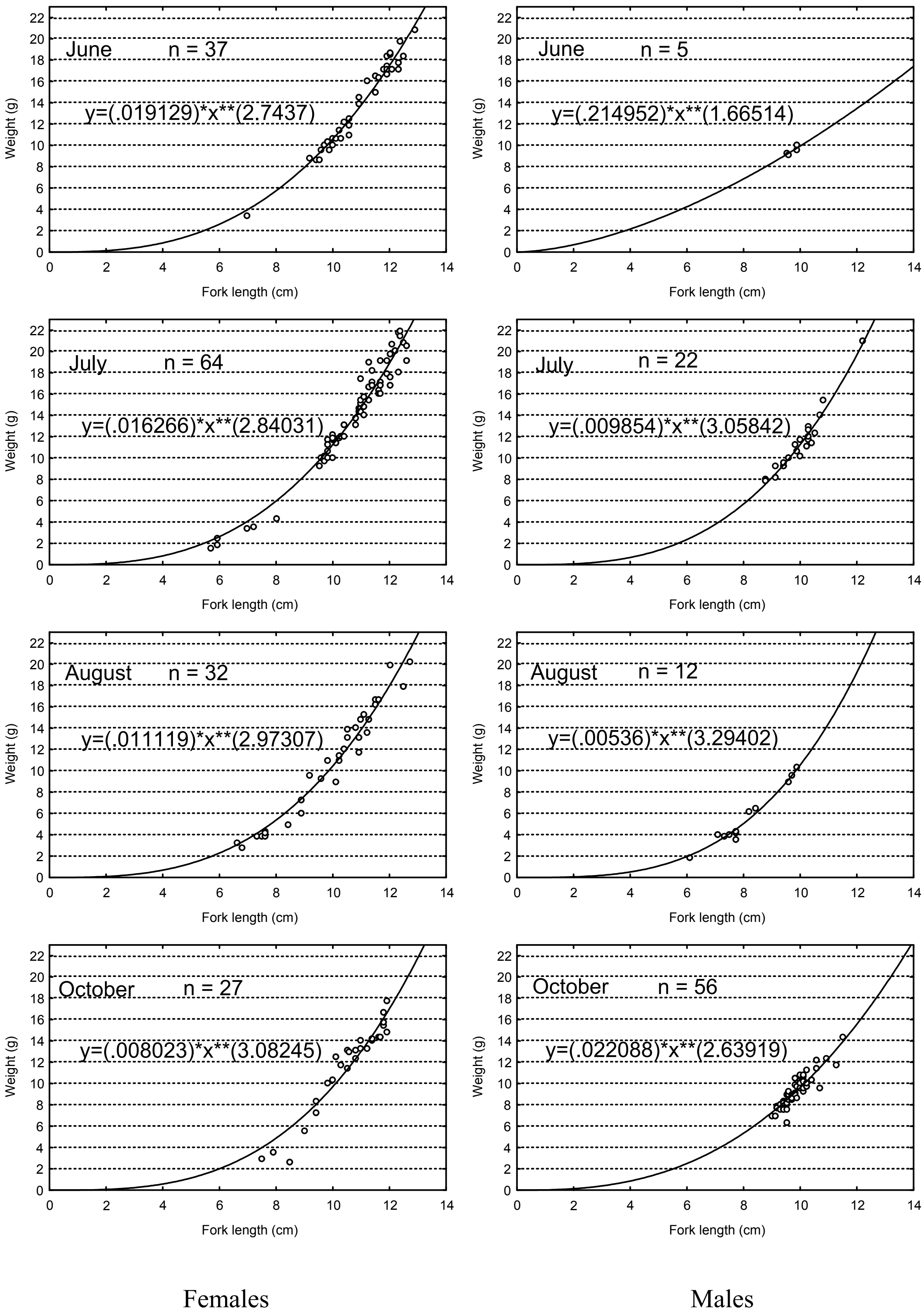

Figure 9. Length-weight comparison for pygmy whitefish by sex.

Table 2. Relative condition factors for pygmy whitefish captured in 2001.

Trip	Females					Males				
	N	Mean	-95%	+95%	Std.Dev.	N	Mean	-95%	+95%	Std.Dev.
June	37	0.996	0.976	1.015	0.058	5	1.000	0.969	1.031	0.025
July	64	0.984	0.961	1.007	0.093	22	1.003	0.978	1.027	0.055
Aug.	32	0.982	0.945	0.019	0.103	12	0.993	0.925	1.062	0.107
Oct.	27	0.977	0.915	1.039	0.157	56	0.999	0.980	1.018	0.070

Diet

Throughout the summer, 135 pygmy whitefish stomachs were preserved for later analysis. Most prey items were classified to order but some were identified to genus. There were eleven different taxa in the samples (Stamford 2003a) and, in an attempt to determine where pygmy whitefish were foraging, we divided the prey into benthic (bottom) or limnetic (water column) organisms.

Although their abundance in stomachs changed seasonally, chironomid larvae were the main benthic prey. They were relatively common during the spring and summer months but less noticeable towards the fall. The July stomach samples were unique in that another benthic taxon (mayflies) were found. The other nine prey items were all limnetic taxa: copepods, chironomids (pupae), phantom midges, water fleas, and water mites. The water fleas were *Daphnia*, *Bosmina*, *Leptodora,* or *Alona*. Seasonally, except for the water mites, the occurrence of all the limnetic taxa was fairly even. Only one water mite (Hydracarina) was observed in the July sample trip.

To examine seasonal shifts in diet, samples for each month were analysed separately. If a food item occurred in 90% or more of the samples for that month, we assumed it was a primary food. If a prey item appeared in 50% to 89% of the samples, we considered it a secondary food. Finally, if a prey item occurred in 25% to 49% of the samples, we considered it a tertiary food (Table 2). The May (3) and November samples (2) were not included in the analysis due to their small sample sizes.

The diet of pygmy whitefish in Dina #1 is diverse and the relative importance of food items (Table 3) varies among months. For example, cycloids dominated in the early summer but as summer progressed, calanoids (especially *Daphnia* and *Bosmina*) became more important prey. Towards fall, no specific prey items dominated the diet and most of their food came from a variety of taxa. Nonetheless, it is clear that water column prey dominated the diet of pygmy whitefish during our sampling season. This tendency has been documented in Alaska (Heard and Hartman 1965). Their fish also consumed chironimid larvae and pupae, copepods, *Daphnia*, and *Bosmina*.

Table 3. Stomach content preferences for pygmy whitefish by sample trip.

Month	Number of Stomachs analysed	Primary Food Source (90% and greater)	Secondary Food Source (50% to 89%)	Tertiary Food Source (25% to 49%)
June	32	Cyclopoida (L)	Chironomidae larvae (B) *Bosmina* (L)	Chironomidae pupae (L) Chaoboridae (L) *Daphnia* (L)
July	31	none present	Calanoida (L) *Daphnia* (L) *Bosmina* (L)	Cyclopoida (L)
August	38	none present	none present	Calanoida (L) *Daphnia* (L)
October	29	none present	none present	Cyclopoida (L) Calanoida (L) *Daphnia* (L) *Bosmina* (L)

(L) = limnetic, (B) = benthic

Reproduction

In both 2000 and 2001, ice formed on Dina #1 before the pygmy whitefish spawned. We examined fish for maturity on November 15, 2001 and, with a light pressure on the abdomen, could extrude neither eggs nor sperm. We estimated that these fish were about a month away from spawning. Consequently, we do not know where or when the pygmy whitefish in Dina #1 spawn. We speculate that they are early winter spawners and spawn somewhere in the lake (using gravel and cobble shoals) presumably after ice cover.

Age at maturity

Age at maturity could only be determined from samples taken in October and November. During late August, we caught both immature and maturing fish. Even in maturing fish, the gonads were not sufficiently developed to determine if they would spawn this fall or winter. In 2000, we speculated that most males mature in their third summer of life and that relatively few survive to a second spawning and that some females do not mature until their fourth growing and probably survive for several additional spawnings. The data from 2001 is consistent with these suggestions. Many immature (y-o-y), a few maturing, and mostly mature fish were captured during the October trip. Otoliths from 15 females and 11 males were obtained. Four females (aged 2) had well developed eggs and probably would have spawned in 2001. There was only one other aged 2 female (9.0 cm FL) and this fish had small eggs and probably would not have spawned this year. The other 10 females (ages 3 to 6) all had well developed eggs.

From examination of the lengths of these females, the size at first maturity appears to be approximately 9.4 cm. We examined 12 more females (not aged but 9.8 cm or longer) and they were all mature enough to spawn within a few months. In contrast, four females (9.0 cm or shorter) had small eggs and would not have spawned this year. Thus, while a few females may spawn at age 2, most appear to reach first maturity at age 3 (in their fourth year of growth).

Males also showed some variation in age at first maturity. We examined one male that was age 2 (9.1 cm FL) and a second that was age 3 (10.0 cm FL). Both were still immature in October. The remaining nine males were aged 2 to 4 and all would have spawned this year. Their lengths ranged from 9.2 to 11.5 cm. We examined another 45 males (9.2 to 10.7 cm FL) that were not aged. All these fish were mature enough to spawn in 2001 (we suspect they were age 2 and older). No males aged at 1 during October were mature. Thus, the age of first maturity for most males appears to be 2 (their third year of growth).

Only nine pygmy whitefish (8 females and 1 male) were captured during the one-day trip in November. Three of these fish were aged from scales. They were all mature and close to spawning. The females ranged in length from 10.4 cm to 13.2 cm with the median fork length being 11.25 cm. The male was 10.6 cm. Since scales tend to underestimate age in pygmy whitefish, no conclusions are drawn about the age at first maturity from the November sample.

Parasites

Again in 2001, we observed parasites on the stomachs and livers of pygmy whitefish. We used an appropriate parasite fixative (AFA) in 2001 and parasite samples collected in July and August were sent to the UBC laboratory (Amanda Brown) for analysis. The parasites were white and had a wide range of sizes (from 1 to 3 mm in diameter). With the new fixative, the small ball-shaped parasites were easier to dissect and identify. Once the final thin membrane surrounding each parasite was removed, a small worm like organism appeared. The membrane surrounding the worm is presumed to be a host-derived tissue. The worms were immature and poorly differentiated and without clear features such as head, mouth, suckers, etc. Although no internal or reproductive features were visible, these parasites are likely larval worms belonging to the Phylum Platyhelminthe. Owing to their almost paper-thin structure, Platyhelmithes are commonly known as “flatworms”. The phylum contains three Classes: Turbellaria, Trematoda, and Cestoda. Turbellarians are almost all free-living and have no involvement in the diseases of fishes. All members of the other two classes live in a close relationship with animal hosts. The trematodes are known as “flukes” and the cestodes as “tapeworms” (Post 1987).

The parasites from Dina #1 pygmy whitefish are considered to be cestode larvae based on (a) their overall length and shape; (b) the fact that they lacked oral and ventral suckers which are indicative of trematodes; and (c) the presence of grainy calcareous corpuscles which are considered a diagnostic feature of cestode larvae. These corpuscles were plainly evident when the larvae were cleared in glycerin solution. A more comprehensive identification process would require the use of a hematoxylin and eosin stain. This process was beyond the scope and resources of this study.

No adult cestodes were found in any of the pygmy whitefish. These older, more developed parasites would have facilitated identification. This may be the first documentation of cestodes from pygmy whitefish as there are no published records. The parasites associated with pygmy whitefish are not reported in Scott and Crossman (1973). McDonald and Margolis (1995) list one parasite (*Neoechinorhynchus ratili*) for this species. This parasite is an Acanthocephala. These worms have an anterior proboscis covered with hooks and the Dina #1 pygmy whitefish appear to lack this structure. As such, the parasites are currently identified as cestodes.

Young-of-the-year external characteristics

There is no published description of y-o-y pygmy whitefish. We used the 27 pygmy whitefish caught in 2001 to develop a brief description of their morphology. The Dina #1 population consistently averaged between 9 and 10 dorsal rays (using a 40-power microscope) and between 9 and 10 anal rays (with one anal ray count of 11). The two short rays at the anterior end of the anal fin were not included in these counts. The size of these fish ranged from 27 to 45 mm. In 2000, we examined only the dorsal rays in adults. Our 2000 dorsal ray counts were slightly lower (8 to 9 rays); however, we did not use a microscope in 2000.

The y-o-y fish were also examined for parr marks in 2001. Parr marks were first discernable in a fish of 36 mm (FL). Fish smaller than 36 mm had fine speckling on the dorsal and caudal fins but no parr marks. The parr marks appear first on the dorsal surface posterior to the dorsal fin. As the fish ages, they then appear anterior to the dorsal fin and more along the mid-line. The number of countable parr marks ranged from zero to nine (median = 4).

We also examined y-o-y fish for evidence of scale development. The smallest fish examined was 27 mm (FL). It did not have scales but scale pockets were present. We suspect that the scales start to develop at about the same size as the parr marks.

DISCUSSION

With the effort conducted by the gill nets and trap nets to date, it appears that these pygmy whitefish in Dina #1 are a “schooling” type fish and migrate in the lake as a school rather than as individuals. As such, it is reasonable that capture success will be opportunistic. Further, if a gill net or trap net is set for any period and captures no fish, it should not be considered indicative that pygmy whitefish do not inhabit that particular area.

Pygmy whitefish were probably once widely distributed across North America in glacial lakes that formed along the edge of the retreating ice-sheets. Evidently, the species has a narrow range of habitat requirements and, except for widely scattered (Alaska to Lake Superior) "relict" populations; it has disappeared from most of the Great Plains (Eschmeyer and Bailey 1954). In Western Canada, pygmy whitefish occur mainly in British Columbia with a few scattered records in Alberta and northern Saskatchewan. The populations of pygmy whitefish in Alberta are small and scattered with eight specimens known from five locations in the province (Mackay 2000). In British Columbia, the pygmy whitefish is an interior species that ranges form the Columbia system in the south to the Liard system in the north (Carl et al. 1959). In the southern and central parts of the province, there is probably little, or no, gene flow among lacustrine populations.

With the completion of our two-year study of pygmy whitefish in Dina #1, we have new information about the biology and habitat-use of this species. How applicable our findings are to other populations is unknown. Dina #1 and Dina #2 are a closed system and, presumably, this population has been isolated for generations in what was originally a simple three fish species (longnose suckers, lake chub, and pygmy whitefish) ecosystem. The absence, until recently, of piscivorous fish and no direct competitors may have allowed unusual habitat-use and life history characteristics to develop in Dina #1 pygmy whitefish. Conversely, the Dina #1 ecosystem (including the biology of the pygmy whitefish) could be in a state of flux as it responds to the recent stockings of two top predators (rainbow and brook trout). While brook trout are no longer stocked, future consideration will be given to the possibility of also stopping the rainbow trout stocking in Dina #1. How "unique" this population of pygmy whitefish is has yet to be determined.

Shoreline Habitat Use

Usually, lacustrine pygmy whitefish are characterized as a deep-water species; however, in late (October 2000), we obtained some evidence that they were using shallow littoral regions at night. It was not clear, however, if this movement into the littoral zone was a foraging or a reproductive migration. Consequently, during all of our sampling trips in the second year (2001), we set a small mesh gill net perpendicular to the shoreline for a 24-hour period and checked it late in the day and early in the morning. This net, set on five trips spanning 5 months, caught one pygmy whitefish during the day and 47 at night. Although the sample size is not large, it clearly establishes that pygmy whitefish move onshore at night and offshore during the day.

The trap net set along the shoreline was also relatively unsuccessful in capturing pygmy whitefish. It was set as close to shore as possible and throughout the sampling season was fished for fourteen days. Water depth at the trap mouth was mainly 1.75 to 2.0 m. In July, the trap caught one pygmy whitefish and large numbers of juvenile and adult lake chub and longnose suckers. In August, it caught 7 pygmy whitefish and thousands of y-o-y lake chub and longnose suckers. During the October trip, after two days of no pygmy whitefish, we moved the trap net to a site 30 m from shore and in 6.0 m. of water. It was fished for one night and caught 11 pygmy whitefish. This suggests that at night pygmy whitefish use inshore waters that were beyond the range of our onshore gill net.

Since this onshore-offshore movement occurs throughout the summer and fall months, we concluded it is a foraging migration rather than a reproductive migration. The onshore movement was associated with the onset of darkness and, since throughout the summer only one pygmy whitefish was caught inshore with a gill net during the day, we assume that there is an offshore movement into deeper water at dawn. These fish may move inshore to exploit food items that are unavailable near the bottom in deep water where they spend most of the summer daytime hours.

The inshore net also suggested a possible interaction between pygmy whitefish and other species in the inshore environment. The net was set perpendicular to the shore and covered depths from 1.5 to 4.1 m. All 47 pygmy whitefish caught in the net were taken in the outer (deeper) half of the net. They were all caught within 30 cm of the bottom in 2.2 or more metres of water. The net also caught other species (rainbow trout, longnose suckers, and lake chub). Most of these other species were caught in the shallow (1.5-2.5 m) end of the net and rarely occurred with pygmy whitefish in the deep end of the net. However, when the net did not catch pygmy whitefish, these other species were scattered throughout the entire net. Why, or how, the presence of pygmy whitefish influenced the distribution of other species in the net is unknown. Perhaps pygmy whitefish were normally the first fish in the net and the other species simply avoided that part of the net which contained pygmy whitefish.

Pelagic Habitat Use

Throughout the 2001 sampling season, and regardless of depth, most pygmy whitefish were caught near the bottom. Nonetheless, we did catch some pygmy whitefish in mid-water. In October, 12 pygmy whitefish were caught in a net suspended 7.6 to 10.0 m off the bottom. Another net set 4-5 m off the bottom caught 26 pygmy whitefish. In addition, we caught one fish 12 m off the bottom. All of these fish were captured at night. This finding tends to indicate that after dark, some pygmy whitefish move up into the water column, perhaps, in search of food.

Schooling

Our capture results throughout the sampling period suggest that at times pygmy whitefish “school”. Typically, our nets (both gill nets and trap nets) caught relatively small numbers of fish; however, occasionally we caught unusually large numbers in a single net. For example, in July, we captured 46 pygmy whitefish in a vertically set gill net (the panel was only 2.4 m wide). All fish were within 3.0 m of the bottom and entered the net after dark. During August, one overnight trap net set captured 43 y-o-y and 3 adult pygmy whitefish while another trap net set in roughly the same area caught an estimated 2,065 pygmy whitefish. In October, we suspended a gill net horizontally in the water column and captured 174 pygmy whitefish. Approximately 85 % of these fish were 0.5 m from the lead line and concentrated in the middle of the net. These "schools" were never taken during the day but only after the onset of darkness. They were encountered in different parts of the lake and suggest that, after dark, pygmy whitefish aggregate and move around the lake. Although darkness appears to trigger these aggregations and movements, we do not know why they occur.

Fish often school for protection or to find and exploit aggregated prey (Pitcher and Parrish 1993). In Dina #1, both introduced piscivores (brook and rainbow trout) are present and pygmy whitefish are found in the stomachs of rainbow trout. Brook trout stocking ceased in Dina #1 in 2000. Thus, it is possible the schools are a response to predation. Still, in fish, protective schools usually occur during the day and break up at night (Pitcher and Parrish 1993); whereas, in pygmy whitefish they appear to form at night and break up during the day. The absence of evidence for schools in the day in shallow water may reflect net avoidance. Although, if the fish were schooling during the day, we should have caught schools below the photic zone. Since we did not, we speculate that schooling in the dark in pygmy whitefish is somehow associated with foraging.

Temperature and Oxygen Tolerances

In 2000, we rarely caught pygmy whitefish in Dina #1 in water above 9° C. Consequently, we argued that this was close to their preferred upper temperature limit; however, our 2001 results demonstrate that pygmy whitefish can tolerate higher temperatures. Throughout the summer, our shore nets regularly caught pygmy whitefish (of all age classes) moving inshore at night into water of temperatures in excess of 18° C. In addition, the two trap nets set in August that together caught over 2000 pygmy whitefish in one night were situated in shallow water at 17.5° C. These traps were set for approximately 27 hours and, if pygmy whitefish move inshore with the onset of darkness as we suspect, then some of these fish must have been in the traps for up to 17 hours. When we pulled the traps, there were no mortalities present. Upon releasing the fish, the fish immediately darted down towards the bottom. Although we do not know the upper lethal temperature limit for pygmy whitefish, temperatures up to 18° C clearly do not inhibit their nocturnal movements into shallow water.

We did not monitor oxygen levels closely in 2001. Since this species is frequently associated with the bottom in deep water, and Dina #1 develops an anoxic bottom layer in the late summer and fall, we assume that pygmy whitefish also have some tolerance for low oxygen levels. As an example, we caught pygmy whitefish at depths where the oxygen level was 2.5 mg L^{-1}. Again, we do not know how long they can tolerate low oxygen levels but they do not appear to avoid low oxygen waters.

Y-O-Y Age and Growth

Growth rates in pygmy whitefish are variable (Eschmeyer and Bailey 1955; Heard and Hartman 1963; McCart 1965; Weisel et al. 1973) and probably depend on both physical and biological factors. Since most collections of pygmy whitefish are obtained with gill nets, y-o-y fish are rare. Using scales, however, McCart (1965) back calculated the average fork length of pygmy whitefish at the end of their first year in four BC lakes. His estimates range from 47 to 73 mm. This approximates what we found in Dina #1. Our trap nets caught fish as small as 28 mm. In August, the y-o-y (N = 47) ranged from 28 to 48 mm (FL), while in October 8 individuals ranged from 48 to 56 mm. Thus, in late summer and early fall, our y-o-y pygmy whitefish were growing at about 6 mm per month.

Diet

During the summer of 2001, cladocerans and copepods were the most common food items in the diet of pygmy whitefish in Dina #1. Often more than one taxon was abundant in individual stomachs. This greater (relative to the 2000 samples) diversity of abundant taxa in the 2001 stomach sample was mainly due to the higher abundance of *Bosmina* and chironomid larvae and the strikingly lower abundance of *Daphnia*. Perhaps pygmy whitefish select *Bosmina* and chironomid larvae when *Daphnia* is less abundant. There was no obvious evidence that pygmy whitefish forage on more than one species at a time. Indeed, when two or more relatively abundant taxa were found in the same stomach, they often were located in different parts of the stomach (i.e., in the pyloric or cardiac portions of the stomach). This implies that, at any one time, pygmy whitefish selected specific invertebrate prey; prey that, perhaps, were swarming in distinct and separate microhabitats (Stamford 2003a).

Both cladocerans and copepods dominated the pygmy whitefish diet during August, September, and October. Cyclopoid copepods were clearly the most important food source for pygmy whitefish in the spring but as the season progressed, the abundance of cladocerans and calanoida copepods increased in their diet. This suggests that these organisms may be preferred prey for pygmy whitefish in Dina #1. Nonetheless, the presence of benthic organisms in their diet clearly shows that Dina #1 pygmy whitefish sometimes forage on bottom organisms. To survive the less productive months, pygmy whitefish must depend on other organisms (i.e. benthic aquatic insects and crustaceans) when water column prey are rare (Stamford 2003a).

MANAGEMENT IMPLICATIONS

Our study of pygmy whitefish in Dina #1 has filled some of the gaps in our knowledge of pygmy whitefish life history, biology, and habitat use. At present, the distribution and status of this species of special concern is unknown in the Williston watershed. The basic information gleaned from this study will allow us to efficiently gather further distributional and possibly population status data on this species in this area and in other parts of northern British Columbia. It is unknown at this time if this particular population of pygmy whitefish is unique from other pygmy whitefish populations. Further examination of other populations in the Williston watershed will help answer this question.

