MINUTES OF THE SECOND ANNUAL MEETING OF THE ZONAL MONITORING PROGRAM FOR THE NORTHWEST ATLANTIC

Montréal
27-29 November 1999

Executive summary

- The third annual coordination meeting of the Zonal Monitoring Program for the Northwest Atlantic (AZMP) took place in Montréal (26-29 November 2000);
- Representative members from the three Atlantic regions (Laurentian, Newfoundland and Maritimes) and from MEDS actively participated in this meeting;
- The objectives of the meeting 2000 were:
    1. To review the AZMP activity for 1999-2000;
    2. To review the report of the Data Analysis Subcommittee;
    3. To review and discuss problems related to sample collection and analysis, other logistic/methodology issues and data management issues;
    4. To discuss importance and ways to include fish into the monitoring program;
    5. To make advance presentations of some of 1999-2000 results;
    6. To tend to other various business items.

All these objectives were successfully attained as reported in the Minutes of the AZMP 2000 report attached. In particular:

(1) General status reports were presented by regional representatives (annexes I to III) which indicated a successful implementation of the Zonal Monitoring Program. The sampling year 2000 was characterized by a general increase in the number of stations sampled and in the quality the data acquired. Each region is still having some specific problems concerning the logistics, the ship time or the human resources, but on the whole, it looks like the AZMP has reached a viable maturity.

(2) The Data Analysis group report was also presented and briefly reviewed. This report contained the standardized sampling, analysis and presentation methods that were agreed upon at the last Data Analysis Committee meeting. This represents an important step to be able to compare data obtained in the different regions. It is also an essential tool for pooling information to produce State of the Ocean and Zonal reports for presentation at FOC or elsewhere. This is also an essential step toward standardized regional presentation of AZMP data on the MEDS web site. In general it could be concluded that good progress has been made toward analysis and presentation of AZMP results.

(3) Sample collection and analysis issues that were discussed are the representativeness of fixed stations and the zooplankton and phytoplankton sampling methodologies. A common sampling and analysis protocol to be use by all regions was also tabled (Annex V). Other specific issues such as the CPR and remote sensing were also discussed.

(4) Getting Fish into the monitoring program was also discussed at length. In that context, it was mentioned that AZMP has good data on physics, nutrients, plankton, and good fish data as well, but there is a serious gap in between, i.e. forage species and small invertebrates from both the benthic and pelagic regions. It was mentioned that the cancellation of the O-group cod/capelin survey of John Anderson in Newfoundland does not help improve the situation. To the question if it would be useful to have a permanent “fish” person on the AZMP committee, the answer was a resounding “Yes”. The AZMP chairman was given the task to consider who should sit on the committee permanently and to approach the individuals that could have interested. K. Zwanenburg had early expressed willingness to do this.

(5) Data management issues were only briefly discussed because of the absence of a couple of important members from the Data management committee. However, a status report on the BIOCHEM project was presented by Doug Gregory which indicated that progress is being made with this project, but at a slower pace than anticipated. The current status of the AZMP website at MEDS was also presented and indicated good progress.

- Special issues of concern for ASDC
    - CPR **-**The Sir Allister Hardy Foundation is asking for a 5 year commitment. In the past AZMP has been contributing $80,000 but because of the rising cost of the new contract, AZMP will be asked to contribute an extra $12,000 the first year and $3,600 in subsequent years or $20,000 for the next five years depending which contract option is chosen. In any case the rise in cost will drastically affect the overall AZMP. The suggestion was therefore made to consider a separation of the CPR component from the overall AZMP as a highly desirable option. Instead, CPR should be considered as a Canadian contribution to GOOS. Therefore, the AZMP management committee request that CPR be removed from the general AZMP funding and that sources of funding external to the AZMP should be considered.

    - New Northern Gulf and Hamilton Bank Stations? - The committee agreed that there is a need for the two new stations because these are fisheries areas for which data is very sparse. Preliminary contacts made indicated that it would be logistically very difficult to sample these two stations on a regular basis. Because of these difficulties, the possibility to use the Sea Horse instrument to collect data at these remote locations was suggested. This data collection method might alleviate some of the logistical difficulties since the Sea Horse only needs servicing every two months. In the northeastern Gulf, Coast Guard ships would probably be able to reach the instrument for its bimonthly maintenance but it would certainly not be as easy in the case of the Hamilton Bank station.

      Prior to choosing whether or not we should go ahead with this project, 1) the AZMP committee considered that the current deployments and future deployment at fixed Station 2 (Halifax line) would serve as a pilot study for the feasibility of deployments at other sites; and 2) that an examination of existing data for the NEGSL and Hamilton Bank would be undertaken to determine the representativeness of potential station locations. The major data sources would be the SeaWifs and JPLSST observations. Consequently, a funding request for new stations, roughly estimated at $100k, will be postponed by one year.

    - New/replacement of equipment - The logistics subcommittee will prepare a plan for the replacement of AZMP instruments taking into consideration lifetime and usage of each instrument. This plan will be presented to ASDC next year.

    - Overtime – ASDC should be aware that since field work is a major component of the AZMP, overtime should be included in the overall AZMP costs. Overtime represents an important cost of the program and is presently covered from A-Base and imposes a heavy token on other regular research programs. The AZMP committee is of the opinion that overtime costs should be built into the monitoring program itself and that new funding should be obtained to cover this cost.

    - Coast Guard ship availability - Still very much an issue in every region! How do we get CCG to incorporate the oceanographic monitoring program into their official business lines? The AZMP chairman sent a memo to John Davis concerning this issue. The DM was suppose to raise this problem with High Management of CCG, but no news were received from that initiative. In his memo JCT mentioned that this is a very good case where a “horizontal management” is required within DFO. There still seems to be a lack of appreciation for the importance of the monitoring program for DFO and, therefore, the consequences of missing a ship outing.

    - AZMP chairmanship –Pending on approval by ASDC, J.-C. Therriault would accept to serve as committee chair for one more (and probably last) year.

AZMP Funding Summary

A-BASE FUNDING	LAURENTIAN			MARITIMES			NEWFOUNDLAND			MEDS		
	1998-99	**1999-00**	**2000-01**	**1998-99**	**1999-00**	**2000-01**	**1998-99**	**1999-00**	**2000-01**	**1998-99**	**1999-00**	**2000-01**
Total O&M	187	217	235	175	185	190	267	221	270	30	40	90
Salary / FTE	449 / 8.4	376 / 7.1	468 / 8.5	229 / 4.3	269 / 6.1	375 / 6.8	265 / 4.8	414 / 7.8	373 / 7.3	25 / 0.5	25 / 0.5	25 / 0.5
CPR	----	----	----	80	80	80	----	----	----	----	----	----
Overtime	53	59	60	20	35	59	66	76	79	----	----	----
Total (associated AZMP funding)	***637***	***593***	***703***	***484***	***534***	***644***	***531***	***635***	***643***	***55***	***65***	***115***
Total costs of other monitoring programs	81	75	80	69.0	69.0	86	33.0	33.0	32	75	85	140
Ship time (Dedicated to AZMP)	445	481	500	419	594	613	341	347	462	----	----	----
Total related monitoring funding	**1,082**	**1,074**	**1,283**	**972**	**1,197**	**1,342**	**905**	**915**	**1,132**	**130**	**150**	**255**
AZMP allocation	**265**	**265**	**265**	**345**	**345**	**345**	**265**	**265**	**265**	**20**	**20**	**20**

