



ATLANTIC PROVINCES COUNCIL ON THE SCIENCES CONSEIL
DES PROVINCES ATLANTIQUES POUR LES SCIENCES

FUNDY ENVIRONMENTAL STUDIES COMMITTEE

FALL MEETING 1985

Joint Meeting With

NEW ENGLAND ESTUARINE RESEARCH SOCIETY

Despite the best efforts of Hurricane "Gloria" the final arrangements for the F.E.S.C./N.E.E.R.S. meeting at Yarmouth, Nova Scotia, are now being made. The meeting is sponsored by APICS and supported financially by grants from APICS and Environment Canada. The programme for the meeting, which will be held on Thursday 24 and Friday 25 October, is enclosed.

A major theme of the meeting, to which Thursday is devoted, is the:

"Implications of Natural and Anthropogenic Changes in Sea Level and Tides in the Gulf of Maine - Bay of Fundy System."

Contributed paper sessions are set for Friday, but as you will see from the programme, several of these continue the same theme. It appears that we will have a thorough and interesting review of the impacts of both rising sea level and Fundy tidal power.

Contributors to the main thematic session have been asked to prepare manuscripts for the proceedings which will be distributed shortly after the meeting to all participants. The proceedings will also include all abstracts of contributed papers.

Although the programme as outlined appears to be full, all members of N.E.E.R.S. and F.E.S.C. are cordially invited to bring "out of pocket" papers that could be given if other cancellations occur. There is also space for poster presentations - any members wishing to add a poster, please contact Graham Daborn ((902) 542-2201) for details.

Location: The meeting will be held at

Rodd's Grand Hotel, Yarmouth, Nova Scotia
417 Main Street
Yarmouth, N.S.
(902) 742-2446

CONTRIBUTED PAPERS

ABSTRACTS

08.40-09.00 ESTUARINE SEDIMENT DISPERSAL DURING HOLOCENE SEA LEVEL CHANGES IN MAINE. J.T. Kelley (Maine Geological Survey, Augusta, ME 04333). Holocene sea level excursions have drowned the Maine coast to a depth of 75 m and exposed the present nearshore to a depth of 65 m. At present sea level appears to rise unevenly along the coast at rates ranging from 1 mm/yr to 9 mm/yr due to crustal warping. Throughout these sea level changes glacial sediment has been constantly reworked and moved "downhill". During the early drowning, 13,000 years ago, preglacial river valleys were blocked with sediment resulting in today's deranged drainage. During the sea level lowstand, 9,000 years ago, sediment was flushed out of estuaries into the Gulf of Maine. Today some sediment leaks out of estuaries while much is trapped behind river dams. Most sediment accumulating in modern coastal embayments is derived from eroding bluffs of glacial material.

09.00 - 09.20 MAINE BEACH MORPHODYNAMICS: COMPARATIVE EFFECTS OF INCREASED TIDAL RANGE AND VARIABILITY OF NATURAL EVENTS. L. K. Fink, Jr. (University of Maine, Orono, ME 04573). With an increased tidal range predicted for the Gulf of Maine because of the Fundy tidal dam, significant recession of Maine's beaches has been indicated. Presumably, this would result from an increase in the probability of occurrence of storms on a higher tide position. This study has determined the degree of change of shoreline position resulting from seasonal, secular, and Holocene changes in the elevation of mean sea level, all in light of current knowledge of Maine beach morphodynamics. Data from tide gauge stations in Portland and Eastport, specific storm events, anomalous extreme tide events, and shoreline change maps were used in this analysis of the probable response of beaches to an increased tidal range in the Gulf of Maine. Measurable changes in unstabilized shorelines have been linked to variability of MSL elevations. Unstabilized shorelines show a historical recession rate of 20-70 cm/yr while stabilized beaches show redistribution of sediment by loss of intertidal sand volume and accretion along other portions. During this time (1912-1980), there was a significant seasonal increase of 14 cm in the elevation of mean sea level between January and June, corresponding to annual peak runoff periods. The secular trend of MSL shows an average rate of rise of 23 cm/100y; a rate significantly greater than the Holocene average rise rate of 4-6 cm/100y. It is concluded that shoreline positions for unstabilized beaches will not be changed measurably by an increase in tidal range since the existing seasonal and secular changes in mean sea level elevation and storms will continue to dominate beach responses and shoreline variability.