ACKNOWLEDGMENTS

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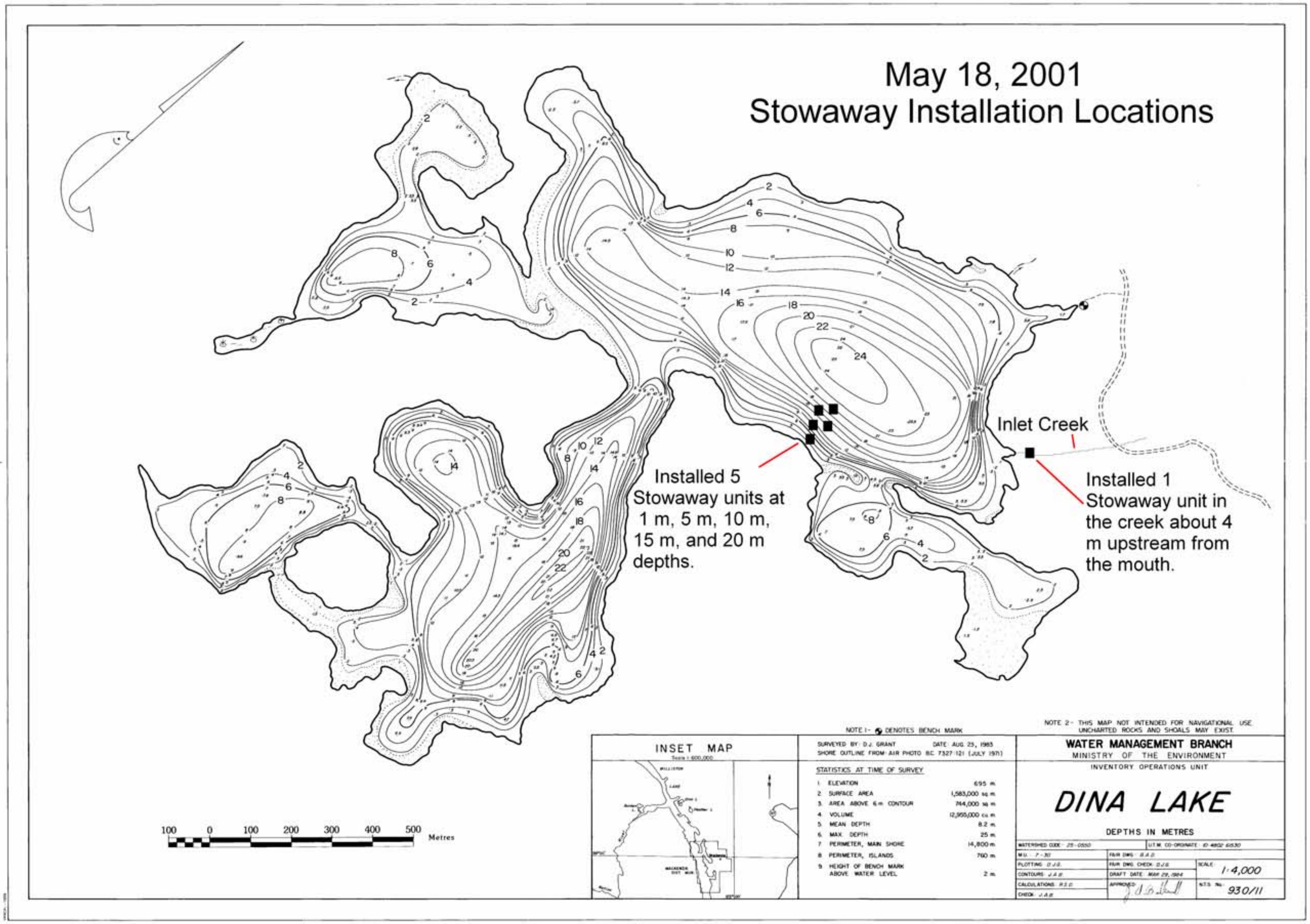
APPENDIX 1

Stowaway Installation Locations



May 18, 2001
Stowaway Installation Locations
Inlet Creek
Installed 5 Stowaway units at 1 m, 5 m, 10 m, 15 m, and 20 m depths.
Installed 1 Stowaway unit in the creek about 4 m upstream from the mouth.
INSET MAP
100 0 100 200 300 400 500 Metres
NOTE 1 - DENOTES BENCH MARK
NOTE 2 - THIS MAP NOT INTENDED FOR NAVIGATIONAL USE UNCHARTED ROCKS AND SHOALS MAY EXIST.
SURVEYED BY: D.J. GRANT DATE: AUG 23, 1983
SHORE OUTLINE FROM AIR PHOTO BC 7327-121 (JULY 1971)
STATISTICS AT TIME OF SURVEY
1. ELEVATION 695 m
2. SURFACE AREA 1,583,000 sq m
3. AREA ABOVE 6 m CONTOUR 744,000 sq m
4. VOLUME 12,955,000 cu m
5. MEAN DEPTH 8.2 m
6. MAX DEPTH 25 m
7. PERIMETER, MAIN SHORE 14,800 m
8. PERIMETER, ISLANDS 760 m
9. HEIGHT OF BENCH MARK ABOVE WATER LEVEL 2 m
WATER MANAGEMENT BRANCH
MINISTRY OF THE ENVIRONMENT
INVENTORY OPERATIONS UNIT
DINA LAKE
DEPTHS IN METRES
SCALE 1:4,000
N.T.S. No. 930/11

APPENDIX 2

Stowaway daily mean water temperatures

Mean Daily Temperatures, Summer of 2001						
Date	**Dina Creek Temperature (°C)**	**Dina Lake 1m Temperature (°C)**	**Dina Lake 5m Temperature (°C)**	**Dina Lake 10m Temperature (°C)**	**Dina Lake 15m Temperature (°C)**	**Dina Lake 20m Temperature (°C)**
May-19	7.8	6.5	6.4	5.1	4.2	data
May-20	8.1	7.0	6.6	5.0	4.2	logger
May-21	9.3	7.4	6.8	5.2	4.2	was
May-22	10.4	8.1	7.3	4.9	4.2	moved
May-23	11.1	8.7	7.3	5.3	4.4	by
May-24	12.1	9.7	8.1	5.1	4.3	an
May-25	11.1	10.4	7.7	5.4	4.4	angler
May-26	11.4	10.2	8.1	5.4	4.4	to
May-27	12.4	10.5	8.9	5.4	4.6	shallower
May-28	12.2	10.9	8.9	5.5	4.5	water
May-29	11.4	10.8	9.4	5.4	4.5	
May-30	11.3	11.1	9.2	5.5	4.6	
May-31	12.4	11.6	9.5	5.5	4.6	
Jun-01	12.4	11.7	9.7	5.6	4.6	
Jun-02	12.0	11.6	9.5	5.5	4.6	
Jun-03	11.6	11.7	10.0	5.6	4.6	
Jun-04	12.2	12.0	10.2	5.7	4.6	
Jun-05	13.0	12.0	11.1	5.7	4.7	
Jun-06	12.7	12.5	11.0	5.7	4.7	4.5
Jun-07	13.4	13.2	11.4	5.8	4.8	4.4
Jun-08	13.6	14.2	11.7	5.8	4.7	4.5
Jun-09	13.4	14.5	11.6	5.9	4.8	4.5
Jun-10	12.0	13.7	11.7	5.8	4.8	4.5
Jun-11	11.0	13.1	11.9	5.8	4.8	4.5
Jun-12	11.8	13.2	12.3	5.9	4.8	4.5
Jun-13	13.7	14.0	12.1	6.0	4.8	4.5
Jun-14	13.1	14.1	12.3	6.0	4.9	4.5
Jun-15	12.7	13.9	12.4	6.0	4.8	4.5
Jun-16	12.8	14.0	12.6	6.1	4.8	4.5
Jun-17	12.9	14.1	12.8	6.1	4.9	4.5
Jun-18	14.1	14.7	13.1	6.2	4.9	4.6
Jun-19	15.0	15.4	13.2	6.3	5.0	4.5
Jun-20	14.5	16.0	13.4	6.3	4.9	4.6
Jun-21	14.6	15.9	13.5	6.3	5.0	4.6
Jun-22	14.6	16.1	14.3	6.3	5.0	4.6
Jun-23	14.0	16.0	14.4	6.5	5.0	4.6
Jun-24	13.4	15.7	14.3	6.5	5.0	4.6
Jun-25	12.9	15.3	14.5	6.5	5.0	4.7
Jun-26	13.5	15.4	14.6	6.7	5.0	4.7

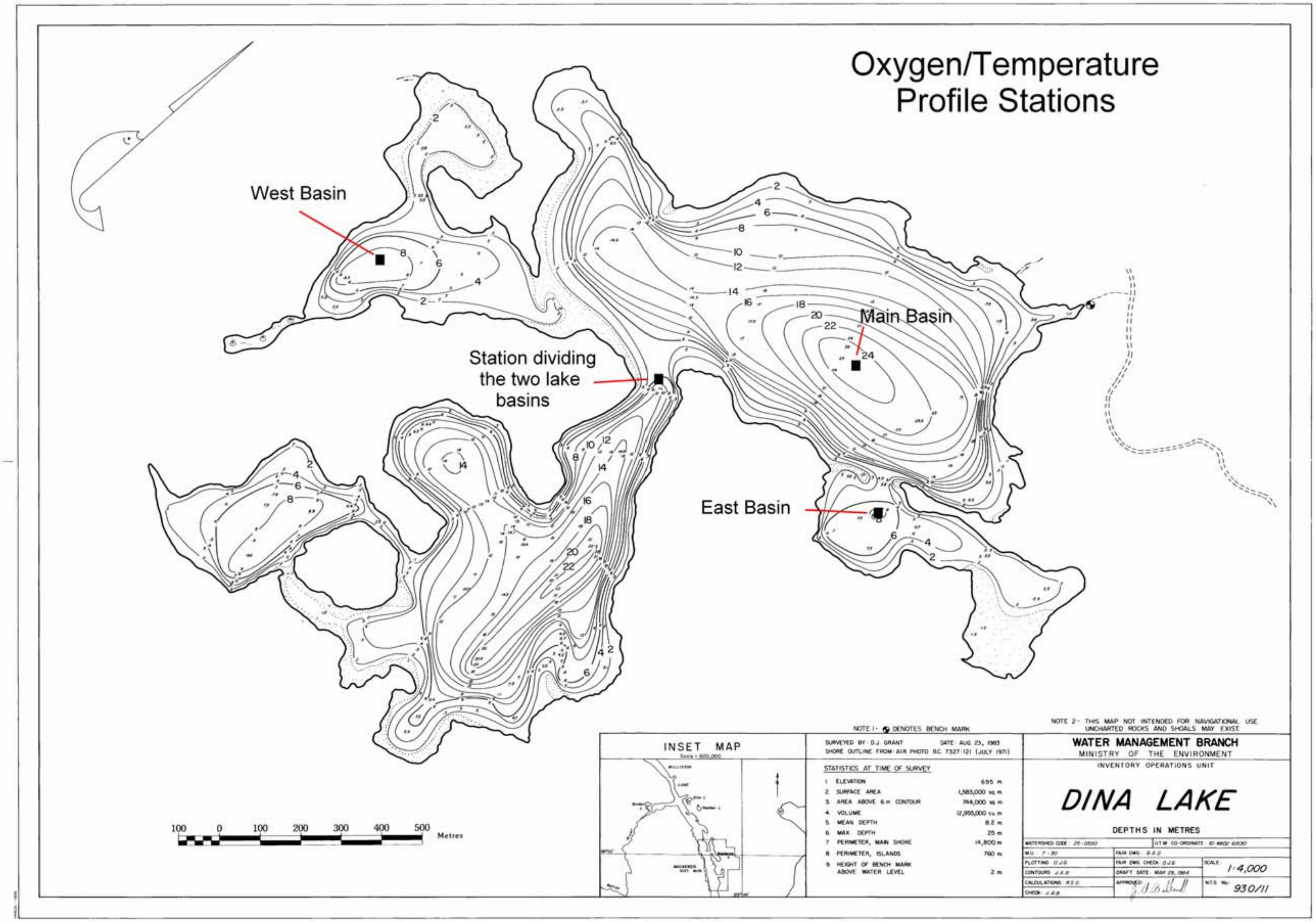
Date	Dina Creek Temperature (°C)	Dina Lake 1m Temperature (°C)	Dina Lake 5m Temperature (°C)	Dina Lake 10m Temperature (°C)	Dina Lake 15m Temperature (°C)	Dina Lake 20m Temperature (°C)
Jun-27	14.0	14.9	14.0	6.7	5.1	4.7
Jun-28	13.8	14.9	14.3	6.7	5.1	4.7
Jun-29	14.3	15.2	14.3	6.7	5.2	4.7
Jun-30	14.4	15.5	14.5	6.8	5.2	4.8
Jul-01	14.8	15.7	14.6	6.8	5.2	4.8
Jul-02	14.8	16.0	15.0	6.9	5.2	4.8
Jul-03	15.4	16.5	15.2	6.9	5.2	4.8
Jul-04	16.0	17.0	15.5	7.0	5.3	4.8
Jul-05	14.9	16.7	15.8	7.1	5.3	4.9
Jul-06	14.3	16.3	16.0	7.2	5.4	4.8
Jul-07	14.4	16.2	16.0	7.2	5.3	4.9
Jul-08	15.0	16.4	16.1	7.3	5.3	4.9
Jul-09	15.6	16.7	16.1	7.4	5.4	4.8
Jul-10	15.4	16.6	16.2	7.4	5.4	4.8
Jul-11	14.8	16.5	16.3	7.4	5.4	4.8
Jul-12	14.9	16.7	16.5	7.5	5.4	4.9
Jul-13	15.9	17.2	16.8	7.6	5.4	4.9
Jul-14	16.4	17.7	16.7	7.7	5.5	4.9
Jul-15	15.7	17.9	17.1	7.8	5.5	4.9
Jul-16	15.3	17.8	17.2	7.8	5.6	4.9
Jul-17	15.4	17.7	17.3	7.9	5.5	5.0
Jul-18	15.7	17.4	17.3	7.9	5.6	5.0
Jul-19	15.9	17.4	17.3	7.9	5.6	5.0
Jul-20	16.2	17.5	17.3	8.0	5.6	4.9
Jul-21	16.9	17.9	17.4	8.0	5.6	5.0
Jul-22	17.9	18.7	17.6	8.0	5.7	5.0
Jul-23	17.9	19.0	17.7	8.0	5.7	5.0
Jul-24	17.3	19.0	17.9	8.1	5.7	5.0
Jul-25	17.2	19.0	18.1	8.1	5.8	5.0
Jul-26	16.9	19.1	18.3	8.2	5.8	5.0
Jul-27	16.5	18.9	18.4	8.3	5.8	5.0
Jul-28	16.2	18.7	18.6	8.4	5.9	5.0
Jul-29	16.3	18.7	18.5	8.4	5.9	5.0
Jul-30	16.8	18.8	18.6	8.4	5.9	5.1
Jul-31	16.4	18.8	18.6	8.5	6.0	5.1
Aug-01	15.7	18.6	18.5	8.5	5.9	5.1
Aug-02	15.7	18.5	18.4	8.6	6.0	5.1
Aug-03	15.6	18.3	18.3	8.6	5.9	5.1
Aug-04	15.2	18.1	18.1	8.6	6.0	5.1
Aug-05	14.9	17.9	17.8	8.7	6.0	5.1
Aug-06	15.2	17.8	17.8	8.7	6.0	5.1
Aug-07	14.6	17.7	17.6	8.8	6.1	5.1
Aug-08	14.9	17.8	17.6	8.8	6.1	5.1
Aug-09	15.4	18.1	17.7	8.9	6.1	5.1
Aug-10	15.7	18.5	17.9	8.9	6.2	5.1
Aug-11	16.1	18.9	18.1	9.0	6.2	5.1

Date	Dina Creek Temperature (°C)	Dina Lake 1m Temperature (°C)	Dina Lake 5m Temperature (°C)	Dina Lake 10m Temperature (°C)	Dina Lake 15m Temperature (°C)	Dina Lake 20m Temperature (°C)
Aug-12	16.1	19.1	18.3	9.1	6.2	5.2
Aug-13	16.6	19.5	18.5	9.1	6.3	5.2
Aug-14	16.7	19.8	18.7	9.2	6.3	5.2
Aug-15	16.4	20.1	18.9	9.3	6.3	5.2
Aug-16	16.2	20.3	19.1	9.4	6.4	5.2
Aug-17	16.4	20.4	19.3	9.5	6.4	5.2
Aug-18	16.0	20.1	19.4	9.5	6.4	5.2
Aug-19	15.1	19.6	19.4	9.5	6.5	5.2
Aug-20	14.1	19.1	19.1	9.5	6.5	5.3
Aug-21	13.8	18.7	18.7	9.6	6.5	5.3
Aug-22	14.3	18.5	18.5	9.6	6.5	5.3
Aug-23	15.2	18.3	18.3	9.6	6.5	5.3
Aug-24	14.4	17.9	18.0	9.7	6.5	5.3
Aug-25	13.8	17.7	17.7	9.7	6.5	5.3
Aug-26	14.6	17.6	17.5	9.8	6.6	5.3
Aug-27	14.9	17.5	17.5	9.8	6.5	5.3
Aug-28	14.3	17.6	17.5	9.9	6.6	5.3
Aug-29	13.8	17.6	17.5	9.9	6.6	5.3
Aug-30	13.8	17.7	17.6	10.0	6.6	5.3
Aug-31	14.6	17.7	17.6	10.0	6.7	5.3
Sep-01	14.2	17.5	17.5	10.1	6.7	5.3
Sep-02	13.3	17.1	17.1	10.1	6.9	5.3
Sep-03	12.6	16.6	16.7	10.1	7.0	5.3
Sep-04	12.0	16.3	16.3	10.2	7.0	5.3
Sep-05	11.3	15.9	16.0	10.1	7.0	5.3
Sep-06	11.4	15.6	15.7	10.2	7.1	5.3
Sep-07	10.7	15.4	15.5	10.3	7.1	5.3
Sep-08	10.8	15.2	15.2	10.2	7.1	5.3
Sep-09	9.9	14.9	14.9	10.4	7.1	5.3
Sep-10	9.6	14.6	14.6	10.4	7.1	5.3
Sep-11	9.1	14.3	14.3	10.4	7.2	5.3
Sep-12	9.2	14.1	14.1	10.5	7.1	5.3
Sep-13	9.6	14.2	14.0	10.8	7.1	5.3
Sep-14	10.2	14.3	14.1	10.8	7.2	5.4
Sep-15	10.6	14.5	14.2	10.9	7.2	5.3
Sep-16	10.8	14.7	14.3	11.0	7.2	5.3
Sep-17	10.8	14.8	14.3	11.1	7.2	5.3
Sep-18	11.2	14.6	14.4	11.2	7.2	5.3
Sep-19	10.3	14.2	14.2	11.3	7.2	5.3
Sep-20	9.7	14.0	14.0	11.3	7.2	5.4
Sep-21	9.7	14.0	13.9	11.4	7.3	5.4
Sep-22	10.8	13.9	13.8	11.4	7.3	5.4
Sep-23	11.7	13.9	13.8	11.5	7.3	5.4
Sep-24	10.9	13.8	13.7	11.8	7.3	5.4
Sep-25	10.7	13.9	13.7	11.7	7.4	5.4
Sep-26	11.2	13.7	13.7	11.8	7.3	5.4

Date	Dina Creek Temperature (°C)	Dina Lake 1m Temperature (°C)	Dina Lake 5m Temperature (°C)	Dina Lake 10m Temperature (°C)	Dina Lake 15m Temperature (°C)	Dina Lake 20m Temperature (°C)
Sep-27	10.4	13.5	13.5	11.9	7.4	5.4
Sep-28	9.1	13.2	13.2	12.1	7.3	5.4
Sep-29	8.6	12.9	12.9	12.1	7.4	5.4
Sep-30	7.9	12.6	12.6	12.1	7.4	5.4
Oct-01	7.4	12.4	12.4	12.1	7.4	5.4
Oct-02	6.9	12.1	12.1	11.9	7.4	5.4
Oct-03	6.6	11.9	12.0	11.8	7.4	5.4
Oct-04	6.0	11.6	11.7	11.5	7.4	5.4
Oct-05	5.7	11.4	11.5	11.3	7.4	5.4
Oct-06	5.8	11.2	11.3	11.1	7.5	5.4
Oct-07	6.0	11.0	11.1	10.9	7.4	5.4
Oct-08	6.3	10.8	10.9	10.8	7.4	5.4
Oct-09	6.3	10.5	10.6	10.6	7.4	5.4
Oct-10	6.2	10.2	10.3	10.2	7.5	5.4
Oct-11	6.0	10.0	10.1	10.0	7.6	5.4
Oct-12	5.9	9.7	9.7	9.7	8.2	5.4
Oct-13	5.4	9.4	9.5	9.4	8.2	5.5
Oct-14	4.4	9.2	9.3	9.2	8.3	5.5
Oct-15	3.6	9.0	9.0	8.9	8.3	5.4
Oct-16	3.8	8.7	8.7	8.6	8.3	5.4
Oct-17	4.0	8.5	8.6	8.5	8.2	5.5
Oct-18	4.4	8.3	8.2	8.2	8.0	5.4
Oct-19	4.7	8.2	8.2	8.1	8.0	5.5
Oct-20	4.3	8.0	8.0	7.9	7.8	5.5
Oct-21	4.2	7.8	7.8	7.8	7.7	5.6
Oct-22	4.0	7.6	7.6	7.6	7.6	5.6
Oct-23	3.8	7.4	7.5	7.4	7.4	5.7
Oct-24	3.4	7.2	7.1	7.1	7.1	5.8
Oct-25	3.2	7.0	7.0	6.9	6.8	5.9

APPENDIX 3

Location of Oxygen/Temperature Profile Stations


Oxygen/Temperature
Profile Stations
West Basin
Main Basin
Station dividing the two lake basins
East Basin
100 0 100 200 300 400 500 Metres
INSET MAP
NOTE 1- DENOTES BENCH MARK
NOTE 2- THIS MAP NOT INTENDED FOR NAVIGATIONAL USE
UNCHARTED ROCKS AND SHOALS MAY EXIST
SURVEYED BY: D.J. GRANT DATE: AUG. 23, 1983
SHORE OUTLINE FROM AIR PHOTO B.C. 7327:121 (JULY 1971)
STATISTICS AT TIME OF SURVEY
1. ELEVATION 695 m.
2. SURFACE AREA 1,583,000 sq. m.
3. AREA ABOVE 6 m. CONTOUR 764,000 sq. m.
4. VOLUME 12,955,000 cu. m.
5. MEAN DEPTH 8.2 m.
6. MAX. DEPTH 25 m.
7. PERIMETER, MAIN SHORE 14,800 m.
8. PERIMETER, ISLANDS 760 m.
9. HEIGHT OF BENCH MARK ABOVE WATER LEVEL 2 m.
WATER MANAGEMENT BRANCH
MINISTRY OF THE ENVIRONMENT
INVENTORY OPERATIONS UNIT
DINA LAKE
DEPTHS IN METRES
SCALE 1:4,000
N.T.S. No. 93O/11

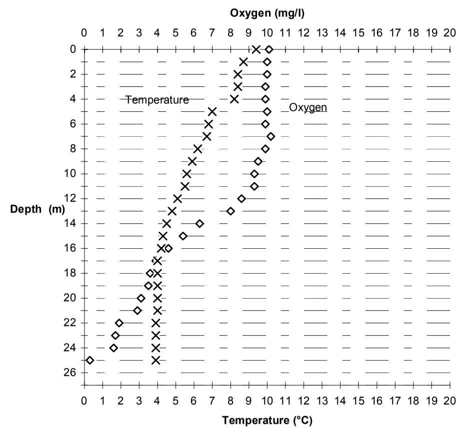
APPENDIX 4

Oxygen/Temperature Profiles

(4 stations)

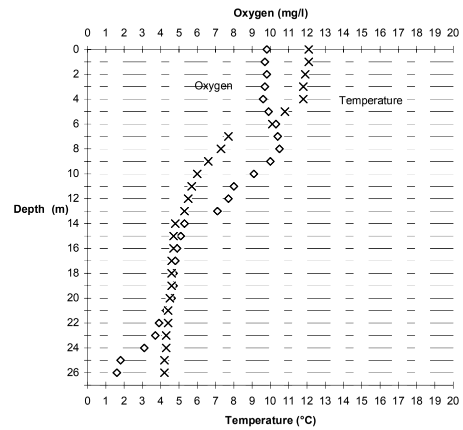
Main Basin Oxygen/Temperature Profiles

Dina Lake #1
May 23, 2001 Main Basin



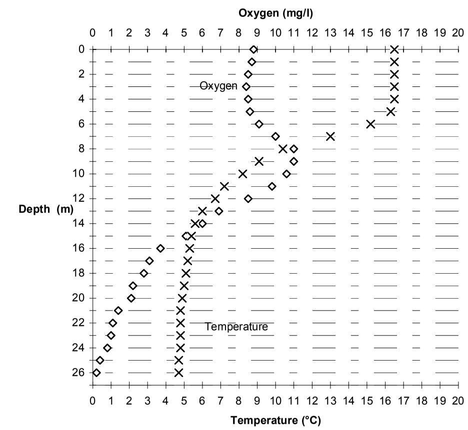
Maximum Depth = 26.0 m

Dina Lake #1
June 5, 2001 Main Basin



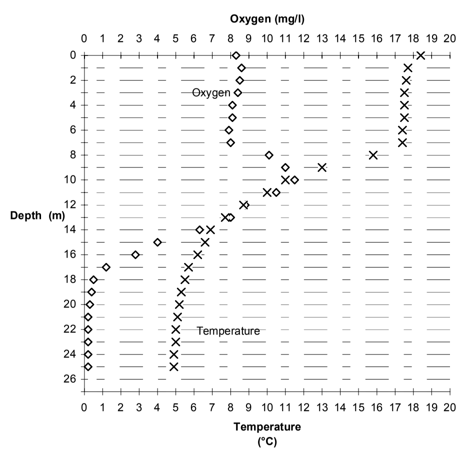
Maximum Depth = 27.0 m

Dina Lake #1
July 10, 2001 Main Basin



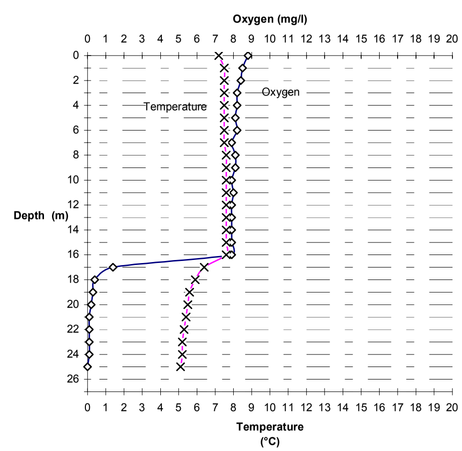
Maximum Depth = 27.0 m

Dina Lake #1
August 28, 2001 Main Basin



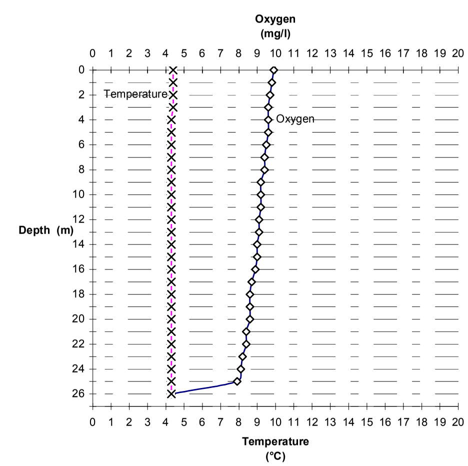
Maximum Depth = 26.0 m

Dina Lake #1
October 23, 2001 Main Basin



Maximum Depth = 26.0 m

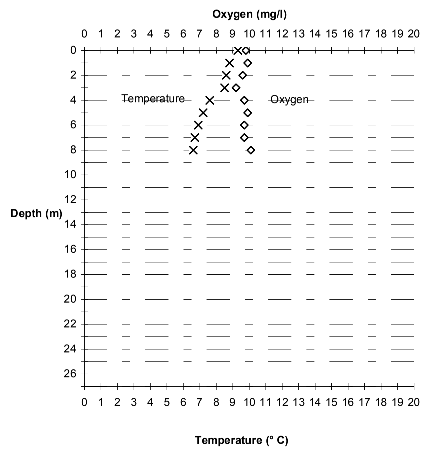
Dina Lake #1
November 15, 2001 Main Basin