TOTAL COST OF AZMP: **1998-1999 = $2,959K + $130K (MEDS) = $3.089K**
1999-2000 = $3,186K + $150K (MEDS) = $3,336K
2000-2001 = $3,757K + $255K (MEDS) = $4,012K

MINUTES OF THE THIRD ANNUAL MEETING OF THE ZONAL MONITORING PROGRAM FOR THE NORTHWEST ATLANTIC

Crowne Plaza Hotel, Montreal
27-29 November 2000

Participants:

Chassé, Joël (Gulf/Maritimes)
Colbourne, Eugene (Newfoundland)
Couture, Estelle (MEDS/Rapporteur)
Frank, Ken (Maritimes)
Fry, Jeff (Newfoundland)
Gilbert, Denis (Laurentian/Rapporteur)
Gregory, Doug (Maritimes)
Harris, Les (Maritimes)
Harrison, Glen (Maritimes / rapporteur)
Harvey, Michel (Laurentian)
Herman, Alex (Maritimes)
Lafleur, caroline (Laurentian)
Mitchell, Michel (Maritimes)
Pepin, Pierre (Newfoundland)
Petrie, Brian (Maritimes/Rapporteur)
Plourde, Jacques (Laurentian)
Runge. Jeffrey (Laurentian)
Sameoto, Doug (Maritimes)
Starr, Michel (Laurentian)
Swain, Doug (Gulf)
Therriault, Jean-Claude (Laurentian / Chair)

AGENDA

1. **Introduction** (J.-C. Therriault)
   - Welcome address with statement of general objectives for the meeting
   - Choice of rapporteurs
   - Review of the minutes of last meeting (17-19 Nov. 1999)
   - Review/modifications/additions/acceptation of the proposed agenda

2. **AZMP General Status Reports – 1999/2000**
   (Statistics of activities, success/failure, costs, other problems/opportunities, etc.)
   - Laurentian (M. Harvey)
   - Maritimes (B. Petrie)
   - Newfoundland (P. Pepin)
   - MEDS (E. Couture)

3. **Report of Data Analysis Subcommittee Meeting**
   2. Standardized presentations
   3. New Indices
   4. Glossy report

4. **Representativeness of "Fixed Stations"**
   - Shediac station (J. Chassé)
   - Other Stations

5. **Zooplankton sample collection and counting**

- Status of protocols and zooplankton sampling/analysis problems (M. Mitchell)
- Replicate tows, depth strata, counting protocols (L. Harris)
- Collection efficiency of vertical net hauls (A. Herman)
- CPR results (D. Sameoto)

6. Phytoplankton / nutrients collection and counting

- Standardisation of collection and counting methods and inter-regional calibration exercises (J.-C. Therriault)
- Preparation of a technical report for methodology

7. Remote sensing

- Status of Laurentian remote sensing projects (J.-C. Therriault)
- Status of SeaWiFS reprocessing and preliminary results for 2000 (G. Harrison)
- Scales of variability – SeaWIFS results and EOF analysis (B. Petrie)
- Status of remote sensing in NFLD region (J. Helbig)

8. Getting "fish" into the monitoring program

- Presentation and discussion of ideas by the different regional representatives

  Special presentation or documentation provided
  - K. Frank : Monitoring finfish diversity on the scotian Shelf
  - K. Zwanenburg : Monitoring of the Scotian Shelf ecosystem off Atlantic Canada (see comments and document attached for inclusion in discussion)
  - Y. Simard: Use of Hydroacoustic (see Y. Simard's comments attached for inclusion in the discussion

9. Data Management

- Data Management problems (S. Narayanan and regional representatives)
- Status of Biochem project (S. Narayanan)
- Quality control of biological data (C. Lafleur)

10. AZMP Web Site

- Status of AZMP-Web Site (E. Couture)
- Other regional web-sites

11. Scientific Presentations

- Plankton (phyto & zoopl). abundance and community structure at the fixed stations in 1999-Maritimes (J. Spry)
- Preliminary results on phytoplankton biomass at the fixed stations, seasonal sections and groundfish surveys in 2000 -Maritimes (G. Harrisson & J. Spry)
- Preliminary results on physical environment at the fixed stations, seasonal sections and groundfish surveys in 2000-Maritimes (B. Petrie)
- Phyto & Zooplankton abundance and community structure at fixed stations and seasonal transects in 2000 –Laurentian (M. Harvey & M. Starr)
- Preliminary 2000 and 1999 results on physical environment –Laurentian (J. Plourde)
- Plankton and physical data in Newfoundland (E. Colbourne/J. Helbig/P. Pepin)
- Real time acquisition of data on ships of opportunity in Laurentian region (D. Gilbert)
- Correlations at the Gaspé Current Monitoring Station (D. Gilbert)

12. Other Business Items

- Need of extra funding: -CPR,
  -New Northern Gulf and Hamilton Bank Stations?
  -New/replacement of equipment
  - others?
- Letter of support for NFLD Ecosystem Survey
- Monitoring living marine resources, LMR-COOP, GCOOS and National plans (S. Narayanan / G. Harrison)
- Involvement of Coast Guard in monitoring program
- AZMP Chairmanship
- Varia….

The meeting will be held in the "Matisse" room and will start at 0900 on 27 November. It should end by 12h00 on 29 November.

MINUTES OF THE MEETING (27-29 Nov. 2000)

Monday, 27 November, 2000 (Morning session) (Rapporteur: Denis Gilbert)

1. Introduction (J.-C. Therriault)

Welcome address with statement of general objectives for the meeting
After a round table introduction, the Chairman (J.-C. Therriault) welcomes the participants and emphasises the importance of this annual meeting to ensure the coherency and continuity of the Atlantic Zone Monitoring Program (AZMP). J.-C. Therriault proposes the following objectives for the AZMP-2000 meeting :

1. To review the activity for 1999-2000 in each Atlantic Region;
2. To review the report of the Data Analysis Subcommittee;
3. To review and discuss problems related to:
    - Sample collection and analysis
    - Other logistic/methodology
    - Data management

4. To discuss importance and ways to include fish into the monitoring program;
5. To make advance presentations of some of 1999-2000 results;
6. To tend to other various business items.

Review of the proposed Agenda
The proposed agenda is reviewed and accepted with only minor changes.

Review of the minutes of the last meeting (17-19 Nov. 1999)
JCT mentions that the ASDC has proposed the name Atlantic Zone Ocean Monitoring (AZOM), but since the program is now well known as the Atlantic Zone Monitoring Program, it is decided to stick with this name (AZMP) for the time being.