09.20-09.40 EFFECTS OF INCREASING TIDAL RANGE ALONG THE COAST OF THE GULF OF MAINE. D.M. Fitzgerald (Boston Univ., Boston, MA 02215). The 30 cm increase in tidal range predicted for the Gulf of Maine coast as a result of tidal power development will result in an increase in inlet tidal prism and ensuing shoreline erosion. The magnitude of the shoreline erosion in the vicinity of the inlets will depend on the volume increase of the tidal prism. At small tidal inlets (width <200 m), which are backed primarily by marsh and tidal creek systems, the increase in tidal prism will cause: 1) a greater frequency of flooding of the high marsh, 2) readjustment of the tidal creeks and 3) an enlargement of the inlet throat. Erosion of adjacent beaches will not be substantial because the volume increase of the ebb-tidal delta will be less than 50,000 m³. At large tidal inlets and estuaries (width >400 m), the effect on the nearby beaches will be much more catastrophic. A 5% increase in tidal prism will result in a very large quantity of sand (vol. >10⁶ m³) moving to the ebb delta. Most (60%) of this will be eroded from adjacent beaches. For example, beaches near the Kennebec R., Maine, are predicted to lose >10⁶ m³ of sand. This loss would result in over 100 m of shoreline recession.

[Abbreviated abstract by meeting organisers]

SPRING - NEAP TIDAL EFFECTS ON NITROGEN-PHOSPHOROUS

09.40-10.00

RELATIONSHIPS IN A NEW ENGLAND SALT MARSH ESTUARY

T.C. Loder (Earth Sciences), C. Vorosmarty (Complex Systems Research Center), F. Short (Jackson Estuarine Lab), N. Kinner (Civil Engineering) and J. Spiller (Complex Systems Research Center, UNH, Durham, NH 03824). Samples for ammonium, nitrate plus nitrite, total dissolved nitrogen and phosphate, phosphate and salinity have been collected over 14 and 26 hour time periods in the Parker River Estuary (northern Massachusetts). During spring tides marsh water floods the entire marsh surface, whereas during neap tides it remains in the marsh channels. For spring-neap comparison studies both during the summer and fall, all nutrients measured were found in significantly higher concentrations (1.5 to 3x) during the neaps for water of the same salinity. Although the total N:P ratios remained about the same, they decrease linearly with the increasing salinity gradient from 0 to 25 ppt. Possible mechanisms controlling these differences and their implications will be presented.

GLOUCESTER HARBOR MONITORING PROGRAM. C.A. Batdorf

10.00-10.20

(Mass. Audubon Society, Gloucester, MA 01930). Benthic cores from 0, 3.5, and 7 ft intertidal levels have been collected within Gloucester Harbor, MA for the past three years as part of an ongoing monitoring program of water quality in the harbor. Statistical analyses of similarity matrices on these data are used as a form of interpreting shifts within the benthic community. These analyses show that populations change significantly quarterly and sometimes more often. The changes are probably due to seasonal community shifts, but may indicate an impact from the start-up of the primary sewage treatment plant.

10.40-11.00

BIOGEOGRAPHICAL FEATURES OF THE MACROINVERTEBRATE BENTHOS OF GEORGES BANK. E. L. Bousfield (National Museum of Canada, Ottawa).

Georges Bank is a prominent physiographic feature of the North American continental shelf that defines most of the seaward boundary of the Gulf of Maine. This study reviews the principal biogeographic features of the bottom-dwelling macroinvertebrates (mainly decapod, amphipod, and mysid crustaceans, and mollusks) of the Banks region, in depths to 200 m. The Banks fauna consists of dominant northern cold-water elements that extend southwards beyond the region, some reaching a southern limit in the northeast portion ("corner") of the Bank proper, and a lesser southern warm-water fauna, elements of which reach their northern limit at the northeast portion. The possible significance of this natural faunal demarcation line with respect to commercial fishing areas of the Banks region is briefly discussed.

PREDATION AND FRFY PRODUCTION ON AN INTERTIDAL

11.00-11.20

FLAT ON THE BAY OF FUNDY. G.W. Gratto and M.L.H.

Thomas (Univ. of New Brunswick at Saint John)

In the Bay of Fundy, the amphipod Corophium volutator is the dominant food of benthic-feeding fish as well as the high concentrations of migratory sandpipers passing through the region. In May 1981 a study of the rates of exploitation of C. volutator was initiated at Musquash Harbour on the outer bay of Fundy. The production of C. volutator was relatively stable over a three year period at 8.8, 9.5 and 10.6g-dw/m/yr; All fish species combined consumed less than 1% of the annual production by C. volutator. Even though present for only an eight week period, sandpipers were by far the most important predator, consuming about 10% of the annual production. Potential invertebrate predators were rare at Musquash with only Crangon septemspinosus occurring in sufficient numbers to have a measureable impact on C. volutator.