Maximum Depth = 27.0 m

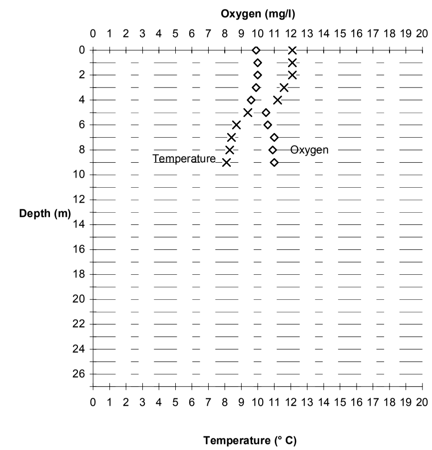
East Basin Oxygen/Temperature Profiles

Dina Lake #1
May 23, 2001 East Basin



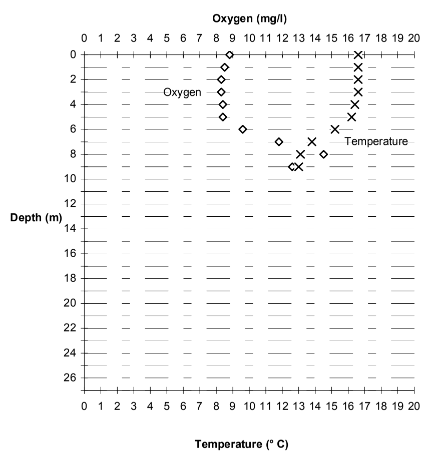
Maximum Depth = 9.0 m

Dina Lake #1
June 5, 2001 East Basin



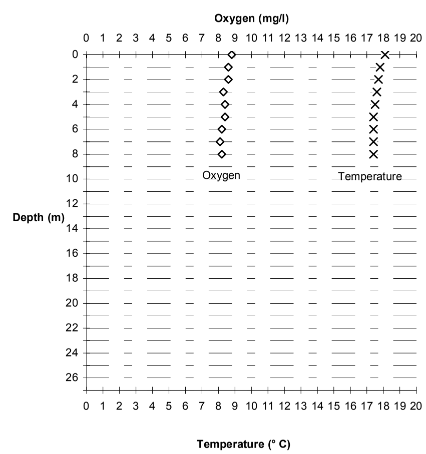
Maximum Depth = 9.3 m

Dina Lake #1
July 10, 2001 East Basin



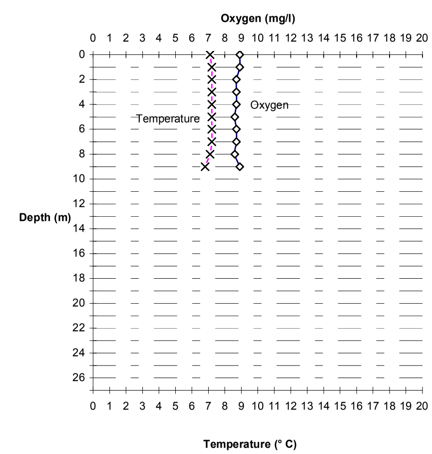
Maximum Depth = 9.6 m

Dina Lake #1
August 28, 2001 East Basin



Maximum Depth = 9.0 m

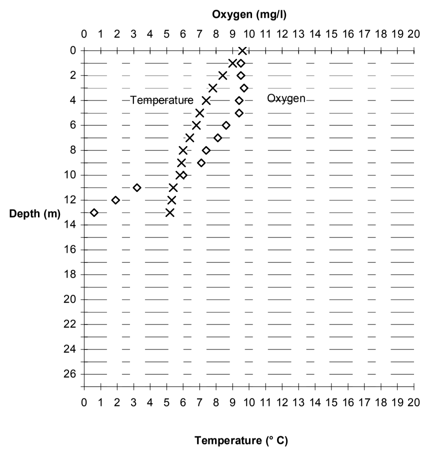
Dina Lake #1
October 23, 2001 East Basin



Maximum Depth = 9.3 m

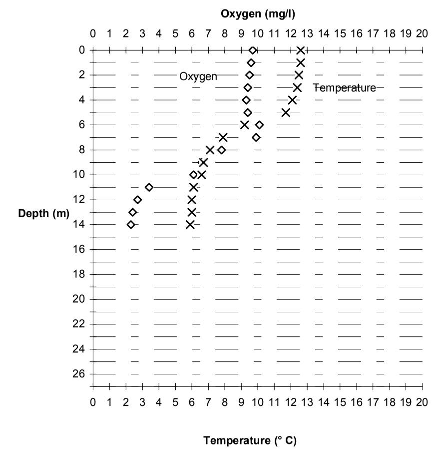
West Basin Oxygen/Temperature Profiles

Dina Lake #1
May 23, 2001 West Basin



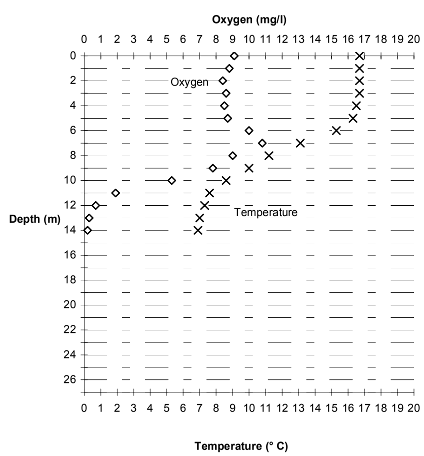
Maximum Depth = 14.0 m

Dina Lake #1
June 5, 2001 West Basin



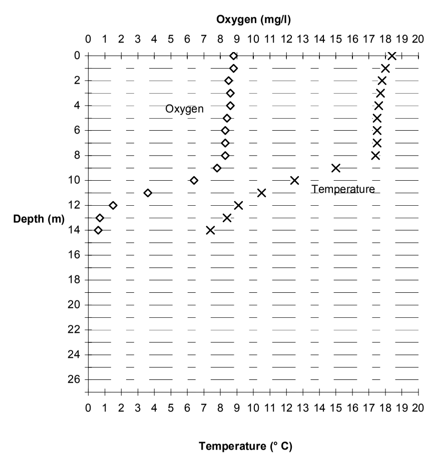
Maximum Depth = 15.0 m

Dina Lake #1
July 10, 2001 West Basin



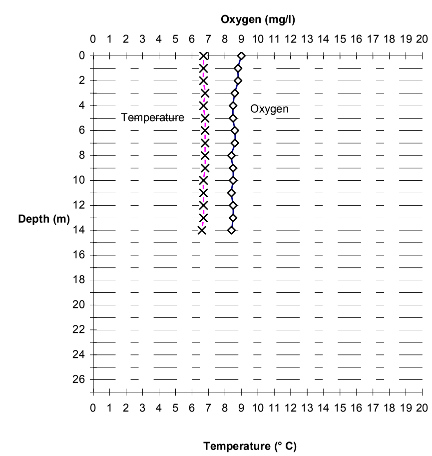
Maximum Depth = 15.0 m

Dina Lake #1
August 28, 2001 West Basin



Maximum Depth = 15.0 m

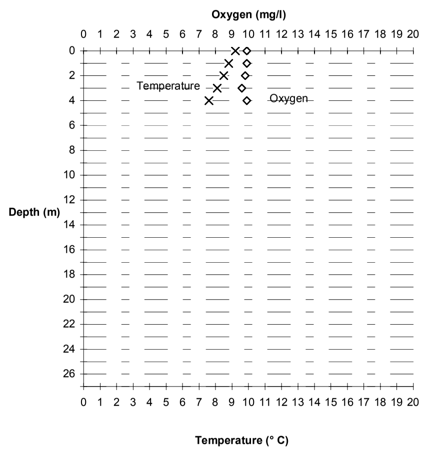
Dina Lake #1
October 23, 2001 West Basin



Maximum Depth = 15.0 m

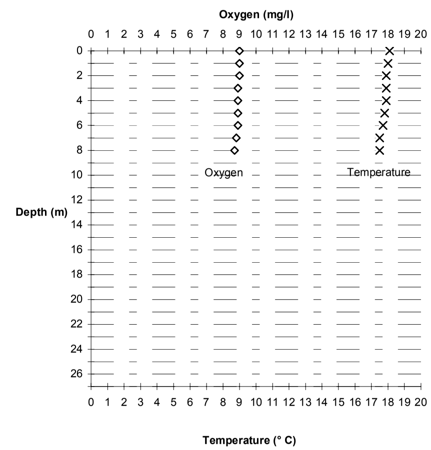
Station between the two large basins
Oxygen/Temperature Profile

Dina Lake #1 - May 23, 2001
Between two large basins



Maximum Depth = 4.5 m

Dina Lake #1 - August 30, 2001
Between two large basins



Maximum Depth = 7.9 m

APPENDIX 5

Zooplankton Results

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010606 CODE: 010606
STN: D4 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	1	40.76	607.18	5.677	0.231
13	Eub.l-noe	0.031250	5	203.82	505.68	3.255	0.664
27	D.gal-neg	0.031250	4	163.06	799.34	8.867	1.446
35	D.lon-f&e	0.031250	2	81.53	842.30	9.060	0.739
37	D.lon-neg	0.031250	8	326.11	645.73	4.972	1.622
50	Ep.nev-ad	0.031250	1	40.76	1,913.11	15.034	0.613
63	D.pri-cop	0.031250	543	22,135.03	729.18	1.439	31.842
76	-nauplii-	0.031250	106	4,321.02	279.01	1.095	4.730
80	C.bt---ad	0.031250	16	652.23	903.71	2.678	1.747
83	C.bt--cop	0.031250	87	3,546.50	566.99	0.890	3.156
85	C.scu--ad	0.031250	129	5,258.60	1,190.51	5.485	28.843
88	C.scu-cop	0.031250	51	2,078.98	992.79	3.434	7.139
			953	38,848.41			82.769

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010606 CODE: 010606
STN: D8 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	2	163.06	319.77	0.568	0.093
27	D.gal-neg	0.015625	4	326.11	556.31	3.200	1.043
37	D.lon-neg	0.015625	2	163.06	651.14	4.732	0.772
68	Di.pr-cop	0.015625	41	3,342.68	690.28	1.195	3.994
75	Harpactoid	0.015625	3	244.59	363.86	0.243	0.059
76	-nauplii-	0.015625	170	13,859.87	304.00	1.143	15.838
86	C.scu----	0.015625	125	10,191.08	1,184.22	5.573	56.793
88	C.scu-cop	0.015625	343	27,964.33	1,020.64	3.675	102.757
			690	56,254.78			181.350

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010606 CODE: 010606
STN: D12 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator:DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
13	Eub.l-noe	0.015625	2	163.06	426.16	1.593	0.260
37	D.lon-neg	0.015625	3	244.59	725.06	6.205	1.518
53	Ep.ne-cop	0.015625	3	244.59	591.25	1.076	0.263
63	D.pri-cop	0.015625	18	1,467.52	715.79	1.325	1.944
76	-nauplii-	0.015625	99	8,071.34	314.35	1.160	9.365
80	C.bt---ad	0.015625	2	163.06	956.63	3.042	0.496
85	C.scu--ad	0.015625	154	12,555.41	1,176.36	5.371	67.439
88	C.scu-cop	0.015625	699	56,988.54	935.17	3.109	177.189
			980	79,898.09			258.473

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010606 CODE: 010606
STN: D16 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
25	D.gal-f&e	0.062500	1	20.38	1,149.49	19.958	0.407
37	D.lon-neg	0.062500	2	40.76	800.26	8.121	0.331
63	D.pri-cop	0.062500	20	407.64	645.66	1.011	0.412
76	-nauplii-	0.062500	20	407.64	292.52	1.122	0.457
80	C.bt---ad	0.062500	2	40.76	962.91	3.096	0.126
85	C.scu--ad	0.062500	292	5,951.59	1,221.15	5.924	35.256
88	C.scu-cop	0.031250	839	34,201.27	905.27	2.818	96.363
			1,176	41,070.06			133.352

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk　　SAMPLE DATE: 010606　　CODE: 010606
STN: D20　　COUNT DATE:　　VOLUME (L): 785.00
GEAR TYPE: Wisconsin　　MESH (um): 64　　MOUTH DIA (m): 0.500
DISTANCE (m): 4.0　　Enumerator: DD
INT COUNTS: 0　　COUNTS/m: 0.000
EXT NET COUNT: 0　　CORRECTION: 1.000　　Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
13	Eub.l-noe	0.062500	1	20.38	418.59	1.494	0.030
27	D.gal-neg	0.062500	2	40.76	864.67	9.684	0.395
37	D.lon-neg	0.062500	3	61.15	648.35	4.982	0.305
63	D.pri-cop	0.062500	30	611.46	681.83	1.206	0.737
76	-nauplii-	0.062500	94	1,915.92	291.05	1.123	2.151
80	C.bt---ad	0.062500	4	81.53	858.96	2.331	0.190
83	C.bt--cop	0.062500	2	40.76	697.04	1.320	0.054
85	C.scu--ad	0.031250	100	4,076.43	1,178.14	5.377	21,921
88	C.scu-cop	0.031250	693	28,249.68	942.52	3.108	87.799
			929	35,098.09			113.582

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk　　SAMPLE DATE: 010606　　CODE: 010606
STN: D24　　COUNT DATE:　　VOLUME (L): 785.00
GEAR TYPE: Wisconsin　　MESH (um): 64　　MOUTH DIA (m): 0.500
DISTANCE (m): 4.0　　Enumerator: DD
INT COUNTS: 0　　COUNTS/m: 0.000
EXT NET COUNT: 0　　CORRECTION: 1.000　　Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	1	40.76	507.55	2.983	0.122
25	D.gal-f&e	0.031250	2	81.53	1,064.54	16.422	1.339
37	D.lon-neg	0.031250	4	163.06	735.72	7.522	1.226
63	D.pri-cop	0.031250	16	652.23	719.36	1.326	0.865
76	-nauplii-	0.031250	88	3,587.26	322.37	1.174	4.213
80	C.bt---ad	0.031250	3	122.29	947.28	3.023	0.370
83	C.bt--cop	0.031250	2	81.53	667.82	1.187	0.097
85	C.scu--ad	0.031250	155	6,318.47	1,140.23	4.971	31.412
88	C.scu-cop	0.015625	778	63,429.30	861.50	2.454	155.663
			%1049	74,476.44			195.306

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010607 CODE: 010607
STN: N4 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	2	163.06	569.61	4.612	0.752
13	Eub.l-noe	0.015625	3	244.59	361.49	0.904	0.221
25	D.gal-f&e	0.015625	8	652.23	1,148.95	20.019	13.057
37	D.lon-neg	0.015625	2	163.06	642.36	4.553	0.742
63	D.pri-cop	0.015625	326	26,578.34	741.78	1.433	38.094
76	-nauplii-	0.015625	99	8,071.34	317.85	1.164	9.396
80	C.bt---ad	0.015625	1	81.53	1,084.95	4.241	0.346
85	C.scu--ad	0.015625	239	19,485.35	1,194.43	5.582	108.762
88	C.scu-cop	0.015625	222	18,099.36	637.64	1.428	25.837
			902	73,538.84			197.207

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010607 CODE: 010607
STN: N8 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
13	Eub.l-noe	0.015625	1	81.53	306.61	0.488	0.040
27	D.gal-neg	0.015625	2	163.06	863.73	10.531	1.717
63	D.pri-cop	0.015625	29	2,364.33	643.57	1.043	2.466
76	-nauplii-	0.015625	241	19,648.41	297.84	1.133	22.270
85	C.scu--ad	0.015625	228	18,588.54	1,188.13	5.466	101.609
88	C.scu-cop	0.015625	429	34,975.80	745.42	1.947	68.083
			930	75,821.66			196.185

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010607 CODE: 010607
STN: N12 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
37	D.lon-neg	0.015625	1	81.53	705.91	5.784	0.472
63	D.pri-cop	0.015625	14	1,141.40	757.18	1.532	1.749
76	-nauplii-	0.015625	58	4,728.66	267.71	1.075	5.084
85	C.scu--ad	0.015625	144	11,740.13	1,151.07	5.081	59.652
88	C.scu-cop	0.015625	555	45,248.41	902.84	2.712	122.735
			772	62,940.13			189.691

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010607 CODE: 010607
STN: N16 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
13	Eub.l-noe	0.015625	1	81.53	342.64	0.728	0.059
37	D.lon-neg	0.015625	2	163.06	683.77	5.812	0.948
63	D.pri-cop	0.015625	6	489.17	871.11	2.037	0.997
76	-nauplii-	0.015625	24	1,956.69	262.96	1.067	2.087
85	C.scu--ad	0.015625	120	9,783.44	1,171.50	5.260	51.460
88	C.scu-cop	0.015625	688	56,091.72	927.95	3.044	170.730
			841	68,565.60			226.280

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk | SAMPLE DATE: 010607 | CODE: 010607
STN: N20 | COUNT DATE: | VOLUME (L): 785.00
GEAR TYPE: Wisconsin | MESH (um): 64 | MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 | Enumerator: DD
INT COUNTS: 0 | COUNTS/m: 0.000
EXT NET COUNT: 0 | CORRECTION: 1.000 | Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
13	Eub.l-noe	0.031250	1	40.76	460.15	2.098	0.086
63	D.pri-cop	0.031250	22	896.82	696.83	1.231	1.104
76	-nauplii-	0.031250	30	1,222.93	292.47	1.117	1.366
80	C.bt---ad	0.031250	2	81.53	829.72	2.090	0.170
85	C.scu--ad	0.031250	117	4,769.43	1,206.09	5.701	27.190
88	C.scu-cop	0.031250	582	23,724.84	879.26	2.657	63.042
			754	30,736.30			92.958

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk | SAMPLE DATE: 010607 | CODE: 010607
STN: N24 | COUNT DATE: | VOLUME (L): 785.00
GEAR TYPE: Wisconsin | MESH (um): 64 | MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 | Enumerator: DD
INT COUNTS: 0 | COUNTS/m: 0.000
EXT NET COUNT: 0 | CORRECTION: 1.000 | Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
35	D.lon-f&e	0.031250	3	122.29	1,137.41	19.487	2.383
37	D.lon-neg	0.031250	1	40.76	506.13	2.485	0.101
63	D.pri-cop	0.031250	15	611.46	738.54	1.414	0.865
76	-nauplii-	0.031250	23	937.58	296.70	1.131	1.060
80	C.bt---ad	0.031250	2	81.53	984.45	3.285	0.268
83	C.bt--cop	0.031250	4	163.06	732.34	1.542	0.251
85	C.scu--ad	0.031250	116	4,728.66	1,183.69	5.427	25.665
88	C.scu-cop	0.031250	624	25,436.94	1,019.20	3.712	94.411
			788	32,122.29			125.005

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010711 CODE: 010711
STN: D4 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	12	978.34	549.47	4.165	4.075
13	Eub.l-noe	0.015625	35	2,853.50	458.86	2.560	7.306
16	Lept.kind	0.250000	1	5.10	4,855.47	29.901	0.152
25	D.gal-f&e	0.015625	4	326.11	1,217.37	23.288	7.595
27	D.gal-neg	0.015625	34	2,771.97	754.39	7.270	20.152
37	D.lon-neg	0.015625	1	81.53	589.01	3.652	0.298
50	Ep.nev-ad	0.250000	2	10.19	2,381.46	24.668	0.251
53	Ep.ne-cop	0.015625	2	163.06	1,261.61	5.950	0.970
63	D.pri-cop	0.015625	50	4,076.43	1,044.04	3.372	13.747
65	Di.pr--ad	0.015625	1	81.53	1,383.51	6.356	0.518
76	-nauplii-	0.015625	9	733.76	167.56	0.858	0.629
80	C.bt---ad	0.015625	26	2,119.75	966.63	3.163	6.704
83	C.bt--cop	0.015625	26	2,119.75	691.23	1.394	2.956
85	C.scu--ad	0.015625	34	2,771.97	1,249.54	6.201	17.189
88	C.scu-cop	0.015625	1	81.53	879.76	2.439	0.199
			238	19,174.52			82.741

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010711 CODE: 010711
STN: D8 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	3	244.59	462.39	2.198	0.538
13	Eub.l-noe	0.015625	12	978.34	450.93	2.161	2.115
16	Lept.kind	0.250000	1	5.10	2,593.88	5.607	0.029
25	D.gal-f&e	0.015625	18	1,467.52	1,208.36	22.852	33.535
27	D.gal-neg	0.015625	188	15,327.39	842.80	9.424	144.447
35	D.lon-f&e	0.015625	20	1,630.57	966.41	13.049	21.277
37	D.lon-neg	0.015625	38	3,098.09	615.55	4.276	13.246
63	D.pri-cop	0.015625	116	9,457.33	1,117.24	3.803	35.965
76	-nauplii-	0.015625	35	2,853.50	255.16	1.044	2.980
80	C.bt---ad	0.015625	12	978.34	969.25	3.175	3.106
83	C.bt--cop	0.015625	49	3,994.90	589.10	0.984	3.931
85	C.scu--ad	0.015625	71	5,788.54	1,168.64	5.224	30.237
88	C.scu-cop	0.015625	29	2,364.33	1,050.98	3.915	9.257
			592	48,188.54			300.664

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010711 CODE: 010711
STN: D12 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	9	733.76	482.78	2.563	1.881
13	Eub.l-noe	0.015625	34	2,771.97	409.07	1.535	4.256
16	Lept.kind	0.015625	1	81.53	2,076.94	3.097	0.253
25	D.gal-f&e	0.015625	7	570.70	1,178.73	21.982	12.545
27	D.gal-neg	0.015625	117	9,538.85	842.67	9.331	89.004
35	D.lon-f&e	0.015625	15	1,222.93	964.18	12.951	15.839
37	D.lon-neg	0.015625	50	4,076.43	696.66	5.735	23.376
63	D.pri-cop	0.015625	37	3,016.56	947.76	2.770	8.357
76	-nauplii-	0.015625	704	57,396.18	175.53	0.882	50.621
80	C.bt---ad	0.015625	8	652.23	1,046.60	3.857	2.516
83	C.bt--cop	0.015625	66	5,380.89	583.44	0.931	5.009
85	C.scu--ad	0.015625	56	4,565.60	1,213.98	5.787	26.420
88	C.scu-cop	0.015625	37	3,016.56	917.42	3.084	9.303
			%1141	93,024.20			249.379

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010711 CODE: 010711
STN: D16 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	2	163.06	475.97	2.378	0.388
13	Eub.l-noe	0.015625	10	815.29	471.57	2.755	2.246
25	D.gal-f&e	0.015625	1	81.53	1,026.91	14.988	1.222
27	D.gal-neg	0.015625	15	1,222.93	714.51	6.121	7.486
35	D.lon-f&e	0.015625	3	244.59	894.46	10.569	2.585
37	D.lon-neg	0.015625	10	815.29	699.82	5.970	4.867
63	D.pri-cop	0.031250	14	570.70	796.85	1.909	1.090
76	-nauplii-	0.007813	732	119,357.96	181.83	0.897	107.015
80	C.bt---ad	0.015625	10	815.29	1,540.40	32.418	26.430
83	C.bt--cop	0.015625	26	2,119.75	651.16	1.126	2.386
85	C.scu--ad	0.015625	19	1,549.04	1,100.15	4.500	6.970
88	C.scu-cop	0.015625	80	6,522.29	884.87	2.606	16.996
			922	134,277.70			179.681

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010711 CODE: 010711
STN: D20 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	1	81.53	554.93	4.110	0.335
13	Eub.l-noe	0.015625	3	244.59	394.92	1.240	0.303
27	D.gal-neg	0.015625	14	1,141.40	893.16	11.228	12.816
35	D.lon-f&e	0.015625	3	244.59	1,046.83	15.747	3.851
37	D.lon-neg	0.015625	4	326.11	640.11	4.709	1.536
63	D.pri-cop	0.015625	12	978.34	921.65	2.604	2.547
76	-nauplii-	0.015625	431	35,138.85	186.01	0.906	31.822
80	C.bt---ad	0.015625	6	489.17	868.45	2.357	1.153
83	C.bt--cop	0.015625	27	2,201.27	669.00	1.204	2.649
85	C.scu--ad	0.015625	50	4,076.43	1,150.49	5.022	20.473
88	C.scu-cop	0.015625	190	15,490.45	914.96	2.885	44.682
			741	60,412.73			122.168

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010711 CODE: 010711
STN: D24 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	2	163.06	450.93	1.970	0.321
13	Eub.l-noe	0.015625	9	733.76	382.61	1.180	0.866
25	D.gal-f&e	0.015625	1	81.53	1,477.17	37.739	3.077
27	D.gal-neg	0.015625	9	733.76	868.29	10.098	7.409
35	D.lon-f&e	0.015625	1	81.53	827.49	8.661	0.706
37	D.lon-neg	0.015625	13	1,059.87	676.13	5.750	6.094
63	D.pri-cop	0.015625	10	815.29	881.79	2.303	1.877
76	-nauplii-	0.015625	136	11,087.90	208.35	0.950	10.538
80	C.bt---ad	0.015625	4	326.11	831.97	2.108	0.688
83	C.bt--cop	0.015625	43	3,505.73	664.02	1.170	4.101
85	C.scu--ad	0.015625	99	8,071.34	1,130.33	4.771	38.506
88	C.scu-cop	0.015625	470	38,318.47	863.78	2.626	100.605
			797	64,978.34			174.790