Newfoundland spring survey cancellation : This item concerns the 0-age-group survey of John Anderson, Newfoundland. JCT said that, as chairman of AZMP, he sent to Bruce Atkinson a letter to support the maintenance of that survey, but to no avail. The question was raised as to what should we do now? Should we restate our support in favor of John Anderson's survey? Pierre Pepin and Glen Harrison expressed views to the effect that a new letter of support for the survey should be written. This suggestion was supported by the other AZMP members present at the meeting***. Action: JCT with help of other AZMP members.***

Moncton representatives : Joël Chassé and Doug Swain are present at the meeting but, they mention that they are not aware of having been officially nominated. Since their presence to the AZMP meeting originates from an official request addressed to Mike Chadwick by the AZMP Chairman, we interpret their presence as an official nomination as representatives of the Gulf Region

Overtime : Management should be made aware that since field work is a major component of the AZMP, overtime costs should be included in the overall AZMP costs. Overtime represents an important cost of the program and is presently covered from A-Base and imposes a heavy token on other regular research programs. It was mentioned that overtime costs should be built into the monitoring program itself and that

new funding should be obtained to cover this cost. It was decided to try to make the overtime costs more visible in our future annual reports.

Coast Guard ship availability : Still very much an issue in every region! How do we get CCG to incorporate the oceanographic monitoring program into their official business lines? JCT said that he sent a memo to John Davis concerning this issue. JCT thinks the DM raised this problem with High Management of CCG but he has not received any news from that initiative. In his memo JCT mentioned that it is a very good case where a "horizontal management" is required within DFO. Michel Mitchell points out that in the Maritimes Region, whenever a decision has to be made about ship assignment for Search And Rescue (SAR), the science activity is always penalized. There still seems to be a lack of appreciation for the importance of the monitoring program for DFO and, therefore, the consequences of missing a ship outing. JCT mentioned that although good working relationships were established with the CCG in the Laurentian Region, there are still many problems to be solved. A similar situation exists for the Newfoundland Region.

2. AZMP General Status Reports – 1999/2000

Newfoundland Region (Pierre Pepin)
(See Annex I : Summary of Zonal Monitoring Activities 1999-2000 for Newfoundland Region)

Highlights:

- Much more frequent sampling was achieved in 2000 relative to 1999.
- Description of sampling accomplished on the spring, summer and fall cruises.
- Problems were encountered with 70 micron nets popping (splitting open).
- Absence of the 0-group survey means the summer CIL volume index will be missing from Eugene Colbourne's report on physical oceanographic conditions in 2000.
- Personnel involved in monitoring program is equivalent to 7 PYs, not the official 3 PYs that are supposed to be part of the AZMP.
- Discussion about the possibility of going on larger CCG ships on those days when the weather is very rough, because we either have to cancel an outing on a smaller ship, or else we go out on that smaller ship to sample and everyone pukes their guts out.

Laurentian Region (Michel Harvey)
(See Annex II: Summary of Zonal Monitoring Activities 1999-2000 for Laurentian Region)

Highlights:

- 18 outings accomplished so far in 2000.
- 2 long sampling gaps: 1 month and 1.5 months.
- Description of AZMP-funded activities and other monitoring activities outside of AZMP.

Maritimes Region (Brian Petrie)
(See Annex III: Summary of Zonal Monitoring Activities 1999-2000 for Maritimes Region)

Highlights:

- Chlorophyll analysis is on time, but there is a backlog of nutrients analysis, as well as zooplankton and phytoplankton analysis.
- Satellite SST and Seawifs data are analyzed and very much up-to-date.
- LTTM data have just come in.
- The phytoplankton spring bloom was captured at all 3 stations (Prince 5, Station 2, Shédiac).

- First successful Seahorse deployment was achieved in October 2000. It shows evidence of upwelling/mixing towards the end of the deployment, and this has lead to increased chlorophyll levels.

MEDS (Savi Narayanan)
(See Annex VI: Summary of Zonal Monitoring Activities 1999-2000 for MEDS)

Highlights:
- No presentation was made for MEDS because of absence of S. Narayanan, but a summary of 2000-2001 activities was prepared and is included with the proceedings.

3. Report of Data Analysis Subcommittee Meeting (Pierre Pepin)

Subcommittee report
A group of people met in Montréal in September to standardize some sampling and analysis methods. Pierre Pepin summarized these discussions and distributed copies of the proceedings of the September 2000 meeting. Details can be obtained from Pierre's documents (Annex V) as well as from his slides.

CD-ROM
A lot of discussion took place regarding the relevance of putting all of the figures produced from the AZMP program onto a single CD-ROM. There are pros and cons to that idea. Perhaps the MEDS web pages could be copied onto those CDs. No consensus was reached on this issue.

The main problem is that the SSRs and the Res. Docs. do not present all of the figures and information that was used to produce them. What means do we have to present/archive all of the figures/data that were produced and to make them available to the public? This CD-ROM could be a repository of the plots that are produced but not included in the written documents, whether part of AZMP or not. However, in order for this to work effectively, relatively strict and well-defined timelines would have to be set.

Estelle Couture points out that the way the web site at MEDS is designed, only the current year and the previous year are displayed. That means that when 2001 comes up, 1999 data will disappear. It was suggested that changes should be made to the computer programs to extend the displayed plots beyond a two years moving window. ***Action : Estelle Couture.***

Official positions of stations on the standard AZMP sections
Jacques Plourde presents a review of the locations of AZMP stations and sections in the GSL. This review, made in collaboration with Brian Petrie (Maritimes), was initiated to ensure that all AZMP sampling activities will share common sites in the future. A map showing the new official locations of "fixed" and "section" stations, along with a table giving the LAT-LONG. position of each station was prepared by Jacques Plourde and is included with these proceedings (see Annex VI).

AZMP glossy report
Brian Petrie describes the draft of AZMP report that was put together by Ken Drinkwater. AZMP members generally agreed that Ken's proposal is a good one and decided it was worth pursuing the initiative. ***Action: All AZMP members involved.***

Monday, 27 November, 2000 (Afternoon session) (Rapporteur: Brian Petrie)

4. Representativeness of Fixed "Shediac" Station in the southern Gulf of St. Lawrence

Objectives: (Joël Chassé, Gulf Region)

- Determine the spatial scales of variability of biological, chemical and physical variable in the southern Gulf of St. Lawrence;
- Consider the adequacy of a single fixed station;
- Consider the data needs for model nowcasts.

Data sources include the archived hydrographic, chemical and biological data, JPLSST 18 km grid dataset, SeaWifs estimates of ocean chlorophyll, mixing parameters from models.

Discussion:
The value of the Shediac Station was questioned because data return/unit effort is considerably higher than other fixed stations. Counter arguments pointed out that sampling in this area was minimal, data were required to support interpretation of the SeaWifs observations, that there are important lessons to be learned because the station is in an area where ice plays a prominent role, but that shiptime must be available reliably in order for the sampling to work.