11.20 -11.40 Population Dynamics of the Rock Barnacle, Semibalanus (= Balanus) balanoides. R.W. Rangeley and M.L.H. Thomas (University of New Brunswick, Saint John). Population characteristics of Semibalanus balanoides and the barnacles' major predators, Nucella lapillus and juvenile Carcinus maenas, are currently being investigated on an outer western Bay of Fundy rocky shore. Barnacle shell morphology, biomass, fecundity, larval settlement and adult and juvenile summer mortality were examined in an attempt to predict larval production available to pelagic food webs. Depending upon habitat type, larval production ranged from approximately 5 to 45 g m⁻² of dry biomass of which less than 0.3% returns to the shore in the form of cynrid settlement.

11.40-12.00 Aspects of the Growth of two species of intertidal mussels. J.P.A. Gardner and M.L.H. Thomas (Division of Sciences, U.N.R., Saint John).

A study of the growth of the Mytilidae sps Modilus modilus and Mytilus edulis at Welch Cove, N.B., was undertaken to relate growth to known climatic conditions, to food availability as well as to space. Analysis of the water at high tide over the mussel beds indicates that food availability is relatively great, whilst potential ration of the rock pools at low tide has been shown to decrease considerably in a 3 hr. period of mussel feeding activity. Whether growth and production is limited at low tide due to a depletion of food immediately above the mussel beds is still unclear. The ability of mussels to induce mixing of the water to a degree; hereby food availability is increased was investigated. The combined effects of temperature plus salinity upon the feeding rate of rock pool mussels were investigated to determine how variation of those two factors during the tidal cycle might affect growth.

13.30-13.50 PHYTOPLANKTON PRIMARY PRODUCTION IN THE SOUTHERN BIGHT OF THE MINAS BASIN. M. Brylinsky (Department of Biology, Acadia University, Wolfville, N.S. BOP 1X0)

In situ measurements of phytoplankton primary production using both carbon-14 and oxygen production techniques were made during the 1985 growing season. Production rates appear to be primarily a function of the availability of solar radiation and can be predicted quite well from a knowledge of incident light flux and euphotic zone depth. The latter is a function of SPM concentration which is in turn related to tidal state. There is no indication that nutrients are ever limiting.

13.50 -14.10 IDENTIFICATION OF SPARTINA-DERIVED DETRITUS IN BAY OF FUNDY SUSPENDED MATTER. P.J.Cranford and P. Schwinghamer (Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, N.S., B2Y 4A2). A histochemical staining technique has been developed which differentiates Spartina-derived detritus from other material in the suspended matter fraction of water samples collected in the upper reaches of the Bay of Fundy. The method has been used to help determine the origin of particulate matter gathered along the axis of the Cumberland Basin in March 1985 and in the water flooding the Grand Pre saltmarsh over a seasonal cycle in 1983. The results confirm earlier observations that Spartina-derived detritus is a major fraction of total suspended matter in these regions.

14.10-14.30 IMPROVED ESTIMATES OF FUNDY SALTMARSH PRODUCTION AND EXPORT. D. C. Gordon and P.J. Cranford (Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, N.S., B2Y 4A2). Earlier studies in the Cumberland Basin indicated that the annual net aerial primary productivity (NAPP) of Spartina alterniflora low marshes averaged $272 \text{ gCm}^{-2}\text{y}^{-1}$ or 29% of the total annual production. More careful measurements on a similar marsh at Grand Pre in the Minas Basin suggest this estimate is at least 14% too low. Export curves at both locations show two peaks; one in the spring just after ice melt and one in the fall when new vegetation dies. Both sets of data are used to prepare monthly estimates of saltmarsh export required for the Cumberland Basin ecosystem model. The major uncertainty is the breakdown of monthly export into labile, intermediate and refractory components.