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 010712   CODE: 010712
STN: N4   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.0
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	3	244.59	584.96	5.298	1.296
13	Eub.l-noe	0.015625	13	1,059.87	408.74	2.039	2.161
16	Lept.kind	0.250000	3	15.29	2,461.87	4.903	0.075
25	D.gal-f&e	0.015625	21	1,712.10	1,263.91	25.675	43.958
27	D.gal-neg	0.015625	131	10,680.25	754.83	7.701	82.252
35	D.lon-f&e	0.015625	2	163.06	1,074.38	17.138	2.795
37	D.lon-neg	0.015625	5	407.64	573.98	3.548	1.446
50	Ep.nev-ad	0.015625	1	81.53	2,188.75	20.379	1.661
53	Ep.ne-cop	0.250000	1	5.10	1,814.29	13.335	0.068
63	D.pri-cop	0.015625	12	978.34	876.37	2.318	2.268
75	Harpactoid	0.015625	2	163.06	840.26	1.866	0.304
76	-nauplii-	0.015625	4	326.11	208.28	0.954	0.311
80	C.bt---ad	0.015625	19	1,549.04	935.51	2.897	4.488
83	C.bt--cop	0.015625	52	4,239.49	708.77	1.490	6.316
85	C.scu--ad	0.015625	7	570.70	1,188.60	5.469	3.121
88	C.scu-cop	0.015625	3	244.59	867.87	2.402	0.587
			279	22,440.76			153.108

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 010712   CODE: 010712
STN: N8   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	24	1,956.69	553.97	4.273	8.361
13	Eub.l-noe	0.015625	46	3,750.32	472.20	2.712	10.170
25	D.gal-f&e	0.015625	26	2,119.75	1,270.34	26.321	55.793
27	D.gal-neg	0.015625	151	12,310.83	756.42	7.552	92.976
35	D.lon-f&e	0.015625	7	570.70	1,048.08	16.014	9.139
37	D.lon-neg	0.015625	42	3,424.20	619.42	4.316	14.778
63	D.pri-cop	0.015625	32	2,608.92	837.05	2.105	5.491
65	Di.pr--ad	0.015625	1	81.53	1,261.61	5.066	0.413
76	-nauplii-	0.015625	22	1,793.63	218.88	0.975	1.749
80	C.bt---ad	0.015625	3	244.59	901.92	2.628	0.643
83	C.bt--cop	0.015625	7	570.70	741.29	1.622	0.926
85	C.scu--ad	0.015625	40	3,261.15	1,196.13	5.547	18.090
88	C.scu-cop	0.015625	32	2,608.92	643.54	1.222	3.188
			433	35,301.91			221.716

ZOOPLANKTON BENCH SHEET

LAKE: Dina   SAMPLE DATE: 010712   CODE: 010712
STN: N12   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.007813	2	326.11	572.78	4.639	1.513
13	Eub.l-noe	0.007813	31	5,054.78	427.32	1.745	8.823
25	D.gal-f&e	0.007813	4	652.23	1,339.66	29.645	19.335
27	D.gal-neg	0.007813	82	13,370.70	804.03	8.666	115.875
35	D.lon-f&e	0.007813	4	652.23	940.83	12.084	7.881
37	D.lon-neg	0.007813	20	3,261.15	679.68	5.601	18.267
63	D.pri-cop	0.007813	45	7,337.58	1,023.78	3.179	23.327
76	-nauplii-	0.007813	272	44,351.59	194.18	0.922	40.877
80	C.bt---ad	0.007813	2	326.11	893.83	2.543	0.829
85	C.scu--ad	0.007813	12	1,956.69	1,178.04	5.306	10.382
88	C.scu-cop	0.007813	70	11,414.01	630.80	1.296	14.797
			544	88,703.19			261.907

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 010712   CODE: 010712
STN: N16   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.007813	1	163.06	484.47	2.524	0.412
13	Eub.l-noe	0.007813	7	1,141.40	439.23	2.001	2.284
25	D.gal-f&e	0.007813	1	163.06	1,179.88	21.326	3.477
27	D.gal-neg	0.007813	24	3,913.38	870.09	10.845	42.439
35	D.lon-f&e	0.007813	5	815.29	951.28	12.678	10.336
37	D.lon-neg	0.007813	17	2,771.97	750.56	7.467	20.699
63	D.pri-cop	0.007813	28	4,565.60	1,077.18	3.497	15.964
76	-nauplii-	0.003906	541	176,428.03	173.58	0.878	154.884
80	C.bt---ad	0.007813	2	326.11	893.55	2.585	0.843
83	C.bt--cop	0.007813	5	815.29	677.31	1.253	1.022
85	C.scu--ad	0.007813	23	3,750.32	1,198.63	5.575	20.907
88	C.scu-cop	0.007813	59	9,620.38	740.73	1.766	16.990
			713	204,473.86			290.256

ZOOPLANKTON BENCH SHEET

LAKE: Dina SAMPLE DATE: 010712 CODE: 010712
STN: N20 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	2	163.06	482.77	2.492	0.406
13	Eub.l-noe	0.015625	9	733.76	427.36	1.684	1.236
25	D.gal-f&e	0.015625	4	326.11	1,376.65	31.575	10.297
27	D.gal-neg	0.015625	24	1,956.69	803.06	8.816	17.249
35	D.lon-f&e	0.015625	4	326.11	1,079.81	17.229	5.619
37	D.lon-neg	0.015625	11	896.82	721.62	6.816	6.113
63	D.pri-cop	0.015625	25	2,038.22	968.36	2.879	5.869
65	Di.pr--ad	0.015625	1	81.53	1,372.65	6.234	0.508
76	-nauplii-	0.015625	516	42,068.79	177.57	0.885	37.248
80	C.bt---ad	0.015625	4	326.11	909.90	2.683	0.875
83	C.bt--cop	0.015625	10	815.29	681.86	1.255	1.024
85	C.scu--ad	0.015625	31	2,527.39	1,169.08	5.220	13.193
88	C.scu-cop	0.015625	155	12,636.94	799.99	2.065	26.100
			796	64,896.81			125.736

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010712 CODE: 010712
STN: N24 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	2	163.06	578.96	4.821	0.786
13	Eub.l-noe	0.015625	12	978.34	456.66	2.355	2.304
25	D.gal-f&e	0.015625	5	407.64	1,148.02	20.824	8.489
27	D.gal-neg	0.015625	34	2,771.97	758.41	7.707	21.363
35	D.lon-f&e	0.015625	6	489.17	939.73	12.086	5.912
37	D.lon-neg	0.015625	19	1,549.04	727.08	6.844	10.601
63	D.pri-cop	0.015625	16	1,304.46	990.35	2.937	3.831
76	-nauplii-	0.015625	369	30,084.08	166.76	0.861	25.911
80	C.bt---ad	0.015625	2	163.06	982.28	3.271	0.533
83	C.bt--cop	0.015625	10	815.29	637.89	1.057	0.862
85	C.scu--ad	0.015625	27	2,201.27	1,171.17	5.244	11.543
88	C.scu-cop	0.015625	257	20,952.87	816.38	2.059	43.138
			759	61,880.25			135.273

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010829 CODE: 010829
STN: D4 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	3	244.59	596.51	5.403	1.321
13	Eub.l-noe	0.015625	14	1,141.40	449.02	2.086	2.381
25	D.gal-f&e	0.015625	9	733.76	1,373.87	32.106	23.558
27	D.gal-neg	0.015625	37	3,016.56	873.43	10.481	31.617
45	Diaph.leu	0.015625	4	326.11	656.44	1.071	0.349
50	Ep.nev-ad	0.500000	2	5.10	2,258.10	21.871	0.111
53	Ep.ne-cop	0.500000	5	12.74	1,396.44	8.551	0.109
63	D.pri-cop	0.015625	23	1,875.16	838.18	2.091	3.921
65	Di.pr--ad	0.015625	15	1,222.93	1,355.96	6.065	7.417
76	-nauplii-	0.015625	55	4,484.08	220.41	0.981	4.400
80	C.bt---ad	0.015625	15	1,222.93	920.77	2.782	3.403
83	C.bt--cop	0.015625	86	7,011.46	572.40	0.913	6.402
85	C.scu--ad	0.015625	1	81.53	1,044.94	3.841	0.313
			269	21,378.34			85.304

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010829 CODE: 010829
STN: D8 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	1	81.53	585.87	4.993	0.407
13	Eub.l-noe	0.015625	5	407.64	408.68	1.455	0.593
16	Lept.kind	0.500000	6	15.29	4,514.41	31.224	0.477
25	D.gal-f&e	0.015625	45	3,668.79	1,444.98	36.218	132.877
27	D.gal-neg	0.015625	119	9,701.91	1,109.96	21.559	209.165
53	Ep.ne-cop	0.015625	1	81.53	1,220.18	5.441	0.444
63	D.pri-cop	0.015625	20	1,630.57	957.33	2.789	4.547
65	Di.pr--ad	0.015625	31	2,527.39	1,281.15	5.288	13.366
75	Harpactoid	0.015625	1	81.53	726.09	1.301	0.106
76	-nauplii-	0.015625	170	13,859.87	181.67	0.896	12.420
80	C.bt---ad	0.015625	11	896.82	939.01	2.994	2.685
83	C.bt--cop	0.015625	99	8,071.34	623.20	1.096	8.842
85	C.scu--ad	0.015625	6	489.17	1,260.59	6.373	3.117
88	C.scu-cop	0.015625	1	81.53	725.16	1.464	0.119
			516	41,594.90			389.166

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 010829   CODE: 010829
STN: D12   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
16	Lept.kind	0.500000	5	12.74	5,445.38	44.319	0.565
25	D.gal-f&e	0.015625	10	815.29	1,364.31	31.292	25.512
27	D.gal-neg	0.015625	135	11,006.37	916.29	11.963	131.664
35	D.lon-f&e	0.015625	10	815.29	907.62	11.148	9.089
37	D.lon-neg	0.015625	35	2,853.50	582.01	3.844	10.968
63	D.pri-cop	0.015625	14	1,141.40	894.08	2.563	2.926
65	Di.pr--ad	0.015625	44	3,587.26	1,323.93	5.731	20.560
76	-nauplii-	0.007813	880	143,490.45	201.16	0.938	134.538
80	C.bt---ad	0.015625	16	1,304.46	1,004.00	3.478	4.537
83	C.bt--cop	0.015625	45	3,668.79	546.75	0.915	3.355
85	C.scu--ad	0.015625	13	1,059.87	1,187.48	5.434	5.759
88	C.scu-cop	0.015625	12	978.34	787.66	1.950	1.908
			1,219	170,733.77			351.381

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 010829   CODE: 010829
STN: D16   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	13	1,059.87	554.65	4.229	4.482
13	Eub.l-noe	0.015625	60	4,891.72	530.11	3.682	18.014
25	D.gal-f&e	0.015625	4	326.11	1,328.92	28.959	9.444
27	D.gal-neg	0.015625	120	9,783.44	984.61	14.488	141.740
35	D.lon-f&e	0.015625	18	1,467.52	887.47	10.729	15.745
37	D.lon-neg	0.015625	90	7,337.58	718.06	6.592	48.372
63	D.pri-cop	0.015625	6	489.17	786.26	2.039	0.997
65	Di.pr--ad	0.015625	5	407.64	1,315.06	5.622	2.292
76	-nauplii-	0.007813	847	138,109.55	181.84	0.898	124.088
80	C.bt---ad	0.015625	7	570.70	917.13	2.869	1.637
83	C.bt--cop	0.015625	23	1,875.16	583.27	0.950	1.782
85	C.scu--ad	0.015625	9	733.76	1,135.59	4.855	3.563
88	C.scu-cop	0.015625	13	1,059.87	645.55	1.356	1.437
			1,215	168,112.10			373.593

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk　SAMPLE DATE: 010829　CODE: 010829
STN: D20　COUNT DATE:　VOLUME (L): 785.00
GEAR TYPE: Wisconsin　MESH (um): 64　MOUTH DIA (m): 0.500
DISTANCE (m): 4.0　Enumerator: DD
INT COUNTS: 0　COUNTS/m: 0.000
EXT NET COUNT: 0　CORRECTION: 1.000　Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	2	163.06	719.16	10.423	1.700
13	Eub.l-noe	0.015625	13	1,059.87	509.51	3.331	3.531
27	D.gal-neg	0.015625	31	2,527.39	1,027.93	16.051	40.568
35	D.lon-f&e	0.015625	4	326.11	995.13	13.865	4.522
37	D.lon-neg	0.015625	47	3,831.85	786.68	7.972	30.547
63	D.pri-cop	0.015625	5	407.64	884.87	2.362	0.963
65	Di.pr--ad	0.015625	10	815.29	1,259.06	5.063	4.128
76	-nauplii-	0.015625	761	62,043.31	186.92	0.911	56.517
80	C.bt---ad	0.015625	6	489.17	830.55	2.123	1.039
83	C.bt--cop	0.015625	15	1,222.93	596.98	1.075	1.314
85	C.scu--ad	0.015625	20	1,630.57	1,193.71	5.569	9.081
88	C.scu-cop	0.015625	33	2,690.45	808.95	2.142	5.762
			947	77,207.64			159.669

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk　SAMPLE DATE: 010829　CODE: 010829
STN: D24　COUNT DATE:　VOLUME (L): 785.00
GEAR TYPE: Wisconsin　MESH (um): 64　MOUTH DIA (m): 0.500
DISTANCE (m): 4.0　Enumerator: DD
INT COUNTS: 0　COUNTS/m: 0.000
EXT NET COUNT: 0　CORRECTION: 1.000　Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	2	163.06	556.11	4.145	0.676
13	Eub.l-noe	0.015625	25	2,038.22	530.75	3.701	7.544
25	D.gal-f&e	0.015625	3	244.59	1,182.54	23.700	5.797
27	D.gal-neg	0.015625	53	4,321.02	938.93	12.507	54.045
35	D.lon-f&e	0.015625	9	733.76	981.50	13.393	9.827
37	D.lon-neg	0.015625	26	2,119.75	825.04	9.026	19.133
45	Diaph.leu	0.015625	1	81.53	504.40	0.453	0.037
63	D.pri-cop	0.015625	2	163.06	839.58	2.435	0.397
65	Di.pr--ad	0.015625	5	407.64	1,329.38	5.763	2.349
76	-nauplii-	0.007813	643	104,845.86	204.37	0.948	99.374
80	C.bt---ad	0.015625	9	733.76	954.80	3.155	2.315
83	C.bt--cop	0.015625	23	1,875.16	527.14	0.685	1.284
85	C.scu--ad	0.015625	8	652.23	1,154.18	5.094	3.322
88	C.scu-cop	0.015625	20	1,630.57	722.21	1.786	2.912
			829	120,010.18			209.012

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010830 CODE: 010830
STN: N4 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
13	Eub.l-noe	0.015625	7	570.70	513.25	3.407	1.944
16	Lept.kind	0.500000	11	28.03	6,181.17	61.012	1.710
25	D.gal-f&e	0.015625	3	244.59	1,494.46	39.219	9.592
27	D.gal-neg	0.015625	150	12,229.30	1,173.67	22.283	272.500
45	Diaph.leu	0.015625	1	81.53	1,118.95	5.108	0.416
50	Ep.nev-ad	0.500000	6	15.29	2,267.82	22.215	0.340
53	Ep.ne-cop	0.015625	4	326.11	988.36	3.851	1.256
63	D.pri-cop	0.015625	20	1,630.57	930.94	2.671	4.356
65	Di.pr--ad	0.015625	7	570.70	1,266.70	5.122	2.923
76	-nauplii-	0.015625	53	4,321.02	199.84	0.935	4.040
80	C.bt---ad	0.015625	12	978.34	1,013.28	3.598	3.520
83	C.bt--cop	0.015625	86	7,011.46	511.33	0.779	5.464
85	C.scu--ad	0.015625	2	163.06	1,159.82	5.164	0.842
88	C.scu-cop	0.015625	5	407.64	673.16	1.261	0.514
			367	28,578.34			309.417

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010830 CODE: 010830
STN: N8 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
13	Eub.l-noe	0.015625	3	244.59	619.12	6.088	1.489
16	Lept.kind	0.500000	4	10.19	6,385.36	71.937	0.733
25	D.gal-f&e	0.015625	12	978.34	1,484.23	38.620	37.783
27	D.gal-neg	0.015625	133	10,843.31	1,019.54	16.602	180.024
37	D.lon-neg	0.015625	1	81.53	555.13	3.142	0.256
45	Diaph.leu	0.015625	2	163.06	777.76	1.966	0.321
63	D.pri-cop	0.015625	15	1,222.93	975.35	2.873	3.513
65	Di.pr--ad	0.015625	2	163.06	1,226.72	4.731	0.771
76	-nauplii-	0.015625	122	9,946.50	204.76	0.944	9.391
80	C.bt---ad	0.015625	5	407.64	853.17	2.369	0.966
83	C.bt--cop	0.015625	75	6,114.65	545.90	0.823	5.034
85	C.scu--ad	0.015625	1	81.53	1,164.92	5.117	0.417
88	C.scu-cop	0.015625	4	326.11	620.87	1.074	0.350
			379	30,583.44			241.049

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010830 CODE: 010830
STN: N12 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	1	81.53	511.88	3.075	0.251
13	Eub.l-noe	0.015625	5	407.64	490.81	2.804	1.143
16	Lept.kind	0.500000	5	12.74	5,852.13	59.369	0.756
25	D.gal-f&e	0.015625	2	163.06	1,497.72	39.663	6.467
27	D.gal-neg	0.015625	213	17,365.61	1,048.20	18.151	315.208
35	D.lon-f&e	0.015625	8	652.23	894.34	10.638	6.938
37	D.lon-neg	0.015625	31	2,527.39	660.68	5.279	13.343
53	Ep.ne-cop	0.015625	1	81.53	730.68	1.707	0.139
63	D.pri-cop	0.015625	38	3,098.09	1,066.61	3.492	10.819
65	Di.pr--ad	0.015625	15	1,222.93	1,325.06	5.744	7.025
76	-nauplii-	0.007813	630	102,726.12	208.35	0.956	98.214
80	C.bt---ad	0.015625	13	1,059.87	869.43	2.541	2.693
83	C.bt--cop	0.015625	10	815.29	594.61	0.974	0.794
85	C.scu--ad	0.015625	23	1,875.16	1,175.02	5.324	9.983
88	C.scu-cop	0.015625	34	2,771.97	618.40	1.089	3.019
			1,029	134,854.58			476.787

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010830 CODE: 010830
STN: N16 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	13	1,059.87	570.73	4.762	5.047
13	Eub.l-noe	0.015625	56	4,565.60	492.40	2.882	13.159
16	Lept.kind	0.500000	2	5.10	7,120.08	83.099	0.423
25	D.gal-f&e	0.015625	2	163.06	1,258.01	25.103	4.093
27	D.gal-neg	0.015625	199	16,224.20	1,134.43	20.906	339.182
35	D.lon-f&e	0.015625	2	163.06	906.83	10.928	1.782
37	D.lon-neg	0.015625	76	6,196.18	648.58	5.039	31.222
63	D.pri-cop	0.015625	15	1,222.93	1,045.38	3.271	4.001
65	Di.pr--ad	0.015625	15	1,222.93	1,338.95	5.890	7.203
76	-nauplii-	0.007813	730	119,031.84	179.17	0.889	105.858
80	C.bt---ad	0.015625	10	815.29	977.96	3.307	2.696
83	C.bt--cop	0.015625	17	1,385.99	788.63	1.928	2.673
85	C.scu--ad	0.015625	15	1,222.93	1,164.23	5.170	6.322
88	C.scu-cop	0.015625	31	2,527.39	810.44	2.206	5.576
			1,183	155,806.36			529.237

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010830 CODE: 010830
STN: N20 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	5	203.82	546.13	4.004	0.816
13	Eub.l-noe	0.031250	18	733.76	522.67	3.422	2.511
25	D.gal-f&e	0.031250	2	81.53	1,454.78	36.352	2.964
27	D.gal-neg	0.031250	90	3,668.79	1,043.12	18.496	67.859
35	D.lon-f&e	0.031250	5	203.82	952.20	12.492	2.546
37	D.lon-neg	0.031250	62	2,527.39	820.45	8.851	22.371
63	D.pri-cop	0.031250	14	570.70	1,053.46	3.358	1.916
65	Di.pr--ad	0.031250	17	692.99	1,322.12	5.713	3.959
75	Harpactoid	0.031250	1	40.76	1,023.41	3.028	0.123
76	-nauplii-	0.015625	595	48,509.55	209.34	0.959	46.509
80	C.bt---ad	0.031250	9	366.88	951.56	3.065	1.125
83	C.bt--cop	0.031250	10	407.64	702.67	1.364	0.556
85	C.scu--ad	0.031250	14	570.70	1,174.39	5.344	3.050
88	C.scu-cop	0.031250	76	3,098.09	848.80	2.354	7.292
			918	61,676.43			163.597

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 010830 CODE: 010830
STN: N24 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	6	244.59	500.91	2.902	0.710
13	Eub.l-noe	0.031250	28	1,141.40	510.32	3.173	3.621
16	Lept.kind	0.500000	2	5.10	4,778.61	31.416	0.160
25	D.gal-f&e	0.031250	4	163.06	1,519.43	40.542	6.611
27	D.gal-neg	0.031250	140	5,707.01	951.83	14.661	83.669
35	D.lon-f&e	0.031250	6	244.59	944.49	12.313	3.012
37	D.lon-neg	0.031250	45	1,834.39	714.97	6.371	11.688
53	Ep.ne-cop	0.031250	1	40.76	1,801.80	13.129	0.535
63	D.pri-cop	0.031250	10	407.64	1,006.23	3.074	1.253
65	Di.pr--ad	0.031250	27	1,100.64	1,340.75	5.909	6.503
76	-nauplii-	0.031250	859	35,016.56	187.56	0.911	31.884
80	C.bt---ad	0.031250	2	81.53	852.53	2.244	0.183
83	C.bt--cop	0.031250	6	244.59	665.16	1.178	0.288
85	C.scu--ad	0.031250	7	285.35	1,097.79	4.396	1.254
88	C.scu-cop	0.031250	45	1,834.39	769.16	1.911	3.505
			1,188	48,351.59			154.875

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 011024   CODE: 011024
STN: D4   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	13	529.94	636.17	6.971	3.694
13	Eub.l-noe	0.031250	167	6,807.64	532.79	3.990	27.163
25	D.gal-f&e	0.062600	15	305.24	1,264.13	25.768	7.866
27	D.gal-neg	0.031250	79	3,220.38	972.99	13.543	43.613
35	D.lon-f&e	0.031250	6	244.59	858.20	9.607	2.350
37	D.lon-neg	0.031250	55	2,242.04	709.44	6.168	13.828
63	D.pri-cop	0.031250	3	122.29	967.81	2.639	0.323
65	Di.pr--ad	0.031250	39	1,589.81	1,300.08	5.467	8.691
76	-nauplii-	0.015625	650	52,993.63	205.89	0.954	50.542
80	C.bt---ad	0.031250	29	1,182.17	957.55	3.074	3.634
83	C.bt--cop	0.031250	211	8,601.27	634.96	1.157	9.952
85	C.scu--ad	0.031250	41	1,671.34	1,108.04	4.553	7.609
88	C.scu-cop	0.031250	61	2,486.62	869.03	2.469	6.140
			1,369	81,996.96			185.403

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 011024   CODE: 011024
STN: D8   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	11	896.82	627.13	6.625	5.941
13	Eub.l-noe	0.015625	35	2,853.50	546.70	4.708	13.435
25	D.gal-f&e	0.015625	3	244.59	1,226.56	24.024	5.876
27	D.gal-neg	0.015625	15	1,222.93	984.50	15.559	19.028
35	D.lon-f&e	0.015625	3	244.59	780.44	7.827	1.914
37	D.lon-neg	0.015625	16	1,304.46	707.52	6.009	7.839
63	D.pri-cop	0.015625	2	163.06	671.83	1.101	0.179
65	Di.pr--ad	0.015625	12	978.34	1,291.74	5.389	5.273
76	-nauplii-	0.015625	593	48,346.50	218.26	0.979	47.355
80	C.bt---ad	0.015625	16	1,304.46	963.50	3.166	4.130
83	C.bt--cop	0.015625	94	7,663.69	521.47	0.746	5.715
85	C.scu--ad	0.015625	10	815.29	1,112.37	4.672	3.809
88	C.scu-cop	0.015625	28	2,282.80	808.59	2.236	5.105
			838	68,321.02			125.598

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 011024 CODE: 011024
STN: D12 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	27	1,100.64	561.07	4.357	4.796
13	Eub.l-noe	0.031250	108	4,402.55	497.54	3.268	14.387
25	D.gal-f&e	0.015625	2	163.06	1,303.17	27.450	4.476
27	D.gal-neg	0.015625	19	1,549.04	1,044.10	15.899	24.628
35	D.lon-f&e	0.015625	6	489.17	800.04	8.081	3.953
37	D.lon-neg	0.015625	19	1,549.04	821.79	9.224	14.289
63	D.pri-cop	0.015625	1	81.53	546.25	0.646	0.053
65	Di.pr--ad	0.015625	4	326.11	1,252.32	5.024	1.638
76	-nauplii-	0.015625	824	67,179.62	206.81	0.956	64.248
80	C.bt---ad	0.015625	8	652.23	1,051.18	3.902	2.545
83	C.bt--cop	0.015625	19	1,549.04	556.35	0.842	1.304
85	C.scu--ad	0.015625	5	407.64	1,014.19	3.550	1.447
88	C.scu-cop	0.015625	45	3,668.79	612.93	1.197	4.391
			1,087	83,118.47			142.154

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 011024 CODE: 011024
STN: D16 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.015625	6	489.17	551.08	4.058	1.985
13	Eub.l-noe	0.015625	274	22,338.85	431.63	1.752	39.147
27	D.gal-neg	0.015625	19	1,549.04	1,022.00	15.033	23.287
35	D.lon-f&e	0.015625	2	163.06	914.52	11.358	1.852
37	D.lon-neg	0.015625	24	1,956.69	760.64	7.353	14.387
65	Di.pr--ad	0.015625	7	570.70	1,212.50	4.605	2.628
76	-nauplii-	0.003906	758	247,194.91	208.81	0.961	237.459
80	C.bt---ad	0.015625	1	81.53	925.30	2.786	0.227
83	C.bt--cop	0.015625	10	815.29	494.26	0.584	0.476
85	C.scu--ad	0.015625	4	326.11	1,027.50	3.674	1.198
88	C.scu-cop	0.015625	19	1,549.04	740.20	1.836	2.844
			1,124	277,034.41			325.490