Conclusion:
Joël would solicit collaborators (potentially Helbig and Gilbert) from the other regions to examine the spatial and temporal scales of variability for all fixed stations sites and prepare a 1 year submission for the SSF. The ship requirements for the Shediac station sampling needed discussion between the Gulf and Maritimes regions. ***Action: Joël Chassé***

4. Zooplankton sample collection and counting

Topic: AZMP protocols (Michel Mitchell)
The presentation consisted of a progress report on the protocol document (AnnexVII) , a review of the current protocol, issues that have arisen from the sampling and from input supplied by others, the next steps/questions that must be resolved. Some issues that have emerged such as: identification of *Calanus* stages, substituting lab oxygen probes for Winkler titrations, pooled samples versus discrete depth samples versus a single depth (10m), depth of sampling on sections (300 m, 500 m or 1000 m maximum).

Discussion
A lively discussion followed that detailed the difference between an absolute biomass (abundance) measure with well-defined statistical uncertainty estimates and a biomass index. It was pointed out that there must be a balance of resources with studies that are of use. Extensive replicate sampling and subsequent analyses might be prohibitively expensive. Phytoplankton contamination of zooplankton samples, the need for a measure of zooplankton biomass for biological modeling, the CALCOFI experience with measures of zooplankton biomass, the relationship of fixed station and section zooplankton observations to the CPR program were debated.

Conclusion
The logistics committee will meet to discuss further the issues raised during the meeting. These will include the very broad topic of "If we need to modify the questions that we are asking of the plankton sampling, then let's consider it" and the fundamental issue of "What protocols are necessary for a

spectrum of animals that will lead to good numbers". It appears that the logistics committee still has some very basic questions to address. ***Action: Michel Mitchell and members of logistic committee.***

Topic: Collection efficiency of vertical net hauls (Alex Herman)
Before the session Alex circulated by email a copy of his presentation to the members of the AZMP group. He cautioned that the results and the conclusions may be applicable to the Scotian Shelf alone. The questions addressed included dry to wet weight relationships, backwash problems associated with sea state, analysis associated with splitting samples, temporal variability and, 76 versus 200 μm net samples. The document provides details on all of these issues (SeeAnnex VIII).

Discussion
On the topic of dry versus wet weights, the absence or presence of gelatinous zooplankton seemed to be a crucial point. It was noted that the Newfoundland area is the one most likely to encounter this problem. Oblique tows were considered by some as better able to give accurate measures of biomass; however, these tows are more difficult and time consuming to run operationally, and are seriously affected by ice conditions.

Conclusion
Newfoundland region will consider examining raw CTD pressure records to examine the potential for net reversals during ZMP and related surveys. The results of Alex's work will be considered by the logistics committee. ***Action: Regional members of logistic committee***

Topic: Replicate tows, depth strata, counting protocols (Les Harris)
A depth limit of 300 m for net hauls was concluded to be inadequate. Distributions of *Calanus* species indicated potential losses of 50% abundance and 80% of the biomass could occur if sampling were limited to 300 m over the Scotian Slope and in Cabot Strait. The 500-1000 m depth range often holds a very significant proportion of the biomass. There is little below 1500 m. No significant difference in *Calanus* abundance was found as a function of tow speed. An examination of counting protocols indicated that animal abundance was not seriously affected by counting 200 individuals, however, stage distribution of *Calanus* was. Counting until at least 100 *Calanus* were enumerated was considered worthwhile.

Conclusion
It was recommended that the maximum tow depth is increased to the bottom or 1000 m, whichever is shallower. This will not affect sampling in the Gulf and will only affect a small number of stations on the Scotian and Newfoundland shelves. It was agreed that this recommendation would be accepted. Les will create a database of weight as a function of species and stage. This database could be used to derive biomass estimates from abundance. The logistics group would meet with zooplankton experts to set up a recipe book for sampling and analysis protocols. A strawman would be created by Michel Mitchell and sent by email first to iron out major concerns before meeting to finalize details. ***Action: Les Harris, Michel Mitchell and logistic subcommittee.***

Topic: CPR results (Doug Sameoto)
The trends of total *Calanus finmarchicus* 1991-1998 from the western Scotian Shelf matched the trend shown by Biological Ocean Sciences sampling in Emerald Basin. Similar results were found for the eastern Scotian Shelf CPR and the Louisbourg Line BOS sampling. Thus, CPR appears to be tracking changes recorded by the fixed and section sampling. A comparison was made between the greenness index, diatoms, dinoflagellates, total copepods and total euphasiids or the western North Atlantic and the Scotian Shelf. The results are presented in a document that Doug has submitted to be included in the

AZMP "glossy" publication. Causal connections of biological variability to stratification, temperature and a storm index were made. Doug has now acquired the Yarmouth to New England CPR data tat could fill the mid 1970s to early 1990s gap in the E line sampling.

Discussion
It was suggested that the CPR data may be more valuable for diversity/abundance studies than for absolute numbers of species. The actual counts associated with particular species was discussed and details of the binning procedure are available from Doug. The value of the CPR data series is an issue that is frequently directed to the AZMP by the National Directors Committee. We should have a document that points out the value of the series. The AZMP chairman asked Doug if he could prepare such a document. ***Action: Doug Sameoto.***

Conclusion
Doug will assemble CPR data products and forward them to MEDS for inclusion on the AZMP website. The recent CJFAS paper on the CPR will serve as a main reference in justifying the expenditure for the data. The AZMP chairman will raise the issue of detaching the CPR funding from the AZMP with the Atlantic Zone Sciences Directors. ***Action: Doug Sameoto and Jean-Claude Therriault.***

Tuesday, 28 November, 2000 (Morning session) (Rapporteur: Glen Harrison)

The first point of discussion raised by the chairman was a suggested change in the agenda. The scientific presentations were moved to day 3 (Wednesday) so that important business items would be discussed with all participants present since some had to leave early Tuesday evening.

5. Phytoplankton/nutrients collection and counting

Topic: Standardization of methods (Jean-Claude Therriault)
The chairman initiated discussion on progress made in AZMP standardization of collection and counting methods and inter-regional calibration exercises. He noted that the NOAA nutrient intercalibration exercise for nutrient were successful; BIO (lead by Peter Strain) and Newfoundland region participated in the exercise. Although the necessity for regional intercalibration (e.g. of phytoplankton and zooplankton counts, chlorophyll) was discussed at the previous annual AZMP meeting, no progress in these intercomparison / intercalibration exercises was reported.

Discussion
The question was raised if the Logistics Subcommittee had completed the methodology protocol and if this information could be posted on the AZMP webpage at MEDS ? Also, the Logistics Subcommittee was asked to consider and organize intercalibration exercise(s) as deemed necessary for chemistry and biology (phytoplankton and zooplankton) measurements. Michel Mitchell (Logistics Subcommittee Chair) indicated that the protocols will be completed shortly and accepted to post it on the web site at MEDS as soon as possible. He will also try to organize (by email, conference call or meeting if necessary) intercalibration exercises between the different regional teams. ***Action: Michel Mitchell***

6. Remote sensing

Topic: SeaWiFS results (Glen Harrison)
Glen Harrison reported on the status of the recent, major SeaWiFS reprocessing exercise and provided some preliminary results of the data collected during Y2000. He described the major elements of the reprocessing carried out by NASA (including improvements in the atmospheric correction algorithms) and their consequences. Most noteworthy in comparing the previous SeaWiFS-based chlorophyll fields with the new data was that the apparent chlorophyll levels were reduced by a factor of as much as 2-4x, but this was not systematic. It was encouraging that many of the anomalously high winter chlorophyll values were eliminated in the reprocessed data; examples from various regions within the AZMP zone were given.