14.30-14.50 DEVELOPMENT AND APPLICATION OF AN ECOSYSTEM MODEL FOR CUMBERLAND BASIN. P.D. Keizer and D.C. Gordon (Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, N.S., B2Y 4A2). An ecosystem model of Cumberland Basin has been developed by means of a number of local and international workshops and with the aid of user-friendly modeling packages. Scientists involved in the project have learned a great deal about the functioning of this ecosystem by taking part in these workshops. The modeling process has identified many areas where our understanding of this ecosystem is incomplete and where more data or research into ecological processes are necessary. Validation of the model and sensitivity analyses must still be completed. As an example of how the model can be used, the hypothesis that detritus derived from salt marshes has a major impact on the Cumberland Basin ecosystem is examined.

THE FORAGING AND ENERGETICS OF BLACK-BELLIED
15.10-15.30 PLOVERS ON STARRS POINT MUDFLAT. A. DuBois-
Lavolette (Acadia University, Wolfville, N.S.)

The foraging and energetics of migrant Black-bellied Plovers (Pluvialis squatarola) were studied on the Starrs Point mudflat. The major prey was the polychaete Glycera dibranchiata. Foraging behaviour of plovers is best described as a run-stop-peck activity. Birds located prey items visually and the foraging distribution of birds was not directly related to the distribution of the prey. An average capture rate of 0.28 ± 0.32 worms/min was calculated representing only a 16% success rate. However this led to a daily energy intake of 4 to 6.8 x BMR and an average rate of fat deposition of 5.1 g fat/day. To deposit fat stores necessary for migration it was estimated that plovers remained in this area for about 13 days.

15.30-15.50 FAT DEPOSITION OF SEMIPALMATED SANDPIPERS DURING AUTUMN
MIGRATION IN THE LOWER BAY OF FUNDY. Louise White (Dept. of
Zoology, University of Guelph, Guelph, Ont. N1G 2W1)

The seasonal weight patterns of semipalmated sandpipers reflect the respective arrival schedules of adults and juveniles at a migratory stopover. In 1983, most adults arrived between 16 July - 11 August with peaks in arrivals occurring during spring tides. Early in the migratory season, most adults weighed <30g, while later in the season most adults weighed >30g. Juveniles arrived in discrete waves which only coincided with spring tides. Weight changes in the juvenile population were much more rapid than those of adults, reflecting the temporally restricted arrival schedule of juveniles. Weight was found to be a good predictor of length of stay in adults. Adults weighing <30g stayed 19-20 days, those weighing 30-39.9 g stayed 6-11 days and adults weighing >40g stayed 1-2 days. An apparent seasonal decline in length of stay is shown to be primarily the result of changes in the weight composition of the population, from predominantly light to heavier individuals as the season progressed. Juveniles did not exhibit a relationship between weight and length of stay. The rate of weight gain of adults and juveniles was estimated to be approximately 1.08-1.26g/day.

15.50-16.10 CORRELATIONS OF LONG TERM CYCLES IN FISHERIES CATCH DATA
WITH THE 18.6 YEAR NODAL CYCLE OF THE TIDES IN THE BAY OF
FUNDY-GULF OF MAINE SYSTEM. David L. DeWolfe (Discovery
Consultants) and Graham R. Daborn (Acadia University,
Wolfville, N.S., BOP 1X0). Examination of some multi-year
(>70 year) data sets for fish catches in the Bay of Fundy-Gulf of
Maine System indicates that several important fish stocks vary in
association with the 18.6 year nodal cycle of the tides. Landings of
cod, halibut and haddock exhibit increases 5-6 years after years of
highest tidal range, corresponding with the period from hatching to
recruitment. Warm-water fish, such as menhaden, tend to show decreases
2-3 years after the highest tides. Catch-per-unit-effort data sets are
too short for correlation with the nodal cycle. We suggest that the
correlations indicate that either lower sea surface temperatures or
higher primary productivity produced by enhanced vertical mixing during
peak years of the nodal cycle favour larval fish survival of some
pelagic species. The 2.5-3.5% variation in tidal range over the nodal
cycle is comparable with the predicted increase from the proposed
Cumberland Basin tidal power development.

16.10-10.30 TAGGING STUDIES OF STRIPED BASS (Morone saxatilis) AND
RIVER HERRING (Alosa pseudoharengus AND A. aestivates) IN MINAS
BASIN, NOVA SCOTIA. R.A. Rulifson (East Carolina University,
Greenville, NC 27834) and M.J. Dadswell (Fisheries and Oceans, St.
Andreas, NB BOM 180). The 1985 field season was the first full-scale
attempt to determine the migration patterns of striped bass, alewife,
and blueback herring in upper Bay of Fundy waters. River herring
(gaspereau) first appeared in commercial weirs in June; peak abundance of
market-sized adults occurred in July. Most river herring present in
August and September were juveniles <130 mm TL. Striped bass abundance
was low throughout the summer, and increased dramatically in September.
Most striped bass caught in weirs were of the 300-400 mm FL size
class. Hypotheses concerning local migration patterns will be
presented.