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 011024   CODE: 011024
STN: D20   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.062500	15	305.73	551.62	4.510	1.379
13	Eub.l-noe	0.062500	205	4,178.34	455.76	2.268	9.478
25	D.gal-f&e	0.062500	1	20.38	1,291.14	26.811	0.546
27	D.gal-neg	0.062500	8	163.06	999.31	14.034	2.288
35	D.lon-f&e	0.062500	10	203.82	829.42	8.814	1.796
37	D.lon-neg	0.062500	121	2,466.24	852.68	9.664	23.834
65	Di.pr--ad	0.062500	6	122.29	1,237.80	4.861	0.595
76	-nauplii-	0.007813	789	128,652.23	207.00	0.958	123.185
80	C.bt---ad	0.062500	20	407.64	927.40	2.849	1.162
83	C.bt--cop	0.062500	33	672.61	615.75	1.013	0.682
85	C.scu--ad	0.062500	18	366.88	1,102.20	4.470	1.640
88	C.scu-cop	0.062500	69	1,406.37	854.75	2.485	3.496
			1,295	138,965.59			170.080

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 011024   CODE: 011024
STN: D24   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.062500	1	20.38	533.33	3.564	0.073
13	Eub.l-noe	0.062500	101	2,058.60	472.79	2.660	5.476
27	D.gal-neg	0.062500	2	40.76	960.28	12.639	0.515
37	D.lon-neg	0.062500	34	692.99	817.15	8.767	6.075
65	Di.pr--ad	0.062500	10	203.82	1,318.28	5.665	1.155
76	-nauplii-	0.031250	595	24,254.78	196.84	0.935	22.677
80	C.bt---ad	0.062500	2	40.76	1,032.46	3.732	0.152
85	C.scu--ad	0.062500	13	264.97	1,147.24	5.014	1.328
88	C.scu-cop	0.062500	90	1,834.39	755.38	1.954	3.585
			848	29,411.46			41.036

ZOOPLANKTON BENCH SHEET

LAKE: Dina　　SAMPLE DATE: 011025　　CODE: 011025
STN: N4　　COUNT DATE:　　VOLUME (L): 785.00
GEAR TYPE: Wisconsin　　MESH (um): 64　　MOUTH DIA (m): 0.500
DISTANCE (m): 4.0　　Enumerator: DD
INT COUNTS: 0　　COUNTS/m: 0.000
EXT NET COUNT: 0　　CORRECTION: 1.000　　Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	18	733.76	605.64	5.843	4.288
13	Eub.l-noe	0.031250	156	6,359.24	472.49	2.651	16.859
25	D.gal-f&e	0.031250	11	448.41	1,185.24	21.977	9.855
27	D.gal-neg	0.031250	40	1,630.57	1,005.77	15.704	25.606
35	D.lon-f&e	0.062500	14	285.35	850.01	9.668	2.759
37	D.lon-neg	0.031250	38	1,549.04	765.56	7.465	11.563
63	D.pri-cop	0.031250	2	81.53	1,039.18	3.150	0.257
65	Di.pr--ad	0.031250	22	896.82	1,287.88	5.351	4.799
76	-nauplii-	0.015625	583	47,531.21	225.04	0.995	47.303
80	C.bt---ad	0.031250	6	244.59	907.69	2.680	0.656
83	C.bt--cop	0.031250	71	2,894.27	565.88	0.883	2.557
85	C.scu--ad	0.031250	23	937.58	1,110.37	4.569	4.283
88	C.scu-cop	0.031250	90	3,668.79	932.76	2.912	10.683
			1,074	67,261.15			141.468

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk　　SAMPLE DATE: 011025　　CODE: 011025
STN: N8　　COUNT DATE:　　VOLUME (L): 785.00
GEAR TYPE: Wisconsin　　MESH (um): 64　　MOUTH DIA (m): 0.500
DISTANCE (m): 4.0　　Enumerator: DD
INT COUNTS: 0　　COUNTS/m: 0.000
EXT NET COUNT: 0　　CORRECTION: 1.000　　Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	21	856.05	625.48	6.516	5.578
13	Eub.l-noe	0.031250	203	8,275.16	500.06	3.186	26.365
25	D.gal-f&e	0.031250	8	326.11	1,344.97	30.159	9.835
27	D.gal-neg	0.031250	41	1,671.34	1,093.84	18.756	31.348
35	D.lon-f&e	0.031250	6	244.59	870.30	10.218	2.499
37	D.lon-neg	0.031250	57	2,323.57	781.49	8.030	18.658
63	D.pri-cop	0.031250	4	163.06	918.16	2.446	0.399
65	Di.pr--ad	0.031250	25	1,019.11	1,301.80	5.481	5.586
76	-nauplii-	0.015625	519	42,313.38	195.32	0.930	39.338
80	C.bt---ad	0.031250	16	652.23	927.97	2.877	1.876
83	C.bt--cop	0.031250	101	4,117.20	501.97	0.657	2.705
85	C.scu--ad	0.031250	23	937.58	1,222.94	5.988	5.614
88	C.scu-cop	0.031250	91	3,709.55	974.78	3.338	12.384
			1,115	66,608.91			162.185

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 011025 CODE: 011025
STN: N12 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	12	489.17	598.18	5.597	2.738
13	Eub.l-noe	0.031250	167	6,807.64	478.42	2.592	17.648
25	D.gal-f&e	0.031250	9	366.88	1,270.85	26.088	9.571
27	D.gal-neg	0.031250	23	937.58	929.23	12.892	12.087
35	D.lon-f&e	0.031250	6	244.59	925.51	12.651	3.094
37	D.lon-neg	0.031250	30	1,222.93	711.22	6.082	7.438
65	Di.pr--ad	0.031250	23	937.58	1,285.07	5.318	4.986
76	-nauplii-	0.031250	969	39,500.64	209.46	0.962	38.016
80	C.bt---ad	0.031250	12	489.17	906.65	2.685	1.313
83	C.bt.-cop	0.031250	72	2,935.03	629.53	1.094	3.212
85	C.scu--ad	0.031250	15	611.46	1,166.85	5.228	3.197
88	C.scu-cop	0.031250	97	3,954.14	883.70	2.756	10.897
			1,435	58,496.82			114.197

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk SAMPLE DATE: 011025 CODE: 011025
STN: N16 COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin MESH (um): 64 MOUTH DIA (m): 0.500
DISTANCE (m): 4.0 Enumerator: DD
INT COUNTS: 0 COUNTS/m: 0.000
EXT NET COUNT: 0 CORRECTION: 1.000 Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.031250	3	122.29	503.31	3.104	0.380
13	Eub.l-noe	0.031250	164	6,685.35	437.20	1.950	13.034
16	Lept.kind	1.000000	1	1.27	7,947.45	111.445	0.142
25	D.gal-f&e	0.031250	3	122.29	1,357.45	30.448	3.724
27	D.gal-neg	0.031250	22	896.82	953.44	12.865	11.538
35	D.lon-f&e	0.031250	5	203.82	635.67	6.279	1.280
37	D.lon-neg	0.031250	37	1,508.28	760.04	7.169	10.813
65	Di.pr--ad	0.031250	10	407.64	1,291.96	5.399	2.201
76	-nauplii-	0.015625	938	76,473.88	217.36	0.980	74.943
80	C.bt---ad	0.031250	12	489.17	937.06	2.981	1.458
83	C.bt--cop	0.031250	26	1,059.87	620.12	1.080	1.145
85	C.scu--ad	0.031250	20	815.29	1,105.17	4.527	3.691
88	C.scu-cop	0.031250	74	3,016.56	780.54	2.030	6.125
			1,315	91,802.55			130.472

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 011025   CODE: 011025
STN: N20   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.062500	4	81.53	521.57	3.569	0.291
13	Eub.l-noe	0.062500	74	1,508.28	450.12	2.052	3.095
27	D.gal-neg	0.062500	20	407.64	977.61	13.496	5.502
35	D.lon-f&e	0.062500	9	183.44	954.18	12.549	2.302
37	D.lon-neg	0.062500	79	1,610.19	815.89	8.858	14.263
65	Di.pr--ad	0.062500	5	101.91	1,295.33	5.413	0.552
76	-nauplii-	0.015625	886	72,234.40	201.40	0.944	68.219
80	C.bt---ad	0.062500	8	163.06	862.51	2.382	0.388
83	C.bt--cop	0.062500	48	978.34	524.46	0.673	0.658
85	C.scu--ad	0.062500	10	203.82	1,117.42	4.632	0.944
88	C.scu-cop	0.062500	98	1,997.45	925.70	2.974	5.941
			1,241	79,470.07			102.154

ZOOPLANKTON BENCH SHEET

LAKE: Dina lk   SAMPLE DATE: 011025   CODE: 011025
STN: N24   COUNT DATE: VOLUME (L): 785.00
GEAR TYPE: Wisconsin   MESH (um): 64   MOUTH DIA (m): 0.500
DISTANCE (m): 4.0   Enumerator: DD
INT COUNTS: 0   COUNTS/m: 0.000
EXT NET COUNT: 0   CORRECTION: 1.000   Efficiency (%): 100.00

Zooplankter Code	Name	Fraction Analysed	Number Counted	Density (#/m3)	Length (um)	Weight (ug)	Biomass (mg/m3)
11	Eub.f&egg	0.062500	3	61.15	613.36	6.098	0.373
13	Eub.l-noe	0.062500	83	1,691.72	470.52	2.608	4.412
25	D.gal-f&e	0.062500	5	101.91	1,350.27	30.111	3.069
27	D.gal-neg	0.062500	20	407.64	1,064.15	17.103	6.972
35	D.lon-f&e	0.062500	7	142.68	902.67	11.145	1.590
37	D.lon-neg	0.062500	22	448.41	737.54	6.862	3.077
65	Di.pr--ad	0.062500	9	183.44	1,236.91	4.829	0.886
76	-nauplii-	0.031250	788	32,122.29	209.62	0.962	30.912
80	C.bt---ad	0.062500	7	142.68	881.20	2.488	0.355
83	C.bt--cop	0.062500	37	754.14	600.00	1.003	0.757
85	C.scu--ad	0.062500	11	224.20	1,160.08	5.194	1.165
88	C.scu-cop	0.062500	28	570.70	825.34	2.282	1.302
			1,020	36,850.95			54.869

APPENDIX 6

Gill Netting Records

(Data showing hours fished, substrate, and species captured)

MAY TRIP

NETTING SITE #1

Type:	Sinking Monofilament gill net one panel hung vertically		
Date Set:	May 24, 2001	Time:	955 hrs
Date Lifted:	May 24, 2001	Time:	1210 hrs
Net Dimensions:	Length:15.24	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	9.5 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	9.5 m unknown

Location is east basin

Comments:

Fished entire water column. No fish captured.

NETTING SITE #2

Type:	Sinking Monofilament gill net one panel hung vertically		
Date Set:	May 24, 2001	Time:	1000 hrs
Date Lifted:	May 24, 2001	Time:	1215 hrs
Net Dimensions:	Length: 15.24	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	9.6 m unknown
Deep End Mesh Size:	14 mm	Depth: Substrate:	9.6 m unknown

Location is east basin

Comments:

Fished entire water column. No fish captured.

NETTING SITE #3

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	May 24, 2001	Time:	1005 hrs
Date Lifted:	May 24, 2001	Time:	1220 hrs
Net Dimensions:	Length: 15.24	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	9.8 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	9.8 m unknown

Location is east basin

Comments:

Fished entire water column. No fish captured.

NETTING SITE #4

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	May 24, 2001	Time:	1230 hrs
Date Lifted:	May 24, 2001	Time:	1450 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	14.0 m unknown

Location is west basin

Comments:

Fished entire water column. No fish captured.

NETTING SITE #5

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	May 24, 2001	Time:	1234 hrs
Date Lifted:	May 24, 2001	Time:	1453 hrs
Net Dimensions:	Length:15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	14 mm	Depth: Substrate:	14.0 m unknown

Location is west basin

Comments:

Fished entire water column. No fish captured.

NETTING SITE #6

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	May 24, 2001	Time:	1238 hrs
Date Lifted:	May 24, 2001	Time:	1258 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	13.0 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	13.0 m unknown

Location is West basin

Comments:

Fished entire water column. No fish captured.

NETTING SITE #7

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	May 24, 2001	Time:	1505 hrs
Date Lifted:	May 25, 2001	Time:	0935 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	16.0 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	16.0 m unknown

Location is Main basin

Comments:

Checked net at 1710 hrs May 24, no fish captured. Reset overnight, captured 4 Pygmy whitefish. Three were 0.5 m from the bottom and one was 4 m from the bottom. Three of these were almost dead but gilling and one was still healthy looking.

NETTING SITE #8

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	May 24, 2001	Time:	1510 hrs
Date Lifted:	May 25, 2001	Time:	0940 hrs
Net Dimensions:	Length: 15.24m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	16.0 m unknown
Deep End Mesh Size:	14 mm	Depth: Substrate:	16.0 m unknown

Location is Main basin

Comments:

Net pulled at 1715 hrs May 24th, no fish captured. Reset overnight, no fish captured.

NETTING SITE #9

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	May 24, 2001	Time:	1514 hrs
Date Lifted:	May 25, 2001	Time:	0945 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	14.0 m unknown

Location is Main basin

Comments:

Net was pulled at 1720 hrs May 24th, no fish captured. Reset overnight, no fish captured.

NETTING SITE #10

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	May 24, 2001	Time:	1530 hrs
Date Lifted:	May 24, 2001	Time:	1705 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	2.0 m organics and LWD
Deep End Mesh Size:	14 mm	Depth: Substrate:	3.5 m organics

Location was a shore net set near the Stowaways in the Main basin.

Comments:

No fish captured.

JUNE TRIP

NETTING SITE #1

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	June 5, 2001	Time:	0953 hrs
Date Lifted:	June 6, 2001	Time:	0925 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	9.3 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	9.3 m unknown

Location is in the East basin

Comments:

Net checked at 1410 and 2200 on June 24, no fish captured. Net left overnight, no fish captured.

NETTING SITE #2

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	June 5, 2001	Time:	0957 hrs
Date Lifted:	June 6, 2001	Time:	0930 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	9.2 m unknown
Deep End Mesh Size:	14 mm	Depth: Substrate:	9.2 m unknown

Location is in the East basin

Comments:

Net checked at 1415, 1850, and 2202, no fish captured. Net left overnight, one pygmy whitefish captured 30 cm from bottom (still alive).

NETTING SITE #3

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	June 5, 2001	Time:	1002 hrs
Date Lifted:	June 6, 2001	Time:	0935 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	9.0 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	9.0 m unknown

Location is in the East basin

Comments:

Net was checked at 1420hrs, captured one pygmy whitefish that was 0.5m from the bottom. Net was reset and checked again at 1852hrs, captured one pygmy whitefish, reset net. Net checked again at 2204hrs and had no fish. Net was reset and left overnight. Net was pulled at 0935hrs on June 6, captured 3 pygmy whitefish; one was 1.5 m from the bottom, one was 50 cm form the bottom, and one was 30 cm from the bottom.

NETTING SITE #4

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	June 5, 2001	Time:	1840 hrs
Date Lifted:	June 6, 2001	Time:	1545 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	1.5 m SWD, sand
Deep End Mesh Size:	19 mm	Depth: Substrate:	3.5 m unknown

Location is in the Main basin, shore net set.

Comments:

Net was checked at 1950 June 5, captured 2 rainbow trout and one lake chub. Net was reset overnight. Pulled the next morning at 0915hrs, captured 1 adult and 7 juvenile rainbow trout, 5 longnose suckers, 6 lake chub, and 11 pygmy whitefish. All pygmy whitefish were in the deepest half of the net, and all near the lead line (no more than 30 cm from the bottom). Ten of these pygmy whitefish were pretty decomposed which might suggest that these fish have been captured for some time. There may be the possibility that with the onset of darkness, these fish move into the shallows to forage. Net was reset again on June 6. Net was checked at 1400hrs and captured no fish. Net was reset. Net was then pulled at 1545hrs and no fish were captured.

NETTING SITE #5

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	June 6, 2001	Time:	0955 hrs
Date Lifted:	June 7, 2001	Time:	0536 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	16.0 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	16.0 m unknown

Location is in the Main basin

Comments:

Net checked at 1554hrs, no fish captured. Net reset overnight, no fish captured.

NETTING SITE #6

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	June 6, 2001	Time:	1000 hrs
Date Lifted:	June 7, 2001	Time:	0540 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	16.0 m unknown
Deep End Mesh Size:	14 mm	Depth: Substrate:	16.0 m unknown

Location is in the Main basin

Comments:

Net checked at 1557hrs, no fish captured. Reset overnight, no fish captured.

NETTING SITE #7

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	June 6, 2001	Time:	1005hrs
Date Lifted:	June 7, 2001	Time:	0545 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	16.0 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	16.0 m unknown

Location is in the Main basin

Comments:

Net checked at 1600hrs, June 6th, no fish captured. Reset overnight, no fish captured.

NETTING SITE #8

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	June 7, 2001	Time:	0555 hrs
Date Lifted:	June 8, 2001	Time:	0955 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	15.0 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	15.0 m unknown

Location is in the West basin

Comments:

Net checked at 1116hrs June 7th, no fish captured. Reset overnight, no fish captured.

NETTING SITE #9

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	June 7, 2001	Time:	0558 hrs
Date Lifted:	June 8, 2001	Time:	1005 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	14 mm	Depth: Substrate:	14.0 m unknown

Location is in the West basin

Comments:

Net checked at 1319hrs, no fish captured. Reset overnight, no fish captured.

NETTING SITE #10

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	June 7, 2001	Time:	0603 hrs
Date Lifted:	June 8, 2001	Time:	1012 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	14.0 m unknown

Location is in the West basin

Comments:

Net checked at 1322hrs, no fish captured. Net reset overnight. Net was pulled the next morning and captured 14 pygmy whitefish; one was 6 m from the bottom, seven were 4 m from the bottom, and six were 2 m from the bottom.

NETTING SITE #11

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	June 7, 2001	Time:	1337 hrs
Date Lifted:	June 7, 2001	Time:	1540 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	9.1 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	9.1 m unknown

Location was in the East basin

Comments:

Captured 3 pygmy whitefish, all fish were alive and were located 1 m off of the bottom.

NETTING SITE #12

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	June 7, 2001	Time:	1545 hrs
Date Lifted:	June 8, 2001	Time:	0930 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	1.5 m SWD and organics
Deep End Mesh Size:	25 mm	Depth: Substrate:	3.5 m organics

Shore net set by the Stowaways in the Main basin

Comments:

Net was set overnight. Next morning, net captured 14 lake chub, 5 longnose suckers, 6 rainbow trout, 2 brook trout, and 14 pygmy whitefish. All pygmy whitefish were 30 cm or less above lead line and in the deepest half of the net (from 2.5 m deep to 3.5m deep). Therefore, pygmy whitefish are not coming above the 2.5 m depth. This may be due to water temperature or species composition. All of the remaining species were captured in the shallower part of the net (1.5 m depth to 2.5 m depth).

JULY TRIP

NETTING SITE #1

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	July 10, 2001	Time:	1058 hrs
Date Lifted:	July 11, 2001	Time:	0910 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	8.7 m unknown
Deep End Mesh Size:	14 mm	Depth: Substrate:	8.7 m unknown

Location is in the East basin

Comments:

Net checked at 1515hrs, captured 5 pygmy whitefish that were 0.5m from the bottom (still gilling). Checked net again at 2120hrs July 10th, no fish captured. Reset overnight. Next morning, net captured 3 pygmy whitefish. All fish were 20cm from the bottom.

NETTING SITE #2

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	July 10, 2001	Time:	1105 hrs
Date Lifted:	July 11, 2001	Time:	0916 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	8.9 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	8.9 m unknown

Location is in the East basin

Comments:

Net checked at 1520hrs, captured 3 pygmy whitefish (all gilling), all fish were 1.0 m from the bottom. Net checked again at 2125hrs, captured 1 pygmy whitefish 1.0 m from the bottom. Net reset overnight. Next morning, net captured 1 lake chub, 1 brook trout, and 9 pygmy whitefish. The brook trout appeared to preying on one of the pygmy whitefish. Seven pygmy whitefish were caught 40 cm from the bottom and two were 1.0 m from the bottom.

NETTING SITE #3

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	July 10, 2001	Time:	1108 hrs
Date Lifted:	July 11, 2001	Time:	0928 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	9.1 unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	9.1 unknown

Location is in the East basin

Comments:

Net checked at 1523hrs, no fish captured. Net checked again at 2128hrs, captured 3 pygmy whitefish. One pygmy whitefish was caught 1.0 m from the bottom and two were located 0.5 m form the bottom. Net was reset overnight. Next morning, the net captured 2 pygmy whitefish, both fish were alive and 30 cm from the bottom.

NETTING SITE #4

Type:	Sinking monofilament gill net one panel set on the bottom		
Date Set:	July 10. 2001	Time:	1113 hrs
Date Lifted:	July 11, 2001	Time:	0905 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	9.1 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	8.7 m unknown

Location is in the East basin

Comments:

Net checked at 1530hrs, captured 2 pygmy whitefish (located in the middle of the net). Net checked again at 2110hrs, no fish captured. Net was reset overnight. Net checked the next morning and captured 6 pygmy whitefish. Five fish were at one end of the net while the sixth fish was located at the other end of the net. All were 10 to 20 cm from the bottom. It appears that maybe the net acts like a curtain and they see it and try and go around it.

NETTING SITE #5

Type:	Sinking monofilament gill net		
	1 panel set on the bottom		
Date Set:	July 10, 2001	Time:	1117 hrs
Date Lifted:	July 10, 2001	Time:	2120 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	32 mm	Depth: Substrate:	8.7 m unknown
Deep End Mesh Size:	32 mm	Depth: Substrate:	8.7 m unknown

Location is in the East basin

Comments:

Net checked at 1540hrs, captured 8 longnose suckers. Net reset. Net pulled at 2120hrs, captured 6 longnose suckers (all released alive).

NETTING SITE #6

Type:	Sinking monofilament gill net		
	1 panel set on the bottom		
Date Set:	July 10, 2001	Time:	1238 hrs
Date Lifted:	July 12, 2001	Time:	0200 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	1.5 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	4.1 m unknown

Location is on the bottom by the Stowaways in the Main basin (shore net set)

Comments:

Net checked at 1545hrs, captured 1 rainbow trout. Reset net. Net checked at 2135hrs, captured 15 lake chub and 8 rainbow trout. Net reset overnight. Next morning at 0940hrs, net captured 13 rainbow trout, 2 longnose suckers, 27 lake chub, and 1 pygmy whitefish (30 cm from bottom). Depth of pygmy whitefish was 2.5 m. Net was reset. Checked again at 1508, captured 2 rainbow trout and 3 lake chub. Net reset again. Checked at 2245hrs, captured 3 rainbow trout and 6 lake chub. Net reset to fish at night. Checked at 0200hrs July 12th, captured 1 rainbow trout, 5 lake chub, and 3 pygmy whitefish. Whitefish were all 20 cm from the bottom (two were 4.0 m deep and one was 2.5 m deep). Two pygmy whitefish were still alive.

NETTING SITE #7

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	July 11, 2001	Time:	0955 hrs
Date Lifted:	July 11, 2001	Time:	2230 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	16.0 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	16.0 m unknown

Location is in the Main basin

Comments:

Net checked at 1500hrs, captured 2 pygmy whitefish, 30 cm and 1.8 m from the bottom. Net reset. Net pulled at 2230hrs and captured a school of pygmy whitefish. A total of 27 pygmy whitefish were captured. These fish were evenly distributed throughout the net and were located 2.0 m or less from the bottom.

NETTING SITE #8

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	July 11, 2001	Time:	1000 hrs
Date Lifted:	July 11, 2001	Time:	2220 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	16.0 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	16.0 m unknown

Location is in the Main basin

Comments:

Net checked at 1457hrs, captured 2 pygmy whitefish, one was 0.5 m from the bottom and the other was 1.0 m from the bottom. Net was checked at 2220hrs. Net revealed 46 evenly distributed pygmy whitefish that were within 3.0 m from the bottom. Net was pulled and was not set overnight. At this time, we determined that hanging the nets vertically can capture many pygmy whitefish in a single setting. Therefore, these nets should not be left overnight if possible.

NETTING SITE #9

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	July 11, 2001	Time:	1005 hrs
Date Lifted:	July 11, 2001	Time:	2212 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	16.0 m unknown
Deep End Mesh Size:	14 mm	Depth: Substrate:	16.0 m unknown

Location is in the Main basin

Comments:

Net checked at 1453hrs, no fish captured. Net reset. Net pulled at 2212hrs and captured 1 pygmy whitefish that was 1.0 m from the bottom.

NETTING SITE #10

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	July 11, 2001	Time:	1010 hrs
Date Lifted:	July 12, 2001	Time:	0430 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	15.0 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	16.0 m unknown

Location is in the Main basin

Comments:

Net checked at 1445hrs, no fish captured. Net reset. Checked again at 2205hrs, no fish captured. Reset overnight. Net pulled the next morning at 0430hrs and captured no fish. We left this net in overnight to try and capture young-of-the-year pygmy whitefish.

NETTING SITE #11

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	July 12, 2001	Time:	1341 hrs
Date Lifted:	July 12, 2001	Time:	1628 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	15.0 m unknown
Deep End Mesh Size:	14 mm	Depth: Substrate:	15.0 m unknown

Location is in the West basin

Comments:

Captured no fish.

NETTING SITE #12

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	July 12, 2001	Time:	1341 hrs
Date Lifted:	July 12, 2001	Time:	1625 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	15.0 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	15.0 m unknown

Location is in the West basin

Comments:

Captured no fish.