Glen also gave an update on the SeaWiFS ground-truthing activity at BIO. All available zonal chlorophyll data collected over the past 3 years that met the ground-truthing criteria (e.g. collected within 24h of the satellite pass and within the region of a single valid pixel value or 3x3 pixels) were used. Some 385 datasets qualified. Where available, a depth-weighted average chlorophyll for the upper 20m was used but surface values were used otherwise. The satellite chlorophyll values compared reasonably well with the ground-truth data at levels below ~2 mg m^{-3} but systematically underestimated higher levels, i.e. the spring bloom events. The SeaWiFS processing team lead by Trevor Platt are currently employing a local algorithm to the SeaWiFS raw radiance values (instead of NASA's global algorithm) to try and correct this discrepancy. Glen cautioned others about the trying to do their own ground-truthing using the 2-week composite SeaWiFS images posted on the BIO web page; ground-truthing cannot be done with composite data and is difficult even with single pass data that fits the comparison criteria perfectly.

Glen then briefly discussed one of the SeaWiFS data products being produced, i.e. basic statistics for the 24 sub-region "boxes", 6-fixed stations and 11 sections. He asked if the range of statistics was adequate and if other boxes or lines should be added to the list. Additional lines run as part of the Newfoundland hydrographic surveys were suggested as well as the new Southern Gulf line and the WOCE AR7/W line from Labrador to Greenland. With regard to basics statistics, the need for information on "pixel depth" (mean and frequency distribution) was suggested to give a better idea of the data that went into the production of the bi-weekly composites. Glen ended this part of his presentation with some examples of seasonal variations in mean SeaWiFS chlorophyll levels for selected regions, comparing 1997-2000 results. Significant interannual variability in timing and magnitude of the spring and fall blooms was noted for many regions.

The presentation ended with an update on the development of primary production maps from the SeaWiFS data. The production of these maps is now operational and Trevor is in the process of writing up the methodology for publication. Examples of primary production composites for the NW Atlantic were shown; it was clear that the primary production maps differ significantly (peak levels generally in summer) from the comparable chlorophyll maps (peak levels generally in spring).

Discussion
Most of the questions centered around what confidence we should have in the ocean colour data at this stage of development of the technology. In answer, the ground-truth results are encouraging but further refinements are inevitable and the unqualified application of the SeaWiFS data would be unwise at this stage. This is still very much a R&D activity and this fact should be kept in mind when using (and interpreting) ocean colour data in the AZMP context.

Topic: Scale of variability of SeaWiFS data (Brian Petrie)
Brian Petrie followed Glen's presentation with a more in-depth discussion of scales of biological variability employing SeaWiFS data. He began with a report on an investigation of small scale variability using data from a 20x20 pixel (34x34km) box centered on the Halifax Stn2 Fixed Station. Of the 334

images recovered for 1998 and 1999, only 90 were deemed usable because of inadequate coverage of the box, erroneous data "spikes", often associated with cloud mask boundaries, etc. Of the images considered good, manual removal of spikes was still required. One of the main objectives of this analysis was to assess the spatial coherence in the ocean colour data. Correlation fields were generated for 3 time spans, Aug-Nov 1998, 1998, and 1998-1999. The length scales of correlation were very low (a few kms) for the summer-fall analysis when overall chlorophyll variability was low but much longer when the large seasonal signals in chlorophyll (i.e. spring and fall blooms) were incorporated in the year and multi-year analyses. For the latter, the e-folding scale was estimated to be ~82km. This result suggested that analysis of larger box is required. Overall, however, the implications of these results argue that the production of a SeaWiFS electronic database should consider the full resolution data rather than a ~9km product that was originally suggested.

Brian followed his discussion of small-scale variability with a discussion of preliminary results from an EOF analysis of SeaWiFS data from 20 "boxes" covering the entire Atlantic zone (Hudson Strait to Georges Bank), i.e. looking specifically at variability on the large scale. The data used in this analysis were the mean and median statistics for each bi-weekly composite imagine (1997-2000) for each of the boxes. Differences were found in the mean and median values; spikes and dubious values as discussed earlier could have contributed to these differences. The EOF analysis indicated clearly that the data clustered into coherent patterns, i.e. the EOF analysis indicated that the first 3 modes contained 60% of the total variance (31.2, 18.4, 10.5%). The first mode (seasonal chlorophyll cycle) accounted for most of the variance at Cabot Strait and the Eastern Scotain Shelf and decreasing over the Grand Banks with a node at St. Anthony. Mode 1 also accounted for an appreciable variance in the Gulf of St. Lawrence proper but none in the northwest Gulf or estuary. The contribution of Mode 1 variance decreased westward over the Scotian Shelf. Some of the de-correlation could simply have been a phase shifting in the seasonal chlorophyll cycles. Overall, the results suggested that large geographic areas of the NW Atlantic act in concert with regard to chlorophyll dynamics.

Discussion

Questions centered around the practical implications of managing full-resolution SeaWiFS data (i.e. this is principally a data storage issue since each NW Atlantic bi-weekly composite image is comprised of >2million pixels) and what satellite data products does AZMP need? The latter question was not explicitly answered.

Topic: Remote sensing activities in Laurentian Region (Jean-Claude Therriault)

J.-C. Therriault ended discussion of this agenda item with a summary of remote sensing activities in the Laurentian region. Two relevant projects were described. Progress is being made in operationalizing the automated full-resolution SST facility at IML; it should be online early in 2001. Also the receiving station at Resolute, NWT, was mentioned since it provides a much wider (further north) coverage of SST than the receiving stations at IML/BIO alone. The second project described is the optics program (joint DFO and universities) dealing specifically with "Case-2" waters that are contaminated with suspended sediments, yellow substances, etc. and interferes with the extraction of chlorophyll from ocean colour satellite data. Among the promising results from this research is the possibility of using carotenoids as a proxy for chlorophyll since it correlates well with chlorophyll but apparently is not affected by the presence of yellow substances or suspended sediments. This research is continuing and a major publication of the research results is expected in 2001.

Discussion

A questions was raised about how many "optical regions" there are in the Gulf. J.-C. indicated there are at least three in the Estuary alone and a couple in the Gulf. JCT indicated that a more detailed presentation and discussion of the results of this work will be made at the 2001 annual AZMP meeting.

One comment was made about the SeaWiFS chlorophyll fields for the Southern Gulf in 2000, specifically that the indicated levels were much higher than believable.