16:30-16:50 Mortality of Adult American Shad (Alosa sapidissima)
passed through a Straflo Turbine in the Low-Head Tidal
Power Generating Station at Annapolis Royal, N.S.,
W.E. Hogans, G.D. Melvin and M.J. Dadswell.

During spring 1985 24 adult pre and post-spawning American shad were introduced into the upstream end of the draft tube of Straflo turbine at the low-head tidal power plant on the Annapolis River, Nova Scotia. Nineteen test shad were passed through the turbine successfully. Of these 9 survived turbine passage. Ten test fish introduced into the turbine showed no movement for at least 5 hours and followed patterns exhibited by three sacrificed shad put through the turbine. "Thirty-nine control fish tagged with dummy tags were retained alive in holding pens for estimations of mortality due to capture, handling and tagging methods. Mean percent turbine mortality was $46.3\% \pm 34.7\%$. Observations by SCUBA divers of the river bottom off the turbine discharge opening in early July revealed large numbers of macerated fishes of several species including shad, striped bass, alewives, herring, eels and mackerel.

Additional Abstracts

FUNDY TIDAL POWER DEVELOPMENT AND POTENTIAL FISH PRODUCTION IN THE GULF OF MAINE. D.E. Campbell (Maine Dept. of Mar. Res., W. Boothbay Hbr., ME 04575) and J.S. Wroblewski (Bigelow Lab. for Ocean Sci., W. Boothbay Hbr., ME 04575). The possible effects of tidal amplitudes altered by Fundy tidal power development upon potential fish production in the Gulf of Maine are examined with a marine ecosystem model. Three areas off the Maine coast are delineated on the basis of winds, tides, and the extent of vertical mixing. An optimum kinetic energy from wind and tide exists for maximum primary production in the water column. Primary production in the model is the base for a simple pelagic food chain leading from phytoplankton through zooplankton to fish. If the construction of a tidal power dam in the upper Bay of Fundy results in a 5 to 10% increase in tidal amplitude, our first order model predicts that enhanced vertical mixing from May to October will increase potential fish production along the Maine west coast by 7 to 12%. Fish production along the Maine east coast and in offshore waters is predicted to remain at present levels. Climatic variation is predicted to have as large an impact on fish production as man-induced changes in vertical mixing caused by tidal power development.

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"Effects of increasing tidal range along the coast of the Gulf of Maine"

ABSTRACT

Hydroelectric power plant construction in the Bay of Fundy may cause a 30% increase in tidal range along the Gulf of Maine coast. This change in hydrographic regime will result in an increase in inlet tidal prism and ensuing shoreline erosion. The magnitude of the shoreline erosion in the vicinity of the inlets will depend on the volume increase of the tidal prism. Erosion will be caused due to sand moving from the beaches to the ebb-tidal delta. As previous studies have demonstrated, there is direct correspondence between an inlet's tidal prism and the size of its ebb-tidal delta.

At small tidal inlets (width < 200m), which are backed primarily by marsh and tidal creek systems, the increase in tidal prism will cause: 1) a greater frequency of flooding of the high marsh, 2) readjustment of the tidal creeks and 3) an enlargement of the inlet throat. Although there will be a large percent increase in tidal prism and size of the ebb-tidal delta at these inlets, erosion of the adjacent beaches will not be substantial. This is because the volume increase of the ebb-tidal delta will be less than 50,000m³.

At large tidal inlets and estuaries (width > 400m), like the mouth of the Kennebec River in Maine, the percent increase in tidal prism will be approximately the same as it is at smaller-sized inlets. However, the effect to the nearby beaches will be much more catastrophic. Due to the large size of the ebb-tidal delta of these systems (Kennebec River ebb-tidal delta volume = 10⁹m³ of sand), a 5% increase in tidal prism will result in a very large quantity of sand (vol. > 10m³) moving to the ebb delta. Some of this sand will come from the scouring of the river channel bottom. However, it is likely that most of the sand (>60%) will be eroded from adjacent beaches. For example, the beaches in the vicinity of the Kennebec River are predicted to lose over 10⁷m³ of sand. This loss of sand would result in over 100m of shoreline recession.