NETTING SITE 13

Type:	Sinking monofilament gill net one panel hung vertically		
Date Set:	July 12, 2001	Time:	1348 hrs
Date Lifted:	July 12, 2001	Time:	1624 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	14.0 m unknown

Location is in the West basin

Comments:

Captured 1 longnose sucker.

NETTING SITE #14

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	July 12, 2001	Time:	1355 hrs
Date Lifted:	July 12, 2001	Time:	1618 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	14.0 m unknown

Location is in the West basin

Comments:

Captured no fish.

NETTING SITE #15

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	July 12, 2001	Time:	1400 hrs
Date Lifted:	July 12, 2001	Time:	1610 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	32 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	32 mm	Depth: Substrate:	15.0 m unknown

Location is in the West basin

Comments:

Captured 1 adult longnose sucker.

NETTING SITE #16

Type:	Sinking monofilament gill net 2 panels, set on the bottom		
Date Set:	July 13, 2001	Time:	0910 hrs
Date Lifted:	July 13, 2001	Time:	1215 hrs
Net Dimensions:	Length: 30.48 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	14.0 m unknown

Location is in the West basin

Comments:

Captured no fish, possibly no oxygen available at the bottom.

NETTING SITE #17

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	July 13, 2001	Time:	0918 hrs
Date Lifted:	July 13, 2001	Time:	1220 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	15.0 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	15.0 m unknown

Location is in the West basin

Comments:

Captured no fish, possibly no oxygen available at the bottom. It is hard to say if there are any pygmy whitefish in this West basin at this time of year because we did not have any overnight net sets.

AUGUST TRIP

NETTING SITE #1

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	August 28, 2001	Time:	1220 hrs
Date Lifted:	August 29, 2001	Time:	1125 hrs
Net Dimensions:	Length: 15.24 m	Depth:	3.05 m
Shallow End Mesh Size:	10 mm	Depth: Substrate:	15.0 m unknown
Deep End Mesh Size:	10 mm	Depth: Substrate:	15.0 m unknown

Location is in the West basin

Comments:

Net checked at 1410hrs, no fish captured. Reset net. Checked at 1600hrs, no fish. Reset overnight in 14.0 m depth. Net pulled August 29th at 0820hrs, captured 1 rainbow trout. Area could be anoxic. Net moved to 10.0 m depth. Checked at 1125hrs August 29th, no fish captured. Pulled net completely due to success in the trap nets (i.e. captured young-of-the-year pygmy whitefish).

NETTING SITE #2

Type:	Sinking monofilament gill net 1 panel, shore set on bottom		
Date Set:	August 29, 2001	Time:	0809 hrs
Date Lifted:	August 29, 2001	Time:	2250 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	1.5 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	3.5 m unknown

Location is a shore net set on the bottom in the Main basin

Comments:

Net checked at 1135hrs, captured 1 rainbow trout and 1 pygmy whitefish (still alive). Whitefish was 10 cm from the bottom and in 2.3 m of water. This was somewhat rare to capture a pygmy whitefish in the day time in this shore net set. Reset net. Checked at 1440hrs, no fish captured. Checked again at 2022, no fish captured. Net reset (dark at 2115). Net pulled at 2250, captured 17 pygmy whitefish and 2 lake chub. All whitefish were near the lead line (about 15 cm from the bottom). One pygmy whitefish was 2.0 m in depth while the other 16 were in depths greater than 2.0 m. It appears that the onset of darkness definitely brings in the pygmy whitefish into shore. Approximately 6 of these fish were still gilling.

OCTOBER TRIP

NETTING SITE #1

Type:	Sinking monofilament gill net 1 panel suspended horizontally		
Date Set:	October 24, 2001	Time:	0932 hrs
Date Lifted:	October 25, 2001	Time:	1015 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	12.4 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	12.4 m unknown

Location is in the Main basin, water column depth is 15.0 m deep

Comments:

The net was suspended horizontally within the water column from 2.6 m off of the bottom to 5.0 m off of the bottom. We wanted to know for sure that pygmy whitefish are located throughout the water column. Most of our sampling has occurred off of the bottom . Since last years work revealed that most of their food items were pelagic, we needed to sample in the pelagic zone of the lake. In addition, night sets were determined as being necessary. Therefore, net was left overnight and pulled October 25th at 1015hrs. Net captured 174 pygmy whitefish. Most of them (85%) were 0.5 m from the lead line, or about 2.5 m to 3.0 m from the bottom. There was a high concentration of them located in the middle of the net (very few located at the ends). It appears that these fish are schooling fish and we captured the top part of a school. We suspect many more fish escaped the net by swimming underneath the net. This sample did have males and females congregating together.

NETTING SITE #2

Type:	Sinking monofilament gill net 1 panel suspended horizontally		
Date Set:	October 25, 2001	Time:	1010 hrs
Date Lifted:	October 26, 2001	Time:	0925 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	2.4 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	2.4 m unknown

Location is in the Main basin, water column depth is 15.0 m deep

Comments:

Since gill net #1 captured fish just off of the bottom, we then started to work from the surface where these fish were less likely to be located (out in the middle). The net was suspended horizontally within the water column from 12.6 m off of the bottom to surface (15.0 m off of the bottom). Net was checked at 1130hrs, no fish captured. Net checked again at 1623hrs, no fish captured. Net left overnight. Net pulled the next morning and captured no fish.

NETTING SITE #3

Type:	Sinking monofilament gill net 1 panel suspended horizontally		
Date Set:	October 25, 2001	Time:	1130 hrs
Date Lifted:	October 26, 2001	Time:	0920 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	7.4 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	7.4 m unknown

Location is in the Main basin, water column depth is 15.0 m deep

Comments:

The net was suspended horizontally within the water column from 7.6 m off of the bottom to 10.0 m off of the bottom. We wanted to know for sure that pygmy whitefish are located throughout the water column. Net was checked at 1620hrs and captured no fish. Net was reset. Net was reset overnight. The next morning, the net was pulled at 0920hrs and captured 12 pygmy whitefish. These fish were scattered throughout the net and at various depths (no concentration of them). Mostly males were collected (8) while there was 4 females captured. We now know for sure that this species does migrate off of the bottom, probably in search of food and is likely to occur during the onset of darkness.

NOVEMBER TRIP

NETTING SITE #1

Type:	Sinking monofilament gill net		
	1 panel set on the bottom		
Date Set:	November 15, 2001	Time:	1225 hrs
Date Lifted:	November 15, 2001	Time:	1350 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	9.3 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	9.3 m unknown

Location is in the East basin

Comments:

Net fished for approximately 1.5 hours and captured 8 pygmy whitefish. All fish were captured alive. One of these fish escaped the net and was not sampled.

NETTING SITE #2

Type:	Sinking monofilament gill net		
	2 panels set on the bottom		
Date Set:	November 15, 2001	Time:	1235 hrs
Date Lifted:	November 15, 2001	Time:	1400 hrs
Net Dimensions:	Length: 30.48 m	Depth:	2.4 m
Shallow End Mesh Size:	14 mm	Depth: Substrate:	14.0 m unknown
Deep End Mesh Size:	25 mm	Depth: Substrate:	15.0 m unknown

Location is in the Main basin

Comments:

Net fished for approximately 1.5 hours and captured 2 pygmy whitefish. Both fish were on the edge near the bottom of the lead line.

NETTING SITE #3

Type:	Sinking monofilament gill net 1 panel set on the bottom		
Date Set:	November 15, 2001	Time:	1245 hrs
Date Lifted:	November 15, 2001	Time:	1408 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	15.0 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	15.0 m unknown

Location is in the West basin

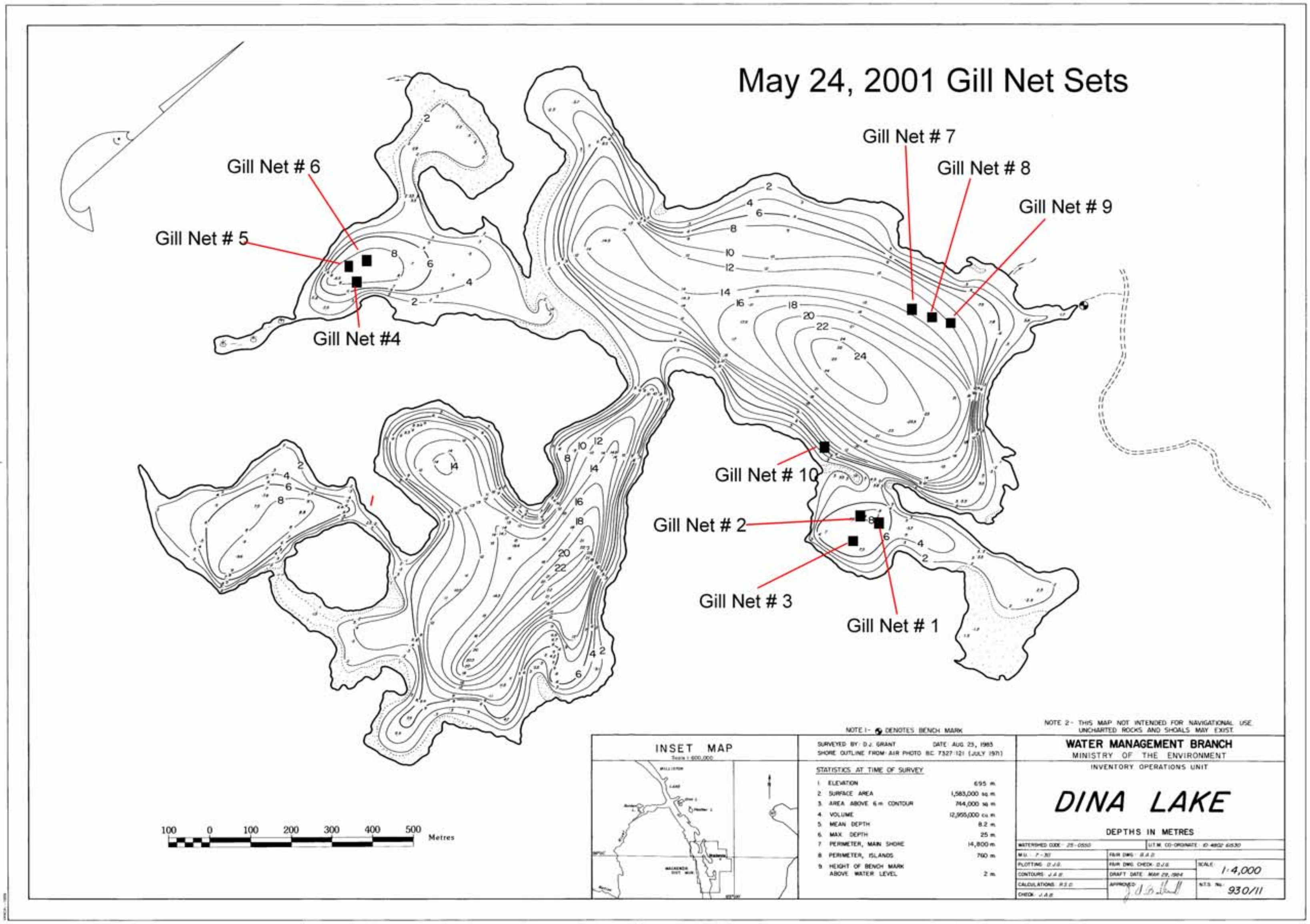
Comments:

Net was set for approximately 1.5 hours and captured no fish.

APPENDIX 7

Gill Netting Locations

Throughout the 2001 field season, there were 13 separate gill netting days undertaken. Due to the fact that the bathymetric maps presented in this report contain large file sizes, only the first gill netting session (May 24, 2001) is provided as an example. This example shows where the nets were generally set for each of the monthly sampling sessions. The locations for each month were quite similar. Detailed locations for each individual gill net set can be obtained at the address at the beginning of this report.


May 24, 2001 Gill Net Sets
Gill Net # 1
Gill Net # 2
Gill Net # 3
Gill Net #4
Gill Net # 5
Gill Net # 6
Gill Net # 7
Gill Net # 8
Gill Net # 9
Gill Net # 10
100 0 100 200 300 400 500 Metres
NOTE 1- DENOTES BENCH MARK
NOTE 2- THIS MAP NOT INTENDED FOR NAVIGATIONAL USE
UNCHARTED ROCKS AND SHOALS MAY EXIST
INSET MAP
SURVEYED BY: D.J. GRANT DATE: AUG. 23, 1983
SHORE OUTLINE FROM AIR PHOTO BC 7327-121 (JULY 1971)
STATISTICS AT TIME OF SURVEY
1. ELEVATION 695 m.
2. SURFACE AREA 1,583,000 sq. m.
3. AREA ABOVE 6 m CONTOUR 744,000 sq. m.
4. VOLUME 12,955,000 cu. m.
5. MEAN DEPTH 8.2 m.
6. MAX. DEPTH 25 m.
7. PERIMETER, MAIN SHORE 14,800 m.
8. PERIMETER, ISLANDS 760 m.
9. HEIGHT OF BENCH MARK ABOVE WATER LEVEL 2 m.
WATER MANAGEMENT BRANCH
MINISTRY OF THE ENVIRONMENT
INVENTORY OPERATIONS UNIT
DINA LAKE
DEPTHS IN METRES
SCALE 1:4,000
N.T.S. No. 93O/11

APPENDIX 8

Trap Netting Records

(Data showing hours fished, trap depths, and species captured)

MAY TRIP

NETTING SITE #1

Type:	Trap Net		
Date Set:	May 23,2001	Time:	1415 hrs
Date Lifted:	May 25,2001	Time:	1000 hrs
Depth at Mouth:	2.0 m		
Depth at end of centre wall:	Not recorded		
Location:	Shallow zone on west shore of main basin		

Comments:

Net checked at 1635hrs May 23rd, captured 9 lake chub. Reset net and checked 1400hrs May 24th, captured 3 adult rainbow trout, 4 juvenile rainbow trout, 9 longnose suckers, and 69 lake chub. Reset net overnight, pulled May 25th at 1000hrs, and captured 16 lake chub, 30 rainbow trout, and 9 longnose suckers. No pygmy whitefish were captured by this trap net on the May trip.

JUNE TRIP

NETTING SITE #1

Type:	Trap Net		
Date Set:	June 5, 2001	Time:	1400 hrs
Date Lifted:	June 8, 2001	Time:	1100 hrs
Depth at Mouth:	2.0 m		
Depth at end of centre wall:	3.1 m		
Location:	South shore of the main basin, by Stowaways		

Comments:

Trap net checked at 1844hrs, no fish, reset. Checked again at 2155hrs, captured 9 lake chub. Reset overnight. Checked June 6th at 1010hrs, captured 2 silver rainbow trout, 2 juvenile rainbow trout, and 10 lake chub, reset. Checked again at 1400hrs, captured 4 lake chub and 1 juvenile rainbow trout, reset. Checked again at 1545hrs, no fish. Reset overnight. Checked June 7th at 0610hrs, captured 10 lake chub and 3 juvenile rainbow trout, reset. Checked again at 1343hrs, captured 1 longnose sucker and 22 lake chub. Reset overnight. Checked at 1100hrs June 8th, few fish present (not sampled) and reset trap. Trap later pulled at 1220hrs, captured 41 lake chub, 5 rainbow trout, and 1 sucker.

No pygmy whitefish were captured with this trap net during the June trip. After observing the results obtained with the gill nets (set during the same time as this trap net), it appears that there may be some trap avoidance with this trap net. A gill net was set nearby this trap net (15 m away) and did capture pygmy whitefish. When the trap net was finally pulled, it appears that there may be a problem with the lead lines. While this trap was situated on the bottom, the lead lines were elevated off of the bottom by about 30 cm in a few places. If pygmy whitefish do swim right near the bottom, then they may swim under the lead lines and avoid being captured. It was recommended for the next trip to attach more weight to the bottom of the lead lines.

JULY TRIP

NETTING SITE #1

Type:	Trap Net		
Date Set:	July 10, 2001	Time:	1230 hrs
Date Lifted:	July 13, 2001	Time:	0945 hrs
Depth at Mouth:	1.75 m		
Depth at end of centre wall:	3.1 m		
Location:	South shore of the main basin, by Stowaways		

Comments:

Trap checked at 1750hrs, saw 40 fish, presumed lake chub but not verified. Checked at 2145hrs, captured 3 rainbow trout , 231 lake chub, and 2 longnose suckers. Left trap in overnight. Checked trap again at 1030hrs on July 11th, captured 1 live pygmy whitefish, and estimate 700 lake chub and 150 longnose suckers. Checked again at 1712hrs, captured 323 lake chub, 3 rainbow trout, and 28 longnose suckers. Checked again at 2255hrs, captured an estimated 500 plus lake chub, 50 longnose suckers, and 3 rainbow trout. Left trap in overnight. Checked trap at 0450hrs on July 12th, captured 310 lake chub, 27 longnose suckers, and 1 rainbow trout. Checked again at 1410hrs, captured 265 lake chub,12 longnose suckers, and 6 rainbow trout. Trap left in overnight. Trap pulled at 0945hrs on July 13th, captured approximately 1000 lake chub, 100 suckers, and 30 rainbow trout.

AUGUST TRIP

NETTING SITE #1

Type:	Trap Net		
Date Set:	August 28, 2001	Time:	1110 hrs
Date Lifted:	August 31, 2001	Time:	1030 hrs
Depth at Mouth:	1.75 m		
Depth at end of centre wall:	Not recorded		
Location:	Next to Stowaways		

Comments:

Trap net checked at 1610hrs, captured 2 rainbow trout, about 100 lake chub, and a few longnose suckers. Trap left in overnight. Checked August 29th at 0840hrs, captured 5 rainbow trout, an estimated 100 lake chub, and about 1000 longnose suckers. The longnose suckers are Y-O-Y from this last spring (mean length = 35 mm). Checked again at 1442hrs, captured a few rainbow trout, Many lake chub and longnose suckers were captured, neither species was counted. The Y-O-Y lake chub averaged 21 mm in length while the Y-O-Y longnose suckers mean length was 25 mm. Also captured 2 pygmy whitefish, samples 185 (41 mm) and 186 (84 mm). Trap checked again at 2030hrs, captured 160 young of the year lake chub and longnose suckers, 1 rainbow trout (120 mm), and 2 pygmy whitefish: vouchers 187 and188. Trap reset overnight. Checked at 0500hrs August 30th, captured about 100 each of lake chub and longnose suckers. Checked again at 1825hrs, captured 1 pygmy whitefish, 2 rainbow, 10 lake chub, and 40 juvenile longnose suckers. Reset overnight. Trap pulled August 31st at 1030hrs, captured about 1000 longnose suckers, approximately 1000 lake chub, 7 rainbow trout, and 2 pygmy whitefish.

NETTING SITE #2

Type:	Trap Net		
Date Set:	August 28, 2001	Time:	1210 hrs
Date Lifted:	August 29, 2001	Time:	0915 hrs
Depth at Mouth:	3.0 m		
Depth at end of centre wall:	15.0 m		
Location:	Shoal area between the main basin and the east basin		

Comments:

Trap left overnight. Trap pulled at 0915 August 29th, captured about 40 adult longnose suckers, many Y-O-Y and juvenile longnose suckers, a few hundred lake chub, 3 adult pygmy whitefish, and 3 smaller pygmy whitefish. Trap moved to another location.

NETTING SITE #3

Type:	Trap Net		
Date Set:	August 28, 2001	Time:	1350 hrs
Date Lifted:	August 29, 2001	Time:	1030 hrs
Depth at Mouth:	6.5 m		
Depth at end of centre wall:	8.5 m		
Location:	Shoal area between the main basin and the east basin		

Comments:

Trap was set and left overnight. Pulled at 1030hrs August 29, captured about 40 adult longnose suckers, 100's of juvenile longnose suckers, about 1000 lake chub, and 27 pygmy whitefish (26 juvenile size and 1 Y-O-Y). The trend with these trap nets appears to be more successful in deeper water for capturing pygmy whitefish. Trap moved to another location.

NETTING SITE #4

Type:	Trap Net		
Date Set:	August 29, 2001	Time:	1000 hrs
Date Lifted:	August 30, 2001	Time:	1345 hrs
Depth at Mouth:	5.4 m		
Depth at end of centre wall:	7.0 m		
Location:	Between 2 large basins		

Comments:

Trap was left overnight and pulled at 1345hrs August 30th. Captured 20 adult longnose suckers, 12 juvenile longnose suckers, 12 lake chub, 3 adult pygmy whitefish, 43 young of the year pygmy whitefish (samples 206 and 251). Trap was located on a mud substrate. The younger pygmy whitefish appear to be located in shallower water (around 5.0 m) along a shoal. We did not see many of these smaller fish in the deeper trap set #5 (over 7.0 m). Trap moved to another location.

NETTING SITE #5

Type:	Trap Net		
Date Set:	August 29, 2001	Time:	1115 hrs
Date Lifted:	August 30, 2001	Time:	1415 hrs
Depth at Mouth:	7.3 m		
Depth at end of centre wall:	8.5 m		
Location:	Between 2 large basins		

Comments:

Trap was left overnight and pulled the next afternoon. Captured an estimated 2065 pygmy whitefish (min. 39 mm, mean 77 mm, max. 127 mm). There were very few of the minimum sized fish, mainly of the mean and maximum size present. A few samples were taken (252 to 256). No mortalities occurred in the trap net, all fish appeared healthy. Fish were released and their response was to immediately dive down towards the bottom.

NETTING SITE #6

Type:	Trap Net		
Date Set:	August 30, 2001	Time:	1405 hrs
Date Lifted:	August 31, 2001	Time:	0930 hrs
Depth at Mouth:	9.0 m		
Depth at end of centre wall:	9.0 m		
Location:	East basin		

Comments:

Trap was set overnight and pulled the next morning. Captured 80 adult longnose suckers and 25 juvenile suckers. No pygmy whitefish or lake chub were captured in this deep of water. Oxygen levels appear adequate (approx. 8 mg/L) but water temperature is high (approx. 17° C).

NETTING SITE #7

Type:	Trap Net		
Date Set:	August 30, 2001	Time:	1705 hrs
Date Lifted:	August 31, 2001	Time:	0930 hrs
Depth at Mouth:	11.0 m		
Depth at end of centre wall:	14.0 m		
Location:	West basin		

Comments:

Trap was set overnight and pulled the next morning. The trap was set in relation to the current oxygen levels (i.e. we did not want the trap box in a anoxic layer where the fish could eventually die). Therefore, we made sure the box was in 10 m of water where the oxygen was about 6.4 mg/L and the temperature was 12.5° C. Trap captured 142 longnose suckers, 2 lake chub, and 1 rainbow trout. No pygmy whitefish were captured and we suspect that the oxygen levels were too low for them to originally enter the trap (i.e. center lead line was in anoxic conditions).

OCTOBER TRIP

NETTING SITE #1

Type:	Trap Net		
Date Set:	October 22, 2001	Time:	1742 hrs
Date Lifted:	October 25, 2001	Time:	1245 hrs
Depth at Mouth:	1.7 m		
Depth at end of centre wall:	2.8 m		
Location:	By the Stowaways, main basin		

Comments:

Trap was set for 4 days and then pulled. Trap checked on October 23 at 1250hrs, captured 23 lake chub and 3 longnose suckers. Left in overnight. Trap checked again at 1035hrs on October 24, captured 5 lake chub and 1 juvenile rainbow trout. Left in overnight again. Trap checked again at 1245hrs October 25, captured 28 juvenile longnose suckers, 13 juvenile rainbow trout, 2 adult rainbow trout, and 26 lake chub. No pygmy whitefish captured yet so the trap was moved out to a deeper location (trap net #10 results).

NETTING SITE #2

Type:	Trap Net		
Date Set:	October 22, 2001	Time:	1628 hrs
Date Lifted:	October 23, 2001	Time:	1145 hrs
Depth at Mouth:	7.5 m		
Depth at end of centre wall:	3.0 m (on a ridge)		
Location:	East basin		

Comments:

Trap was left overnight, captured one adult longnose sucker, 26 juvenile suckers, 40 lake chub, and 23 pygmy whitefish.

NETTING SITE #3

Type:	Trap Net		
Date Set:	October 22, 2001	Time:	1657 hrs
Date Lifted:	October 23, 2001	Time:	1212 hrs
Depth at Mouth:	10.0 m		
Depth at end of centre wall:	9.0 m		
Location:	West basin		

Comments:

Trap was set overnight, captured 3 adult longnose suckers, 26 juvenile suckers, 1 lake chub, and 4 pygmy whitefish. .

NETTING SITE #4

Type:	Trap Net		
Date Set:	October 23, 2001	Time:	1212 hrs
Date Lifted:	October 24, 2001	Time:	1015 hrs
Depth at Mouth:	6.5 m		
Depth at end of centre wall:	8.6 m		
Location:	Between two large basins		

Comments:

Trap was left overnight, captured 1 adult rainbow trout, 2 juvenile longnose suckers, and 2 lake chub.

NETTING SITE #5

Type:	Trap Net		
Date Set:	October 23, 2001	Time:	1240 hrs
Date Lifted:	October 24, 2001	Time:	0945 hrs
Depth at Mouth:	2.8 m		
Depth at end of centre wall:	2.8 m		
Location:	Shallows by west basin		

Comments:

Trap was set overnight, captured 26 lake chub, 53 juvenile longnose suckers, and 7 pygmy whitefish.

NETTING SITE #6

Type:	Trap Net		
Date Set:	October 24, 2001	Time:	1003 hrs
Date Lifted:	October 25, 2001	Time:	1140 hrs
Depth at Mouth:	7.5 m		
Depth at end of centre wall:	10.0 m		
Location:	North west basin area		

Comments:

Trap was set overnight, captured 21 adult longnose suckers, 1 adult rainbow trout, and 1 lake chub.

NETTING SITE #7

Type:	Trap Net		
Date Set:	October 24, 2001	Time:	1030 hrs
Date Lifted:	October 25, 2001	Time:	1212 hrs
Depth at Mouth:	9.0 m		
Depth at end of centre wall:	16.0 m		
Location:	Main basin, right by the point off of the East basin		

Comments:

Trap was set overnight, captured 40 lake chub and 1 juvenile longnose sucker.