Pierre Pepin mentioned that the satellite receiver in Newfoundland has been shut down due to lack of operating funds and personnel to man the facility.

7. Getting "fish" into the monitoring program

Topic: Finfish diversity on Scotian Shelf (Ken Frank)
Ken Frank wrapped up the Tuesday presentations by describing some of his recent work on finfish diversity on the Scotian Shelf. The fundamental question he posed is, "Are the RV groundfish survey data adequate to describe finfish diversity?" The RV surveys on the Scotian Shelf, going since 1970, were designed principally to assess abundance of dominant species. Ken then discussed in general terms why monitor fish diversity is important, including needs for trophodynamics modeling, climate impacts, and for compliance to biodiversity conventions. Following this, he described some early work on diversity by Strong and Hanke (1995) based on No. of species/tow which showed highest diversity on the Shelf was in the Gully region and mouth of the Bay of Fundy.

Early study #spp/tow: highest diversity in Gully/mouth Bay of Fundy. He then showed that by looking at cumulative number of species over several years of surveys, the census of species was some 3x higher than derived from a single annual survey for a particular stratum. The interpretation of these results was that many more sets are required to do a proper census (and assess diversity) of fish species than is done in a typical annual survey. The implications are that sampling effort to achieve 90 percentile would be some 2 orders of magnitude higher than annual survey set number. Ken used the cumulative results to reconstruct a species diversity map of the Scotian Shelf and the geographic patters were markedly different from the earlier Strong and Hanke map; e.g. highest diversity was on the eastern Scotian Shelf instead of the Gully. Ken suggested that practically speaking, >4,000 sets would be required for a complete census (22 surveys at current effort) and this is clearly an impossible task with RV surveys. As an alternative, he suggested that serious consideration should be given to using fishing industry data; in 1991, for example, some 13,000 sets were made by the industry.

Discussion
Among questions asked was if Ken had an explanation for marked change in cumulative species in the early 90s? It appeared to be coincident with closures. There were also some questions related to indices of diversity. For example was "evenness" as well as "richness" of species determined? Ken indicated they are looking at that. Also, does their analysis take into account species turnover? Again, this is something Ken is looking into. Finally, there was a query if this approach can pick up interannual variations in diversity. Ken indicated that the presently available data are simply inadequate to deal with interannual variability.

General Discussion
Following Ken's presentation there was a general discussion on fish, fisheries and their link with AZMP. There was some discussion of the ecosystem approach to fisheries and how it related to AZMP. Pierre Pepin commented that AZMP has good data on ocean physics, nutrients and plankton and good fish data exists but that there is a big gap in between, i.e. forage species, small invertebrates both benthic and pelagic. By making a reference to the termination in 2000 of the O-group cod/capelin surveys of John Anderson in Newfoundland, Pierre said that the situation will certainly not improve.

The question was posed, what can the Department's fish/fisheries scientists offer that would be relevant for AZMP? Ken Frank suggested that recruitment indices may be useful in our discussions of the

implications of environmental changes in the Atlantic Zone to fisheries. Reference was made to the phenomenal year class of Haddock on the Scotian Shelf in 1999 and how environment might have played a role.

The point was made that much of the relevant fisheries information can be found in the SSRs produced annually but the AZMP members felt it important to have some of that information "customized" for our needs and presented in the context of AZMP.

Jeff Runge re-iterated the importance of including basic research in AZMP activities because of the challenges we face in interpreting our results in terms of cause-effect. JCT asked how are we to integrate research in AZMP? Pierre mentioned the need for modelers and that AZMP interpretation should go well beyond a simple correlation analysis. The suggestion was made that a section should be added to the annual report addressing the question, what are AZMP's research needs? What are the gaps in data and understanding? That is a question that should be addressed by the Data Analisis Subcommittee. ***Action: Pierre Pepin and Dada Analysis Subcommittee.***

Along the same lines, Ken Frank suggested we should consider developing possible scenarios (referencing the Norwegian experience) in which we speculate on the impacts (on the foodweb) of environmental changes we are observing (e.g. the Labrador Slope Water intrusion event on the Scotian Shelf in 1998/99). He also commented that this a good time for AZMP to enter into the stock assessment process, referencing the Traffic Light Approach and how environmental data can easily be accommodated.

The Chairman ended this discussion with the question if AZMP thought it useful to have permanent "fish" persons on the AZMP committee? The answer was a resounding "yes". The comment was also made that it would be helpful if we had some fish/fisheries people to present data with an ecosystem perspective at the upcoming FOC meeting in March. Jean Claude asked if one of the individuals in attendance (K. Frank, D. Swain, J. Chase) was 'nominated' as a member of AZMP from their region. They all understood that they were there merely present as observers. Consideration will be given to who should sit on the committee permanently. K. Zwanenburg had early expressed willingness to do this. He, as well as other individuals from the other regions will be approached. ***Action: Jean-Claude Therriault.***

There were two additional written communications on fish/fisheries submitted to the Chairman before our meeting: (1) Monitoring of the Scotian Shelf ecosystem off Atlantic Canada (K. Zwanenburg) and Use of hydroacoustics (Y. Simard) but these were not discussed in detail at the meeting (See Annexes IX and X, respectively).

Tuesday, 28 November, 2000 (Afternoon session (Rapporteur: Estelle Couture)

9. Data Management

Topic: New database (Doug Gregory)
D. Gregory announced the development of a new Long Term Temperature Monitoring (LTTM) database which includes data from Laurentian, Newfoundland and Maritime regions. The new St. Lawrence Observatory (OSL) from the Laurentian Region has made updating this database with data from Laurentian region very easy. Once operational, this new application will be available on the web. Progress is going such that Doug estimates that users will be able to do spatial queries using polygons by spring.

Topic: Status of BIOCHEM project (Doug Gregory)
D. Gregory indicated that progress is being made on the project but it has been slower than anticipated.

Version 4.0 was released on November 25/2000. This current version contains approximately one-third marine chemistry data but no plankton data since complexities associated with the data have been far greater than expected. The database can now be queried from an Intranet site only available within DFO.

Version 4.1 of the project involves fixes to the current release that have been identified as a priority. The release of this version is expected for the end of December 2000.

Version 5.0 of the project entails connecting one other regional server to the Intranet query application. The choice of the additional server has not yet been made and will be a decision of the national BIOCHEM working group. The release of this version is expected for March 2001.

Version 6.0 will involve major upgrades to version 4.0 such as "piecemeal" updates, data editing and performance improvement. One of the objectives during this phase will be to decrease dependence from informatics support. As for funding, the requirements for this version will exceed the resources for this year and at the moment, additional source of funding remains unknown.

Topic: Quality control of biological data
J.-C. Therriault initiated a discussion on the need to quality control biological data. Members of the committee discussed the possibility to use ranges of values and examine depth profiles in order to quality assess the quality of data. P. Pepin and G. Harrisson replied that it might not be such a good strategy since biological properties do not behave as predictably as other variables such as salinity and temperature. Biological data are usually quality controlled/examined by experts in the fields that have the experience and knowledge of biological properties in each specific study areas.