In this analysis, it is important to note that although the volume of sand increase of the ebb-tidal delta can be predicted using existing regression equations, the rate at which the transfer of sand takes place is not known. The net movement of sand to the ebb delta would probably be very slow considering that inlet tidal prisms change up to 20% on a monthly basis.

(Complete Abstract)

Poster Presentations

CUMBERLAND BASIN ECOSYSTEM MODEL. P.D. Keizer, D.C. Gordon, P. Schwinghamer (Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, N.S., B2Y 4A2) and G.R. Daborn (Acadia University, Wolfville, N.S., BOP 1X0). Over the past two and a half years, a team of Canadian scientists, assisted by U.S. and European colleagues, has developed a holistic ecosystem model of the Cumberland Basin, an estuary in the turbid, macrotidal upper reaches of the Bay of Fundy. The model is one dimensional, has three compartments and consists of three interactive submodels (physical, pelagic and benthic). Flows of organic carbon among 29 biological state variables are calculated on a daily basis. The model is highly aggregated and state variables represent general trophic classifications (e.g., phytoplankton, herbivores, carnivores, etc.). It has been verified but not yet validated. Output for most state variables agrees reasonably well with field data.

SELECTIVE FORAGING OF A NESTING COLONY OF ARCTIC TERN (*Sterna paradisaea*) AT AN UPWELLING AREA OF MACHIAS SEAL ISLAND, NEW BRUNSWICK, CANADA. Steven M. Daniel, Acadia University, Wolfville, N.S. BOP 1X0.

Machias Seal Island (M.S.I. 44°30'10" N: 67°06'05" W) is a small seabird colony (10 ha), located at the mouth of the Bay of Fundy. This seabird colony is a breeding site for five species of pelagic seabirds and is administered by the Canadian Wildlife Service, Environment Canada.

In the summers of 1984-85 research on the feeding ecology of the Arctic Tern was undertaken throughout the breeding season (May-August). The primary objectives of this study were to determine: 1) if adult Arctic Terns selectively forage for prey items. 2) the species/frequency of prey items fed to Arctic Tern chicks and their caloric intake on a daily basis. This was done by **monitoring** the feeding frequency and the species of food given to each of the study chicks throughout the day while simultaneously, on two separate occasions, sampling the upwelling area for prey items (modified neuston and double bongo 1100 µm).

It was found that the majority of foraging activity coincided with the flood tide, which induced a tidal upwelling 2 km east of M.S.I. During these time periods, the adult Arctic Terns would feed extensively in this area. Although it was possible to determine the species of food being fed to the Arctic Tern chicks, there was difficulty in determining the species density and relative number of food items available to foraging adult terns (at the upwelling site) in 1984-85. During these feeding frenzies at the upwelling, adults, for the most part returned to the nest site with a homogeneous catch. However there were other species of food captured and brought into the chicks at the same time. Therefore, it would appear that more than one species of food item was available at the upwelling at any one time. It is possible that the adults were selectively foraging for specific prey items, which in some cases may have had a lower caloric value but were more abundant, thus allowing more feedings per unit time.

CHEMICAL ANALYSIS OF PARTICULATE ORGANIC MATTER FROM SALTMARSH GRASS: PYROLYSIS-GAS CHROMATOGRAPHIC APPROACH. R. Helleur, (Dept. of Chemistry, Acadia University, Wolfville, N.S.).

COMPOSITION, MORPHOMETRIC CHARACTERISTICS AND
FEEDING ECOLOGY OF ALEWIVES (Alosa
pseudoharengus) AND BLUEBACK HERRING (A.
aestivalis) (Pisces: Clupeidae) IN MINAS BASIN.

H.H. Stone (Dept. of Biology, Acadia University, Wolfville N.S., BOP 1X0). The diet of summer resident alewives and blueback herring was analyzed using number, volume and frequency of occurrence methods. Age composition, maturity, length-weight relationships and growth characteristics were also examined. Alewives favored larger, more benthic prey (e.g. amphipods, mysids, crangonids) while blueback herring appeared to concentrate their feeding on microzooplankters (e.g. calanoid copepods, cypris larvae, molluscan veligers). Both species may feed more extensively outside of Cobequid Bay where water temperatures are lower and food is more abundant and decrease their feeding activity in the upper reaches of the Bay where food is less abundant.