NETTING SITE #8

Type:	Trap Net		
Date Set:	October 25, 2001	Time:	1207 hrs
Date Lifted:	October 26, 2001	Time:	0945 hrs
Depth at Mouth:	15.0 m		
Depth at end of centre wall:	9.0 m		
Location:	Main basin by Stowaways		

Comments:

Trap was left overnight, captured 2 juvenile longnose suckers.

NETTING SITE #9

Type:	Trap Net		
Date Set:	October 25, 2001	Time:	1242 hrs
Date Lifted:	October 26, 2001	Time:	1025 hrs
Depth at Mouth:	8.5 m		
Depth at end of centre wall:	5.0 m		
Location:	East basin		

Comments:

Trap was set overnight, captured 2 adult longnose suckers, 7 adult pygmy whitefish, 10 immature pygmy whitefish, 7 lake chub, and 6 juvenile suckers. (Only 1 sample taken, #359 – smallest of the bunch)

NETTING SITE #10

Type:	Trap Net		
Date Set:	October 25, 2001	Time:	1309 hrs
Date Lifted:	October 26, 2001	Time:	1110 hrs
Depth at Mouth:	6.0 m		
Depth at end of centre wall:	12.0 m		
Location:	Main basin by Stowaways		

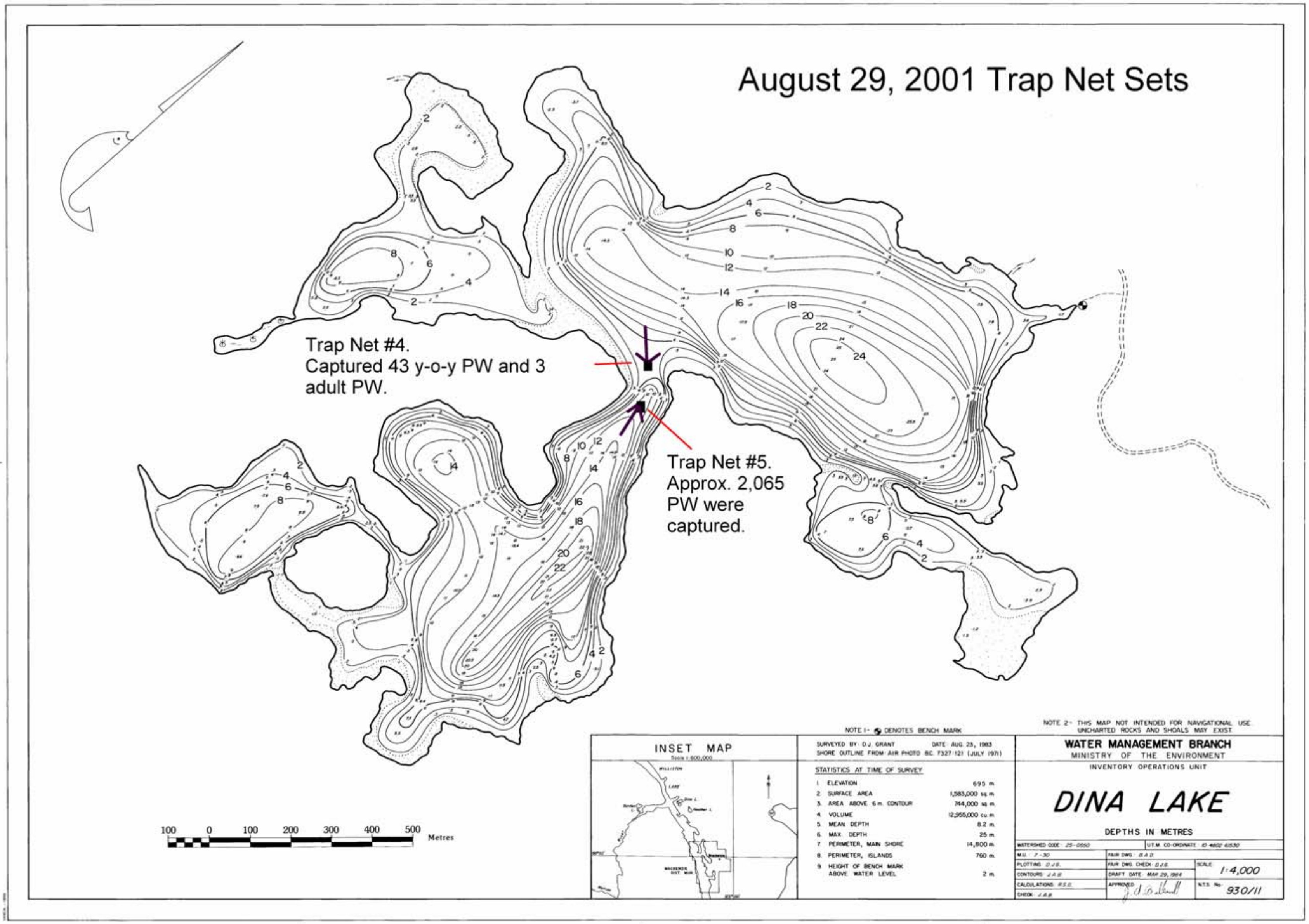
Comments:

Trap was left overnight, captured 2 adult longnose suckers, 2 juvenile suckers, 11 adult pygmy whitefish, and 25 lake chub. Depth may be the key why this trap (previously #1) did not capture any pygmy whitefish close to shore.

APPENDIX 9

Trap Netting Locations

Throughout the 2001 field season, there were 10 separate trap netting days undertaken. Due to the fact that the bathymetric maps presented in this report contain large file sizes, only one of the trap netting sessions (August 29, 2001) is provided as an example. This example shows the exact locations of where the large school of ~2,065 pygmy whitefish were found and also the smaller school of y-o-y pygmy whitefish. Detailed locations for each individual trap net set can be obtained at the address at the beginning of this report.



August 29, 2001 Trap Net Sets
Trap Net #4.
Captured 43 y-o-y PW and 3 adult PW.
Trap Net #5.
Approx. 2,065 PW were captured.
100 0 100 200 300 400 500 Metres
INSET MAP
NOTE 1- DENOTES BENCH MARK
NOTE 2- THIS MAP NOT INTENDED FOR NAVIGATIONAL USE. UNCHARTED ROCKS AND SHOALS MAY EXIST
SURVEYED BY: D.J. GRANT DATE: AUG. 23, 1983
SHORE OUTLINE FROM AIR PHOTO BC 7327:121 (JULY 1971)
STATISTICS AT TIME OF SURVEY
1. ELEVATION 695 m.
2. SURFACE AREA 1,583,000 sq.m.
3. AREA ABOVE 6 m. CONTOUR 744,000 sq.m.
4. VOLUME 12,955,000 cu.m.
5. MEAN DEPTH 8.2 m.
6. MAX. DEPTH 25 m.
7. PERIMETER, MAIN SHORE 14,800 m.
8. PERIMETER, ISLANDS 760 m.
9. HEIGHT OF BENCH MARK ABOVE WATER LEVEL 2 m.
WATER MANAGEMENT BRANCH
MINISTRY OF THE ENVIRONMENT
INVENTORY OPERATIONS UNIT
DINA LAKE
DEPTHS IN METRES
SCALE 1:4,000
N.T.S. No. 93O/11

APPENDIX 10

Trawling Records

May Trip

Trawl #1

Date set:	May 23, 2001
Time Set:	1500 hrs
Time Lifted:	1600 hrs
Depth at top (beam):	5 m
Depth at bottom (weights):	8 m
Speed of boat:	3.6 km/h
Approximate distance covered:	1,000 m
Location:	Main basin

Comments:

First time we used the trawl net. We used a 20 hp engine to tow it. The new was towed 102 m behind the boat. We trawled in two separate lines (from buoy to buoy). No fish were captured.

June Trip

Trawl #1

Date set:	June 5, 2001
Time Set:	2015 hrs
Time Lifted:	2030 hrs
Depth at top (beam):	0 m (surface)
Depth at bottom (weights):	3 m
Speed of boat:	Not recorded
Approximate distance covered:	500 m
Location:	Main basin

Comments:

Pulled net in one direction (from east buoy going to west buoy). Problem with loosing a weight (mouth probably closed partially). No fish captured.

Trawl #2

Date set:	June 5, 2001
Time Set:	2130 hrs
Time Lifted:	2135 hrs
Depth at top (beam):	10 m
Depth at bottom (weights):	13 m
Speed of boat:	Not recorded
Approximate distance covered:	500 m
Location:	Main basin

Comments:

Pulled net in one direction (from west buoy going to east buoy). No fish captured.

Trawl #3

Date set:	June 6, 2001
Time Set:	1450 hrs
Time Lifted:	1459 hrs
Depth at top (beam):	15 m
Depth at bottom (weights):	18 m
Speed of boat:	3.9 km/h
Approximate distance covered:	500 m
Location:	Main basin

Comments:

Pulled net in one direction (from east buoy going to west buoy). No fish captured.

Trawl #4

Date set:	June 7, 2001
Time Set:	0300 hrs
Time Lifted:	0325 hrs
Depth at top (beam):	0 m (surface)
Depth at bottom (weights):	3 m
Speed of boat:	4.1 km/h
Approximate distance covered:	1,000 m
Location:	Main basin

Comments:

Towed the net for one complete circle. Started to get light out at 3:00 A.M. Captured no fish.

Trawl #5

Date set:	June 7, 2001
Time Set:	0343 hrs
Time Lifted:	0405 hrs
Depth at top (beam):	10 m
Depth at bottom (weights):	13 m
Speed of boat:	3.9 km/h
Approximate distance covered:	1,000 m
Location:	Main basin

Comments:

Moon towards the south. Towed the net for one complete circle. Light out at 4:00 A.M (no headlamp needed to make notes). Captured no fish.

Trawl #6

Date set:	June 7, 2001
Time Set:	0424 hrs
Time Lifted:	0434 hrs
Depth at top (beam):	15 m
Depth at bottom (weights):	18 m
Speed of boat:	3.8 km/h
Approximate distance covered:	500 m
Location:	Main basin

Comments:

Towed net from the east buoy towards the west buoy. Captured no fish.

July Trip

Trawl #1

Date set:	July 11, 2001
Time Set:	2330 hrs
Time Lifted:	0030 hrs
Depth at top (beam):	15 m
Depth at bottom (weights):	18 m
Speed of boat:	4.4 km/h
Approximate distance covered:	3,000 m
Location:	Main basin

Comments:

Towed net for three complete revolutions within the two buoys. No moon present, quite dark out. Captured no fish.

Trawl #2

Date set:	July 11, 2001
Time Set:	0045 hrs
Time Lifted:	0125 hrs
Depth at top (beam):	10 m
Depth at bottom (weights):	13 m
Speed of boat:	5.5 km/h
Approximate distance covered:	3,000 m
Location:	Main basin

Comments:

Trawled for three complete revolutions within the buoys. Half moon developed from the SE shore around 1:17 A.M. captured 8 adult longnose suckers.

Trawl #3

Date set:	July 12, 2001
Time Set:	0330 hrs
Time Lifted:	0410 hrs
Depth at top (beam):	5 m
Depth at bottom (weights):	8 m
Speed of boat:	5.8 km/h
Approximate distance covered:	3,000 m
Location:	Main basin

Comments:

Trawled for three complete revolutions within the buoys. Started to get light out at 3:00 A.M. By 3:40 A.M., you could see the floats without the aid of the spotlight. Captured no fish.

Trawl #4

Date set:	July 12, 2001
Time Set:	1500 hrs
Time Lifted:	1550 hrs
Depth at top (beam):	15 m
Depth at bottom (weights):	18 m
Speed of boat:	4.5 km/h
Approximate distance covered:	3,000 m
Location:	Main basin

Comments:

Trawled for three complete revolutions within the buoys. Captured no fish.

Trawl #5

Date set:	July 13, 2001
Time Set:	1035 hrs
Time Lifted:	1135 hrs
Depth at top (beam):	15 m
Depth at bottom (weights):	18 m
Speed of boat:	4.0 km/h
Approximate distance covered:	3,000 m
Location:	Main basin

Comments:

Trawled for three complete revolutions within the buoys. Captured no fish.

August Trip

Trawl #1

Date set:	August 29, 2001
Time Set:	2135 hrs
Time Lifted:	2240 hrs
Depth at top (beam):	15 m
Depth at bottom (weights):	18 m
Speed of boat:	4.1 km/h
Approximate distance covered:	3,000 m
Location:	Main basin

Comments:

Dark at 21:15. The moon was present (at about ¾) but not very bright. Trawled for three complete revolutions within the buoys. Captured 1 lake chub about 55 mm FL.

Trawl #2

Date set:	August 29, 2001
Time Set:	2315 hrs
Time Lifted:	0020 hrs
Depth at top (beam):	10 m
Depth at bottom (weights):	13 m
Speed of boat:	4.1 km/h
Approximate distance covered:	2,000 m
Location:	Main basin

Comments:

Trawled for two complete revolutions within the buoys (did not have enough fuel to complete the third revolution). Captured 1 adult longnose sucker.

Trawl #3

Date set:	August 29, 2001
Time Set:	0209 hrs
Time Lifted:	0309 hrs
Depth at top (beam):	5 m
Depth at bottom (weights):	8 m
Speed of boat:	4.4 km/h
Approximate distance covered:	3,000 m
Location:	Main basin

Comments:

Pitch dark now, no moon present. Trawled for three complete revolutions within the buoys. Captured 2 lake chub, both about 50 mm FL.

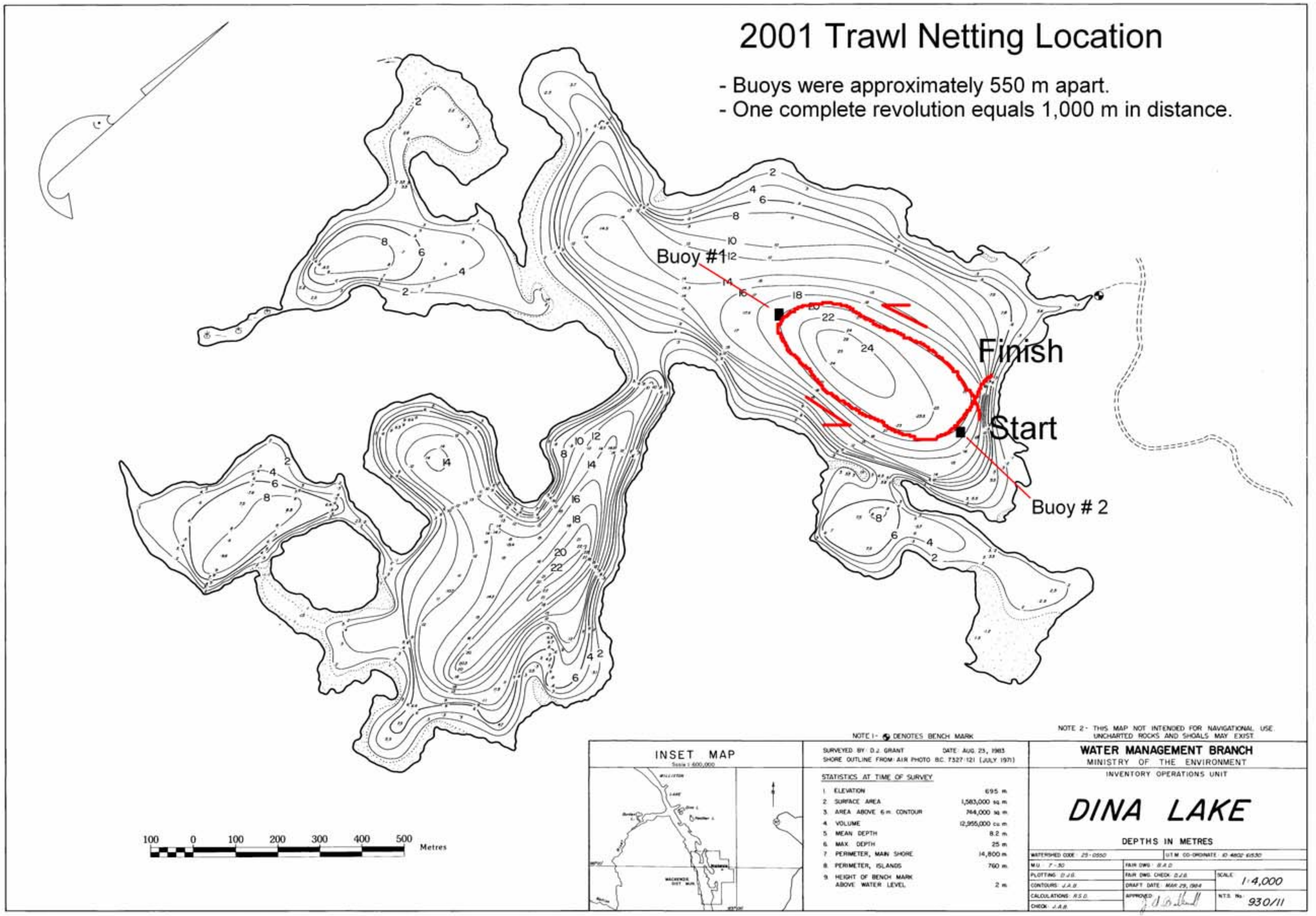
Did not have time to continue with any further trawls during the day. Since the trap net has captured over 2,000 pygmy whitefish in a single setting, we focused more of our future efforts on the trap netting technique.

APPENDIX 11

Trawling Location

2001 Trawl Netting Location

- Buoys were approximately 550 m apart.
- One complete revolution equals 1,000 m in distance.



APPENDIX 12

Light Trap Box Records

May Trip

Light Trap Box #1

Date set:	May 23, 2001
Time Set:	1320 hrs
Date Lifted:	May 23, 2001
Time Lifted:	1620 hrs
Depth of trap location:	15 m
Depth of trap:	0.5 m above bottom
Location:	West basin

Comments:

This light trap box was an experiment where we had a small plexiglass box made up that contained four regular flashlights inside. Four sides of the box would allow light to escape. On the outside, one half of a Gee trap (4 in total) were attached to the box where the flashlights would shine. This box had many problems with water entering inside and causing the flashlights to stop working.

During this particular use, there was a problem with the latch (water entering trap box). Flashlight got went and stopped working. No fish captured.

July Trip

Light Trap Box #1

Date set:	July 10, 2001
Time Set:	2045 hrs
Date Lifted:	July 11, 2001
Time Lifted:	1300 hrs
Depth of trap location:	10 m
Depth of trap:	1.0 m above bottom
Location:	Main basin

Comments:

The light box latch was fixed for this trip (to keep it air tight). When the box was finally pulled, the box was half full of water. Presume water affected operation of flashlight. No fish were captured.

Light Trap Box #2

Date set:	July 10, 2001
Time Set:	2050 hrs
Date Lifted:	July 11, 2001
Time Lifted:	1305 hrs
Depth of trap location:	9.1 m
Depth of trap:	0.5 m above bottom
Location:	East basin

Comments:

This particular light box was constructed differently than the previous. The intent of this trap was for water to enter inside the box through the small openings where the fish would enter. A underwater flashlight was used to shine through the box and entice the fish inside. A small cod end of a zooplankton trap was attached to the bottom of the light box and the fish would eventually get captured here. Three glow sticks (yellow, green, and blue colours) were also placed inside the trap.

When the trap was finally pulled, no fish were captured. Although, the trap did contain a huge amount of zooplankton within the cod end of the trap.

Light Trap Box #1

Date set:	July 11, 2001
Time Set:	2200 hrs
Date Lifted:	July 12, 2001
Time Lifted:	0440 hrs
Depth of trap location:	2 m
Depth of trap:	0.5 m above bottom
Location:	Main basin

Comments:

Trap checked at 1:40 A.M. Flashlight was still working well (lots of light). Some fish were present around the bottom of the trap. Box was not pulled at the time. Box was later pulled at 4:40 A.M. Light was still working. No fish were captured, but lots of zooplankton was present.

Light Trap Box #1

Date set:	July 12, 2001
Time Set:	1645 hrs
Date Lifted:	July 13, 2001
Time Lifted:	0925 hrs
Depth of trap location:	16 m
Depth of trap:	0.5 m above bottom
Location:	Main basin

Comments:

Box was set near the Stowaways. No fish were captured when it was pulled the next morning.

August Trip

Light Trap Box #1

Date set:	August 29, 2001
Time Set:	2040 hrs
Date Lifted:	August 30, 2001
Time Lifted:	0450 hrs
Depth of trap location:	8.6 m
Depth of trap:	0.5 m above bottom
Location:	Between main and east basins

Comments:

Darkness approached at 9:15 P.M. Box was checked at 1:50 A.M, but not pulled. Light was still present. At 4:50 A.M., it was still dark outside, no light was present from the flashlight, and the box was pulled. No fish were captured but there was lots (very thick) of zooplankton in the cod end of the trap.

October Trip

Light Trap Box #1

Date set:	October 24, 2001
Time Set:	1455 hrs
Date Lifted:	October 24, 2001
Time Lifted:	2145 hrs
Depth of trap location:	7.1 m
Depth of trap:	0.5 m above bottom
Location:	Main basin

Comments:

Box was set during the day and captured no fish.

Light Trap Box #2

Date set:	October 24, 2001
Time Set:	2155 hrs
Date Lifted:	October 25, 2001
Time Lifted:	1600 hrs
Depth of trap location:	2.6 m
Depth of trap:	0.5 m above bottom
Location:	Main basin

Comments:

Box set while it was dark out. Box pulled the next afternoon and captured 1 adult lake chub.

Light Trap Box #1

Date set:	October 25, 2001
Time Set:	1615 hrs
Date Lifted:	October 26, 2001
Time Lifted:	1143 hrs
Depth of trap location:	7.5 m
Depth of trap:	0.5 m above bottom
Location:	Main basin

Comments:

Box was set during the day by the Stowaways. The box was then retrieved the next morning and it had drifted towards the north shore. The box captured one adult lake chub.

APPENDIX 13

Light Trap Box Locations

Throughout the 2001 field season, there were 7 separate light trap box days undertaken. Due to the fact that the bathymetric maps presented in this report contain large file sizes, none of the light trap location maps are provided in this report. Light trap box locations were restricted only to the Northern Basin and were set at a variety of different depths. Detailed locations for each individual light trap set can be obtained at the address at the beginning of this report.

APPENDIX 14

Individual Fish Data

INDIVIDUAL PYGMY WHITEFISH DATA

Date Captured: May 18-25, 2001

M - Male		IMM - Immature		EG - Egg		SC - Scale	
F - Female		MG - Maturing		ML - Milt		FR - Fin Ray	
? - Not Obvious		MT - Mature		HD - Head		OT - Otolith	
Y Yes		GV - Gravid		TG - Fish Tag		WF - Whole Fish	
N No		SP - Spent		ST - Stomach			
		? - Not Obvious					

Condition Factor (K) = $W / L^3 \times 100$

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
7	1	10.6	12.6	1.1	F	MG		2	Y	2		
7	2	10.2	11.3	1.1	M	MG		4	Y	4		
7	3	11.3	13.4	0.9	F	MT		5	Y	2		
7	4	12.5	16.4	0.8	?	?			N	?		kept alive, then died

INDIVIDUAL PYGMY WHITEFISH DATA

Date Captured: June 5-8, 2001

M - Male	IMM - Immature	EG - Egg	SC - Scale
F - Female	MG - Maturing	ML - Milt	FR - Fin Ray
? - Not Obvious	MT - Mature	HD - Head	OT - Otolith
Y Yes	GV - Gravid	TG - Fish Tag	WF - Whole Fish
N No	SP - Spent	ST - Stomach	
	? - Not Obvious		

Condition Factor (K) = $W / L^3 \times 100$

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
3	5	11.9	16.6	1.0	F	MG		3	Y	1		
3	6	11.9	18.3	1.1	F	MG		3	Y	0		
4	7	9.5	8.6	1.0	F	MG		1	Y	0		
4	8	9.5	9.2	1.1	M	MG		1	Y	0		
4	9	9.6	9.1	1.0	M	MG		2	Y	4		
4	10	9.7	10.0	1.1	F	MG		1	Y	1		
4	11	9.4	8.7	1.0	F	MG		1	Y	1		
4	12	10.6	11.9	1.0	F	MG			N	?		
4	13	9.6	8.9	1.0	?	?			N	?		
4	14	9.4	?		?	?			N	?		
4	15	9.4	?		F	MG			N	?		
4	16	10.9	13.9	1.1	F	MG		2	N	4		
2	17	7.0	3.4	1.0	F	MG		1	Y	0		
3	18	11.5	16.5	1.1	F	MG		2	Y	2		
3	19	12.3	17.2	0.9	F	MG		5	Y	4		
3	20	11.9	17.2	1.0	F	MG		5	Y	8		
11	21	9.9	9.5	1.0	M	MG		2	N	4		
11	22	9.9	10.1	1.0	M	MG		2	N	0		
11	23	10.6	12.5	1.0	F	MG		2	N	0		
12	24	10.2	11.4	1.1	F	MG		2	Y	4		
12	25	9.9	9.5	1.0	F	MG		1	Y	3		
12	26	10.0	10.0	1.0	F	MG		2	N	2		
12	27	9.6	9.6	1.1	F	MG		2	Y	12		

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
12	28	9.2	8.8	1.1	F	MG		2	N	0		
12	29	10.4	12.2	1.1	F	MG		2	Y	2		
12	30	10.0	10.6	1.1	F	MG		2	N	0		
12	31	9.8	10.4	1.1	F	MG		1	Y	1		
12	32	9.8	10.4	1.1	F	MG		2	Y	3		
12	33	11.2	16.0	1.1	F	MG		3	Y	1		
12	34	9.5	9.2	1.1	M	MG		2	Y	2		
12	35	10.3	10.6	1.0	F	MG		2	Y	1		
12	36	10.6	10.9	0.9	F	MG		2	N	2		
12	37	10.1	10.7	1.0	F	MG		2	N	7		
10	38	11.5	15.0	1.0	F	MG		3	Y	4		
10	39	12.3	17.8	1.0	F	MG		5	Y	6		
10	40	10.9	14.5	1.1	F	MG		4	Y	3		
10	41	?	?		F	MG			N	?		
10	42	11.8	17.2	1.0	F	MG		4	Y	8		
10	43	12.0	18.7	1.1	F	MG		4	Y	6		
10	44	12.9	20.9	1.0	F	MG		3	Y	8		
10	45	12.1	17.1	1.0	F	MG		3	Y	8		
10	46	11.6	16.3	1.0	F	MG		3	Y	0		
10	47	12.0	18.5	1.1	F	MG		4	Y	1		
10	48	12.5	18.3	0.9	F	MG		4	Y	3		
10	49	12.4	19.7	1.0	F	MG		5	Y	5		
10	50	11.9	17.5	1.0	F	MG		4	Y	7		
10	51	12.8	?		?	?			N	?		