P.Pepin suggested exploring what other people in the field are doing in term of quality control of biological data. John O'Reilly was suggested as a contact person. G. Harrison also suggested contacting the NODC to see what approaches they have used in the past. Once the group has a summary of approaches taken by custodians for large databases, a plan can be put in place to ensure that consistent methods are applied in all regions. ***Action: Members of Data management subcommittee.***

Topic: Submission of CTD data
Doug Gregory tabled a new schedule for monitoring data submission from BIO to MEDS (See below). Pierre Pepin suggested submitting CTD (high resolution) data every 6 months instead of yearly for the Newfoundland region. The Laurentian region will keep the same schedule since all their data go to MEDS in a timely manner. Overall, MEDS is very pleased with data submissions from all the regions.

Existing, Actual and Proposed MEDS Submissions from BIO

Data	Commitment to MEDS		Actual		Proposed	
	Fixed station Time scale	ZMP cruises Time scale	Fixed station	ZMP/MFD cruises	Fixed station	ZMP/MFD cruises
Seabird 25 CTD: O2, Fluor, PAR	1-2 days	1 week	Stn 2 ~ 6 weeks P5, Shediac ~ 8 weeks	Igoss data being sent, full data treated as normal cruise <2 years	2 weeks	2 months

Secchi depth	1-2 days	1 week	Data are immediately available, but submitted with Chl. data	Not being sent	4 times/year	annually each January
Oxygen	2-3 days	1 week				
Chlorophyll	1 week	1-3 week	1-2 weeks for stn2, weeks to months for Shediac and P5	Not being sent	4 times/year	annual
Nutrients	1-2 months batch → up to 6-months	1-2 months batch → up to 6-months	No samples run this year	Not being sent	annual	annual
Zooplankton	1-2 months	3-6 months	No analysis this year	Not being sent	annual	annual
Phytoplankton	1-2 months	3-6 months	~ 1yr	Not being sent	annual	annual

10. AZMP Web Sites

Topic: Status of AZMP website at MEDS (Estelle Couture)
Estelle Couture gave a brief overall presentation of the website to the committee to show progress and current status. Since this agenda item was thoroughly examined at the last AZMP Analysis Subcommittee Meeting held in September, no further discussions were initiated on changes to be made or actions to be taken by each region. The group was referred to the Data Analysis Subcommittee report (Annex IV) for more information.

Topic: Other regional websites
J.C. Therriault mentioned the development of a complement to the AZMP web site in the Laurentian region which will be integrated in the OSL web site. This site is not a duplication of MEDS efforts since it will show "value-added" products from the AZMP data with interpretations mostly intended for the general public.

12. Other Business items

Topic: Need of extra funding:

- CPR - The Sir Allister Hardy Foundation is asking for a 5 year commitment. In the past AZMP has been contributing $80,000 but because of the rising cost of the new contract, AZMP will be asked to contribute an extra $12,000 the first year and $3,600 in subsequent years or $20,000 for the next five years depending which contract option is chosen. In any case the rise in cost will drastically affect the overall AZMP.

  Consequently, it would be highly desirable to separate the CPR component from the overall AZMP. This issue should be raised with the science directors. In addition, CPR could be considered as a Canadian contribution to GOOS. The overall conclusion is that CPR should

be removed from AZMP funding and that sources of funding external to the AZMP should be considered. ***Action: Chairman of AZMP.***

- Cessation of Scotian Shelf krill studies - Doug Sameoto indicated to the committee that funding for the Scotian Shelf krill studies, roughly $20k/year, is no longer available. The results from these surveys have been part of the monitoring report to FOC for many years. This issue will be discussed within the Maritimes region. He indicated that the AZMP committee should expect to be asked for an evaluation of the importance of this project. Doug will keep the committee informed of all new developments. The AZMP committee indicated that the data are relevant and it supports their ongoing collection. ***Action: Doug Sameoto***

- New Northern Gulf and Hamilton Bank Stations? - The committee agreed that there is a need for the two new stations because these are fisheries areas for which data is very sparse. Pierre Pepin has contacted some people and found that it would be logistically difficult to sample a station on a regular basis on Hamilton Bank. Because of these difficulties, members of the committee suggested the possibility to use the Sea Horse instrument to collect data at these remote locations. This data collection method might alleviate some of the logistical difficulties since the Sea Horse only needs servicing every two months. In the northeastern Gulf, Coast Guard ships would be able to reach the instrument for its bimonthly maintenance but it would probably not be as easy in the case of the Hamilton Bank station. St-Anthony was suggested as an alternate choice for the location of the fixed station but, like Hamilton Bank, there is ice for as much as 6 months of the year and the risk for icebergs for another 2 months. These factors present obvious problems to a SeaHorse deployment.

  Prior to choosing whether or not we should go ahead with this project, 1) the AZMP committee considered that the current deployments and future deployment at fixed Station 2 (Halifax line) would serve as a pilot study for the feasibility of deployments at other sites; and 2) that an examination of existing data for the NEGSL and Hamilton Bank would be undertaken to determine the representativeness of potential station locations. The major data sources would be the SeaWifs and JPLSST observations. Consequently, a funding request for new stations, roughly estimated at $100k, will be postponed by one year. ***Action: Data Analysis Subcommittee.***

- New/replacement of equipment - The logistics subcommittee will prepare a plan for the replacement of AZMP instruments taking into consideration lifetime and usage of each instrument. Dave MacKeown has done this for the Maritimes region and should be consulted for the template to carry out this exercise. **Action: Michel Mitchell and Logistic subcommittee.**

Topic: Letter of support for NFLD Ecosystem Survey
As mentioned before, a letter of support for the 0-age Survey was directed to the regional science director in Nfld to no avail. Because of the importance of the 0-Age Survey data for AZMP, it was decided to reiterate the AZMP support to this survey. ***Action: Members of Coordinating Committee.***

Topic: Monitoring living marine resources, LMR-COOP, GCOOS and National Plans
Glen Harrison gave a brief report on the Global Ocean Observing System (GOOS) User's Forum and first meeting of the Coast Ocean Observing Panel (COOP) of GOOS held in Costa Rica in early November. There were a number of observations brought back from those meetings that have direct relevance to AZMP. Most importantly, the international planning process for a global observing system appears to

have a number of threads common with the development of ecosystem monitoring and integrated coastal zone management in Canada. Specifically, GOOS planning calls for an "end-to-end" process starting with conceptualization and ending with observational products useful for end-users and society in general. Strong emphasis was given to the need for input and participation of end-users at all stages of planning and implementation. It was recognized, furthermore, that pilot projects are an excellent tool for integrating users into the process. In Atlantic Canada, an "end-to-end" process for merging environmental observation within integrated management is already underway in DFO's Eastern Scotian Shelf Integrated Management (ESSIM) pilot project. Among the elements of planning used in the development of ESSIM were: (1) definition of ecosystem objectives as a framework, (2) followed by a workshop of experts to better develop the objectives and indicators, (3) followed by the ESSIM experts workshop to "test" the ecosystem objectives approach on a real system (note that AZMP is the ecosystem observation system central to this exercise), and finally (4) a user's forum (yet to be held) to get feedback from the end users. The point here is that DFO has in the past and will continue to play an important role in the development of environmental/ecosystem observing systems nationally and internationally and that AZMP will serve as a model. The next step in Canada will be the development of a more formal national GOOS coordinating committee with one of its goals the establishment of a ocean observing network of which elements of AZMP will most certainly be a part.