INDIVIDUAL PYGMY WHITEFISH DATA

Date Captured: July 10-11, 2001

M - Male
F - Female
? - Not Obvious
Y Yes
N No

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
ML - Milt
HD - Head
TG - Fish Tag
ST - Stomach

SC - Scale
FR - Fin Ray
OT - Otolith
WF - Whole Fish

Condition Factor (K) = $W / L^3 \times 100$

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
1	52	7.1	3.6	1.0	?	IMM		1	Y	1		
1	53	7.0	3.4	1.0	F	IMM		1	Y	0		
1	54	6.5	3.1	1.1	?	IMM	1	1	Y	1		
1	55	6.8	3.1	1.0	?	IMM		1	Y	1		
1	56	7.0	3.4	1.0	?	IMM		1	N	?		
2	57	9.1	9.3	1.2	M	MG		2	Y	0		
2	58	9.4	9.6	1.2	M	MG		2	Y	6		
2	59	11.3	15.5	1.1	F	MG		3	Y	4		
4	60	5.9	2.4	1.2	F	IMM		1	Y	1		
4	61	5.7	1.6	0.9	F	IMM		1	Y	0		
2	62	10.0	10.2	1.0	M	MG		2	Y	7		
3	63	12.1	20.7	1.2	F	MG		5	Y	0		
3	64	11.1	15.7	1.1	F	MG		2	Y	1		
3	65	10.8	15.5	1.2	M	MG		3	N	1		
4	66	5.9	1.8	0.9	F	IMM	1	1	Y	0		
4	67	5.2	1.5	1.1	?	IMM	0+	1	Y	0		
4	68	5.2	1.6	1.1	?	IMM	1	1	Y	0		
4	69	5.3	1.4	0.9	?	IMM	1	1	Y	0		
4	70	5.3	1.7	1.1	?	IMM	1	1	N	0		
4	71	5.4	1.7	1.1	?	IMM	0+	1	Y	0		
1	72	8.0	4.4	0.9	F	MG		2	Y	0		
1	73	10.9	14.7	1.1	F	MG			N	?		
2	74	9.8	10.0	1.1	F	MG		2	Y	5		

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
2	75	9.7	10.2	1.1	F	MG		2	Y	2		
2	76	9.6	10.0	1.1	F	MG		2	Y	1		
2	77	10.4	13.2	1.2	F	MG		2	Y	0		
2	78	9.8	10.6	1.1	F	MG		2	Y	1		
2	79	10.3	12.0	1.1	F	MG		2	Y	1		
2	80	?	?		?	?			?	?		
2	81	?	?		?	?			?	?		
2	82	9.8	11.8	1.3	F	MG		2	Y	6		
3	83	11.4	17.1	1.2	F	MG		2	Y	2		
3	84	11.0	17.4	1.3	F	MG			N	?		
6	85	10.0	10.0	1.0	F	MG		2	Y	4		
1	86	?	?	?	?	?						kept alive
8	87	10.5	12.3	1.1	M	MG		2	Y	2		
8	88	?	?		?	?			?	?		
7	89	12.6	19.2	1.0	F	MG		3	Y	4		
7	90	11.6	16.0	1.0	F	MG		3	Y	6		
9	91	7.2	3.6	1.0	F	IMM		1	Y	0		
8	92	11.9	17.9	1.1	F	MG			N	?		
8	93	11.7	17.2	1.1	F	MG			N	?		
8	94	11.6	16.4	1.1	F	MG			N	?		
8	95	8.8	8.1	1.2	M	MG			N	?		
8	96	9.6	10.1	1.1	M	MG			N	?		
8	97	9.5	9.2	1.1	F	MG			N	?		
8	98	9.4	9.2	1.1	M	MG			N	?		
8	99	10.8	13.2	1.0	F	MG			N	?		
8	100	10.9	14.4	1.1	F	MG			N	?		
8	101	11.0	14.6	1.1	F	MG			N	?		
8	102	10.2	11.9	1.1	F	MG			N	?		
8	103	9.8	11.3	1.2	F	MG			N	?		
8	104	11.1	14.8	1.1	F	MG			N	?		

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
8	105	10.2	11.1	1.0	M	MG			N	?		
8	106	10.3	12.9	1.2	M	MG			N	?		
8	107	9.9	10.7	1.1	M	MG			N	?		
8	108	10.4	11.5	1.0	M	MG			N	?		
8	109	11.0	15.2	1.1	F	MG			N	?		
8	110	11.1	14.0	1.0	F	MG			N	?		
8	111	10.0	11.7	1.2	F	MG			N	?		
8	112	10.3	11.8	1.1	M	MG			N	?		
8	113	10.3	12.0	1.1	M	MG			N	?		
8	114	9.1	8.2	1.1	M	MG			N	?		
8	115	8.8	7.9	1.2	M	MG			N	?		
8	116	10.3	12.7	1.2	M	MG			N	?		
8	117	11.7	16.9	1.1	F	MG			N	?		
8	118	12.0	16.8	1.0	F	MG			N	?		
8	119	9.8	11.2	1.2	M	MG			N	?		
8	120	10.0	12.2	1.2	F	MG			N	?		
8	121	9.4	9.2	1.1	M	MG			N	?		
8	122	10.3	12.0	1.1	F	MG			N	?		
8	123	10.1	11.4	1.1	F	MG			N	?		
8	124	10.0	11.9	1.2	F	MG			N	?		
8	125	9.7	9.7	1.1	F	MG			N	?		
8	126	10.4	12.0	1.1	F	MG			N	?		
8	127	10.0	11.8	1.2	M	MG			N	?		
7	128	12.4	21.5	1.1	F	MG			N	?		
7	129	12.3	21.7	1.2	F	MG			N	?		
7	130	12.6	20.5	1.0	F	MG			N	?		
7	131	12.2	21.0	1.2	M	MG		3	N	?		largest male yet
7	132	12.2	20.1	1.1	F	MG			N	?		
7	133	12.3	18.0	1.0	F	MG			N	?		
7	134	12.0	19.8	1.1	F	MG			N	?		

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
7	135	11.4	18.2	1.2	F	MG			N	?		
7	136	11.7	19.1	1.2	F	MG			N	?		
7	137	11.3	16.7	1.2	F	MG			N	?		
7	138	12.2	20.1	1.1	F	MG			N	?		
7	139	12.5	20.9	1.1	F	MG			N	?		
7	140	12.4	22.0	1.2	F	MG			N	?		
7	141	11.4	16.9	1.1	F	MG			N	?		
7	142	11.0	15.5	1.2	F	MG			N	?		
7	143	10.8	13.8	1.1	F	MG			N	?		
7	144	11.7	16.1	1.0	F	MG			N	?		
7	145	11.3	16.7	1.2	F	MG			N	?		
7	146	10.7	14.0	1.1	M	MG		4	N	?		
7	147	11.3	19.0	1.3	F	MG			N	?		
7	148	11.0	14.4	1.1	F	MG			N	?		
7	149	12.0	17.6	1.0	F	MG			N	?		
7	150	11.9	19.1	1.1	F	MG			N	?		

INDIVIDUAL PYGMY WHITEFISH DATA

Date Captured: August 29-30, 2001

M - Male
F - Female
? - Not Obvious
Y Yes
N No

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
ML - Milt
HD - Head
TG - Fish Tag
ST - Stomach

SC - Scale
FR - Fin Ray
OT - Otolith
WF - Whole Fish

Condition Factor (K) = W / $L^3 \times 100$

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
2	151	6.3	2.2	0.9	?	IMM	1	1	Y	0		
2	152	4.3	0.8	1.0		IMM						Voucher for Don
2	153	2.8	0.2	0.9		IMM						Voucher for Don
2	154	8.9	7.2	1.0	F	?			N	?		
2	155	10.5	13.9	1.2	F	MG			N	?		
2	156	8.2	6.2	1.1	M	MG			N	?		Voucher for Don
3	157	4.1	0.5	0.7		IMM						
3	158	6.7	2.8	0.9	?	?			N	?		
3	159	7.1	4.0	1.1	M	MG			N	?		
3	160	7.5	3.9	0.9	F	?			N	?		
3	161	7.3	3.8	1.0	M	MG			N	?		
3	162	6.8	2.8	0.9	F	IMM			N	?		
3	163	7.0	3.1	0.9	?	?			N	?		
3	164	6.6	3.2	1.1	F	IMM			N	?		
3	165	9.6	8.9	1.0	M	MG			N	?		Many gonads
3	166	7.3	3.9	1.0	F	IMM			N	?		
3	167	7.7	4.1	0.9	M	MG			N	?		large size gonads
3	168	8.4	6.5	1.1	M	MG			N	?		
3	169	7.6	4.1	0.9	F	?			N	?		Small eggs
3	170	7.7	4.4	1.0	M	IMM			N	?		
3	171	7.6	3.8	0.9	F	IMM			N	?		
3	172	7.6	4.4	1.0	F	IMM			N	?		
3	173	7.5	4.0	0.9	M	MG			N	?		Large gonads

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
3	174	9.5	?	?	?	?			N	?		
3	175	7.8	?	?	?	?			N	?		
3	176	7.9	?	?	?	?			N	?		
3	177	8.8	?	?	?	?						
3	178	9.4	?	?	?	?						
3	179	8.1	?	?	?	?						
3	180	7.8	?	?	?	?						
3	181	8.9	?	?	?	?						
3	182	7.2	?	?	?	?						
3	183	9.1	?	?	?	?						
2	184	10.1	9.0	0.9	F	MG		2	Y	6		
1	185	4.1	0.5	0.7								Voucher for Don
1	186	8.4	5.0	0.8	F	MG		1	Y	0		
1	187	3.7	0.4	0.8								Voucher for Don
1	188	3.7	0.4	0.8								Voucher for Don
2	189	9.6	9.2	1.0	F	MG		2	Y	1		
2	190	11.1	15.3	1.1	F	MG		3	Y	3		
2	191	10.5	13.2	1.1	F	MG		2	Y	4		
2	192	9.9	10.3	1.1	M	MG		2	Y	0		
2	193	9.7	9.5	1.0	M	MG		3	Y	7		
2	194	10.2	10.9	1.0	F	MG		2	Y	2		
2	195	10.8	14.1	1.1	F	MG		2	Y	1		
2	196	9.8	11.0	1.2	F	MG		2	Y	2		
2	197	10.2	11.5	1.1	F	MG		2	Y	4		
2	198	11.6	16.7	1.1	F	MG		2	Y	2		
2	199	11.3	14.8	1.0	F	MG		2	Y	4		
2	200	10.9	13.1	1.0	F	MG		2	Y	3		
2	201	11.5	16.7	1.1	F	MG		3	Y	1		
2	202	9.2	9.6	1.2	F	MG		2	Y	8		
2	203	10.4	12.1	1.1	F	MG		2	Y	1		

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
2	204	11.2	13.6	1.0	F	MG		2	Y	2		
2	205	11.5	16.2	1.1	F	MG		3	Y	1		
4	206	12.5	17.9	0.9	F	MG		5	Y	10		4 gill lice
4	207	8.9	6.1	0.9	F	IMM		2	Y	?		
4	208	10.9	11.7	0.9	F	MG		2	Y	10		
4	209	4.8	0.8	0.7	?	IMM		0+	Y	?	y-o-y	
4	210	6.1	1.8	0.8	M	IMM		1	Y	0		y-o-y
4	211	4.7	0.7	0.7	?	IMM	0+	0+	Y	?		y-o-y
4	212	4.6	0.8	0.8	?	IMM	0+	0+	Y	?		y-o-y
4	213	4.6	1.0	1.0	?	IMM	0+	0+	Y	?		y-o-y
4	214	4.6	1.0	1.0	?	IMM	0+	0+	Y	?		y-o-y
4	215	3.3	0.3	0.8	?	IMM	0+	0+	Y	?		y-o-y
4	216	3.0	0.3	1.1	?	IMM		0+	Y	?		y-o-y
4	217	3.6	0.3	0.6	?	IMM		0+	Y	?		y-o-y
4	218	3.4	0.3	0.8	?	IMM		0+	Y	?		y-o-y
4	219	4.4	0.5	0.6	?	?			N	?		let go
4	220	3.5	0.3	0.7		IMM						voucher for Don
4	221	3.6	0.4	0.9		IMM						voucher for Don
4	222	3.8	0.6	1.1		IMM						voucher for Don
4	223	3.5	0.4	0.9		IMM						voucher for Don
4	224	3.7	0.4	0.8		IMM						voucher for Don
4	225	4.4	0.8	0.9		IMM						voucher for Don
4	226	3.6	0.5	1.1		IMM						voucher for Don
4	227	4.1	0.8	1.2		IMM						voucher for Don
4	228	4.0	0.6	0.9		IMM						voucher for Don
4	229	3.8	0.6	1.1		IMM						voucher for Don
4	230	3.7	0.5	1.0		IMM						voucher for Don
4	231	4.3	0.8	1.0	?	IMM			N	?		y-o-y

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
4	232	4.2	0.7	0.9	?	IMM			N	?		y-o-y
4	233	3.7	0.5	1.0	?	IMM			N	?		y-o-y
4	234	3.7	0.6	1.2	?	IMM			N	?		y-o-y
4	235	4.2	0.6	0.8	?	IMM			N	?		y-o-y
4	236	4.0	0.5	0.8	?	IMM			N	?		y-o-y
4	237	3.8	0.5	0.9	?	IMM			N	?		y-o-y
4	238	3.9	0.5	0.8	?	IMM			N	?		y-o-y
4	239	4.1	0.6	0.9	?	IMM			N	?		y-o-y
4	240	4.2	0.8	1.1	?	IMM			N	?		y-o-y
4	241	4.0	0.7	1.1	?	IMM			N	?		y-o-y
4	242	4.1	0.7	1.0	?	IMM			N	?		y-o-y
4	243	4.1	0.6	0.9	?	IMM			N	?		y-o-y
4	244	3.6	0.5	1.1	?	IMM			N	?		y-o-y
4	245	4.1	0.6	0.9	?	IMM			N	?		y-o-y
4	246	3.9	0.5	0.8	?	IMM			N	?		y-o-y
4	247	4.0	0.6	0.9	?	IMM			N	?		y-o-y
4	248	3.9	0.5	0.8	?	IMM			N	?		y-o-y
4	249	3.5	0.4	0.9	?	IMM			N	?		y-o-y
4	250	4.0	0.7	1.1	?	IMM			N	?		y-o-y
4	251	4.2	0.6	0.8	?	IMM			N	?		y-o-y
5	252	12.0	19.9	1.2	F	MG		4	Y	0		
5	253	11.0	14.8	1.1	F	MG		3	Y	10		
5	254	3.9	0.6	1.0	?	IMM	0+	0+	Y	?		
5	255	7.7	3.5	0.8	M	MG		1	Y	1		
5	256	12.7	20.3	1.0	F	MG			Y	2		

INDIVIDUAL PYGMY WHITEFISH DATA

Date Captured: October 23-26, 2001

M - Male	IMM - Immature	EG - Egg	SC - Scale
F - Female	MG - Maturing	ML - Milt	FR - Fin Ray
? - Not Obvious	MT - Mature	HD - Head	OT - Otolith
Y Yes	GV - Gravid	TG - Fish Tag	WF - Whole Fish
N No	SP - Spent	ST - Stomach	
	? - Not Obvious		

Condition Factor (K) = $W / L^3 \times 100$

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
2	257	11.9	14.9	0.9	F	MT		4	Y	10		took eggs & parasites
2	258	11.6	14.3	0.9	F	MT		3	Y	5		took eggs & parasites
2	259	11.8	15.4	0.9	F	MT		3	Y	2		took eggs
2	260	11.7	14.3	0.9	F	MT		6	Y	8		took eggs
2	261	10.0	9.6	1.0	M	MT		3	Y	2		no milt
2	262	9.4	0.2	0.0	F	MT		2	Y	5		took eggs
2	263	9.1	6.9	0.9	M	MT		2	Y	0		no milt
2	264	9.0	5.6	0.8	F	IMM		2	Y	0		won't spawn this year
2	265	7.5	3.0	0.7	F	IMM		1	Y	4		
2	266	7.9	3.6	0.7	F	IMM	1	1	Y	0		really small eggs
2	267	5.8	1.5	0.8	?	IMM	1	1	Y	?		no visible parasites
2	268	5.8	1.5	0.8	?	IMM	1	1	Y	?		no visible parasites
2	269	5.8	1.6	0.8	?	IMM	1	1	Y	?		no visible parasites
2	270	5.5	1.5	0.9	?	IMM	0+	1	Y	?		no visible parasites
2	271	5.8	1.5	0.8	?	IMM	1	1	Y	?		no visible parasites
2	272	5.0	1.0	0.8	?	IMM	0+	0+	Y	?		no visible parasites
2	273	5.6	1.4	0.8	?	IMM	0+	0+	Y	?		no visible parasites
2	274	5.3	1.3	0.9	?	IMM	0+	0+	Y	?		no visible parasites
2	275	4.8	0.9	0.8	?	IMM	0+	0+	Y	?		no visible parasites
2	276	4.8	1.0	0.9	?	IMM	0+	0+	Y	?		no visible parasites

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
2	277	5.2	1.1	0.8	?	IMM	0+	0+	Y	?		no visible parasites
2	278	5.2	1.3	0.9	?	IMM	0+	0+	Y	?		no visible parasites
2	279	5.1	1.1	0.8	?	IMM	0+	0+	Y	?		no visible parasites
3	280	5.3	1.3	0.9	?	IMM	0+	1	Y	?		
3	281	10.0	10.1	1.0	M	MT		4	Y	5		
3	282	10.1	9.6	0.9	M	MT		3	Y	3		took parasites
3	283	11.0	13.3	1.0	F	MT		3	Y	3		took eggs
5	284	5.3	0.9	0.6								kept alive
5	285	6.0	1.4	0.6								kept alive
5	286	5.4	1.1	0.7								kept alive
5	287	5.2	0.7	0.5								kept alive
5	288	6.1	1.6	0.7								kept alive
5	289	8.5	2.6	0.4	F	IMM		1	Y	0		won't spawn this year
5	290	9.5	6.4	0.7	M	MT		2	Y	0		will spawn, no milt
1	291	9.9	9.7	1.0	M	MT			N	?		will spawn this year
1	292	10.0	10.3	1.0	F	MT			N	?		will spawn this year
1	293	9.2	7.8	1.0	M	MT		2	N	6		will spawn this year
1	294	10.0	10.6	1.1	M	MT			N	?		will spawn this year
1	295	9.8	9.1	1.0	M	MT			N	?		will spawn this year
1	296	9.5	7.6	0.9	M	MT			N	?		will spawn this year
1	297	11.5	14.4	0.9	M	MT		3	N	2		will spawn this year
1	298	10.1	10.8	1.0	M	MT			N	?		will spawn this year
1	299	9.8	10.5	1.1	M	MT			N	?		will spawn this year
1	300	11.4	14.2	1.0	F	MT			N	?		will spawn this year
1	301	9.8	9.9	1.1	M	MT			N	?		will spawn this year
1	302	10.1	9.6	0.9	M	MT			N	?		will spawn this year

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
1	303	10.1	10.4	1.0	M	MT			N	?		will spawn this year
1	304	9.5	8.2	1.0	M	MT			N	?		will spawn this year
1	305	9.7	8.5	0.9	M	MT			N	?		will spawn this year
1	306	10.7	9.6	0.8	M	MT			N	?		will spawn this year
1	307	11.8	15.7	1.0	F	MT		3	N	6		will spawn this year, eggs
1	308	9.8	10.1	1.1	F	MT			N	?		will spawn this year
1	309	10.8	12.3	1.0	F	MT			N	?		will spawn this year
1	310	9.6	9.3	1.1	M	MT			N	?		will spawn this year
1	311	9.4	8.2	1.0	M	MT			N	?		will spawn this year
1	312	9.5	9.0	1.0	M	MT			N	?		will spawn this year
1	313	9.3	7.5	0.9	M	MT			N	?		will spawn this year
1	314	10.5	13.2	1.1	F	MT		2	N	3		will spawn this year, eggs
1	315	9.4	7.6	0.9	M	MT			N	?		will spawn this year
1	316	9.8	8.9	0.9	M	MT			N	?		will spawn this year
1	317	10.2	11.3	1.1	M	MT			N	?		will spawn this year
1	318	10.8	13.2	1.0	F	MT			N	?		will spawn this year
1	319	10.1	10.6	1.0	M	MT			N	?		will spawn this year
1	320	10.6	12.9	1.1	F	MT		3	N	6		will spawn this year, eggs
1	321	11.4	14.1	1.0	F	MT			N	?		will spawn this year
1	322	11.0	14.1	1.1	F	MT			N	?		will spawn this year
1	323	9.4	8.3	1.0	M	MT			N	?		will spawn this year
1	324	9.9	8.7	0.9	M	MT			N	?		will spawn this year
1	325	9.7	8.7	1.0	M	MT			N	?		will spawn this year
1	326	9.5	8.1	0.9	M	MT			N	?		will spawn this year
1	327	11.8	16.6	1.0	F	MT			N	?		will spawn this year

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
1	328	10.2	9.8	0.9	M	MT			N	?		will spawn this year
1	329	9.4	8.4	1.0	M	MT			N	?		will spawn this year
1	330	10.1	9.6	0.9	M	MT			N	?		will spawn this year
1	331	11.2	13.3	0.9	F	MT			N	?		will spawn this year
1	332	9.3	8.1	1.0	M	MT			N	?		will spawn this year
1	333	10.9	12.4	1.0	M	MT		2	N	8		will spawn this year
1	334	10.1	9.2	0.9	M	MT			N	?		will spawn this year
1	335	10.4	10.4	0.9	M	MT			N	?		will spawn this year
1	336	10.1	10.2	1.0	M	MT			N	?		will spawn this year
1	337	9.7	8.8	1.0	M	MT			N	?		will spawn this year
1	338	9.2	7.7	1.0	M	MT		2	N	3		will spawn this year
1	339	9.4	8.2	1.0	M	MT			N	?		will spawn this year
1	340	9.4	7.5	0.9	M	MT			N	?		will spawn this year
1	341	9.0	6.9	0.9	M	MT		2	N	3		will spawn this year
1	342	9.5	8.3	1.0	M	MT			N	?		will spawn this year
1	343	10.2	10.1	1.0	M	MT			N	?		will spawn this year
1	344	10.2	9.8	0.9	M	MT			N	?		will spawn this year
1	345	11.3	11.7	0.8	M	MT		3	N	4		will spawn this year
1	346	11.9	17.7	1.1	F	MT		2	N	5		will spawn this year, eggs
3	347	10.6	12.2	1.0	M	MT			N	?		will spawn this year
3	348	10.0	10.8	1.1	M	MT			N	?		will spawn this year
3	349	9.2	7.9	1.0	M	MT			N	?		will spawn this year
3	350	10.0	10.3	1.0	M	MT			N	?		will spawn this year
3	351	9.7	8.9	1.0	M	MT			N	?		will spawn this year
3	352	9.4	8.4	1.0	F	MT		2	N	3		will spawn this year

3	353	9.6	8.9	1.0	M	MT			N	?		will spawn this year
3	354	10.6	11.4	1.0	M	MT			N	?		will spawn this year
3	355	10.3	11.7	1.1	F	MT			N	?		will spawn this year
3	356	10.1	12.5	1.2	F	MT			N	?		will spawn this year
3	357	9.6	8.5	1.0	M	MT			N	?		will spawn this year
3	358	10.5	11.5	1.0	F	MT			N	?		will spawn this year
9	359	4.5	0.5	0.5	?	IMM			N	?		voucher

INDIVIDUAL PYGMY WHITEFISH DATA

Date Captured: November 15, 2001

M - Male	IMM - Immature	EG - Egg	SC - Scale
F - Female	MG - Maturing	ML - Milt	FR - Fin Ray
? - Not Obvious	MT - Mature	HD - Head	OT - Otolith
Y Yes	GV - Gravid	TG - Fish Tag	WF - Whole Fish
N No	SP - Spent	ST - Stomach	
	? - Not Obvious		

Method of Capture: Sinking monofilament gill net.

Condition Factor (K) = $W / L^3 \times 100$

Gill or Trap Number	Fish Sample Number	Fork Length (cm)	Weight (grams)	K	Sex	Gonadal Maturity	Scale Age	Otolith Age	Stomach Sample Taken	Parasites Present	Gonad Weight (grams)	Comments
1	360	13.2	21.4	0.9	F	MT	3		Y	2		took eggs, add 52 to count
1	361	11.9	18.3	1.1	F	MT	2		Y	8		took eggs
1	362	12.0	17.9	1.0	F	MT			N	6		will spawn
1	363	12.0	15.8	0.9	F	MT			N	1		eggs becoming loose when handled
1	364	10.4	12.2	1.1	F	MT			N	?		will spawn
1	365	10.4	11.9	1.1	F	MT			N	?		will spawn
1	366	10.6	12.3	1.0	F	MT			N	?		will spawn
2	367	10.6	11.4	1.0	M	MT	2		N	2		will spawn
2	368	10.3	11.4	1.0	F	MT			N	0		eggs fairly loose in posterior end

AGE DETERMINATION COMPLETED BY:

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