Topic: Involvement of Coast Guard on monitoring programme
It appears that relationships with CCG are causing problems in some regions. For example, it seems that the monitoring activities are very low on the list of priorities of the CCG in the Maritimes in light of an incident where film crews were given priority over monitoring activities. A letter to the CGG was judged to be an inappropriate means of addressing this problem. It was recommended that Dave MacKeown, Maritimes region, be consulted to determine the best approach to this issue. The relationships with CCG in Laurentian Region seems to be a lot better, but there is still place for improvement.

Topic: AZMP chairmanship

After discussion, J.C. Therriault agreed to serve as committee chair for one more (and probably last) year if the ASDC accept this extension of his mandate as Chairman of AZMP.

Wenesday, 29 November, 2000 (Morning session (No rapporteur)

11. Scientific presentations (Jean-Claude Therriault)

The following presentations were made which generated interesting scientific discussion (not reported here since most of this material will be includes in other AZMP reports or website) :

- Plankton (phyto & zoopl). abundance and community structure at the fixed stations in 1999-Maritimes (J. Spry)
- Preliminary results on phytoplankton biomass at the fixed stations, seasonal sections and groundfish surveys in 2000 -Maritimes (G. Harrisson & J. Spry)
- Preliminary results on physical environment at the fixed stations, seasonal sections and groundfish surveys in 2000-Maritimes (B. Petrie)
- Phyto & Zooplankton abundance and community structure at fixed stations and seasonal transects in 2000 –Laurentian (M. Harvey & M. Starr)
- Preliminary 2000 and 1999 results on physical environment –Laurentian (J. Plourde)
- Plankton and physical data in Newfoundland (E. Colbourne/J. Helbig/P. Pepin)
- Real time acquisition of data on ships of opportunity in Laurentian region (D. Gilbert)
- Correlations at the Gaspé Current Monitoring Station (D. Gilbert)

ANNEX I

Newfoundland Region: Summary of Zonal Monitoring Activities in 2000

Fixed Station

Located 5 km from the mouth of St. John's harbour, the station is routinely sampled using ships-of-opportunity using CTDs as well as 200 micron vertical net tows. In addition, the station is being sampled regularly using CTD, nutrients, chlorophyll, salinity, dissolved oxygen and plankton tows (70 and 200 micron). This year, we also included sampling of bacteria, POC, PON at selected depths, and starting in August of 2000, we occasionally measure rates of primary production from a single depth located in the mixed layer.

The schedule of occupations of dedicated (complete sampling) and ships-of-opportunity (where only CTD and 200 micron plankton casts are taken) is shown in Figure N1. A total of 21 and 26 samplings of the site were obtained during 2000.

Problems: although we currently have a vessel that is routinely available for sampling, the small size (14 m) often places limitations on whether we can successfully sample the site. An analysis of the past year indicates that approximately 40% of our planned use of the vessel has not resulted in the collection of information. We are currently exploring the potential to use the CCGS Louis M. Lauzier, currently on loan to Memorial University and the Marine Institute. Use of the vessel could be on an opportunistic basis whereby we make use of the vessel during scheduled courses, or where we charter the vessel at a cost of $400 for a four hour period. If we have to pay for use of the vessel out of existing AZMP funds, it will place severe restrictions on some of our activities.

Sections

Three cruises were dedicated to Zonal Monitoring Activities during 2000. The spring (22 Apr – 7 May) and summer (14 – 30 July) surveys were conducted aboard the CCGS Teleost while the fall survey (31 Oct – 11 Nov) was conducted aboard the CCGS Hudson. Spring and fall surveys were designed to sample the Southeast Grand Banks, Flemish Cap and Bonavista transects while the summer survey focussed on the Flemish Cap, Bonavista, White bay, Seal Island, Makovik and Nain Bank transects. All stations were sampled using a CTD (temperature, conductivity, oxygen and fluorescence) while nutrients, chlrophyll, phytoplankton, micro- and macrozooplankton, POC, PON were sampled at a subset of those stations (see Figure N2).

Problems: Workload in some areas of the surveys is proving to be excessive. This regional problem is being addressed.

Other activities

The thermograph program sampled 78 locations during various portions of the calendar year (Figure N3). Routine CTD deployments on all bottom trawl surveys in the Newfoundland region continued as usual. At the time of the November AZMP meeting, data were available from the spring surveys in 3LNOPs and the fall surveys of areas 2J3KLMNO are ongoing.

Problems: There will be a shortfall this year in terms of the summer estimates of the volume of the cold intermediate layer (CIL) and biological sampling on the southern Grand Banks due to the cancellation of the pelagic 0-group survey.

Personnel

All positions are currently staffed. There are currently two(2) technical and one and three quarter (1.75) professional physical oceanographers dedicated primarily to Zonal Monitoring activities while there are two (2) technical and one and a half (1.5) professional biological oceanographers dedicated to those activities.

Budgetary Summary

Total O&M funds dedicated to Zonal Monitoring were $162.5K (following 5% clawback). Capital allocations, under various programs total $60K. Overtime incurred during the surveys continues to be covered by the Regional Director.

Newfoundland region: AZMP+ A-Base Funding	**1998-99 $K**	**1999-2000 $K**	**2000-2001 $K**
O&M			
Equipment maintenance	62.0	37.0	35.0
Data Processing	21.0	5.0	0.0
Sampling equipment	34.0	24.0	21.0
Sample processing	35.0	50.0	34.0
Contract staff	16.0	0.0	11.0
Expandable (field supplies)	11.0	18.0	18.5
Meetings	12.0	11.0	11.0
Capital	10.0	0.0	60.0
Overtime	65.7	76.2	79.3
Total O&M	**266.7**	**221.2**	**269.8**
Salary/FTE's	**264 / 4.8**	**414 / 7.8**	**373 / 7.25**
Total (Direct AZMP funding)	**530.7**	**635.2**	**642.8**

Other Monitoring programs	**1998-99 $K**	**1999-2000 $K**	**2000-2001 $K**
Fish surveys	20.0	20.0	19.0
Remote sensing	5.0	5.0	0.0
LTTMP	8.0	8.0	8.0
Total	**33.0**	**33.0**	**32.0**

Ship time (dedicated to AZMP)	**341.0**	**247.0**	**462.0**

Total monitoring related funding	**904.7**	**915.2**	**1,131.8**

AZMP Allocation	**265.0**	**265.0**	**265.0**

Figure N1. Occupations of Station 27 using dedicated (complete sampling) and ships-of-opportunity (CTD and 200 micron plankton casts) for 1999 and 2000.

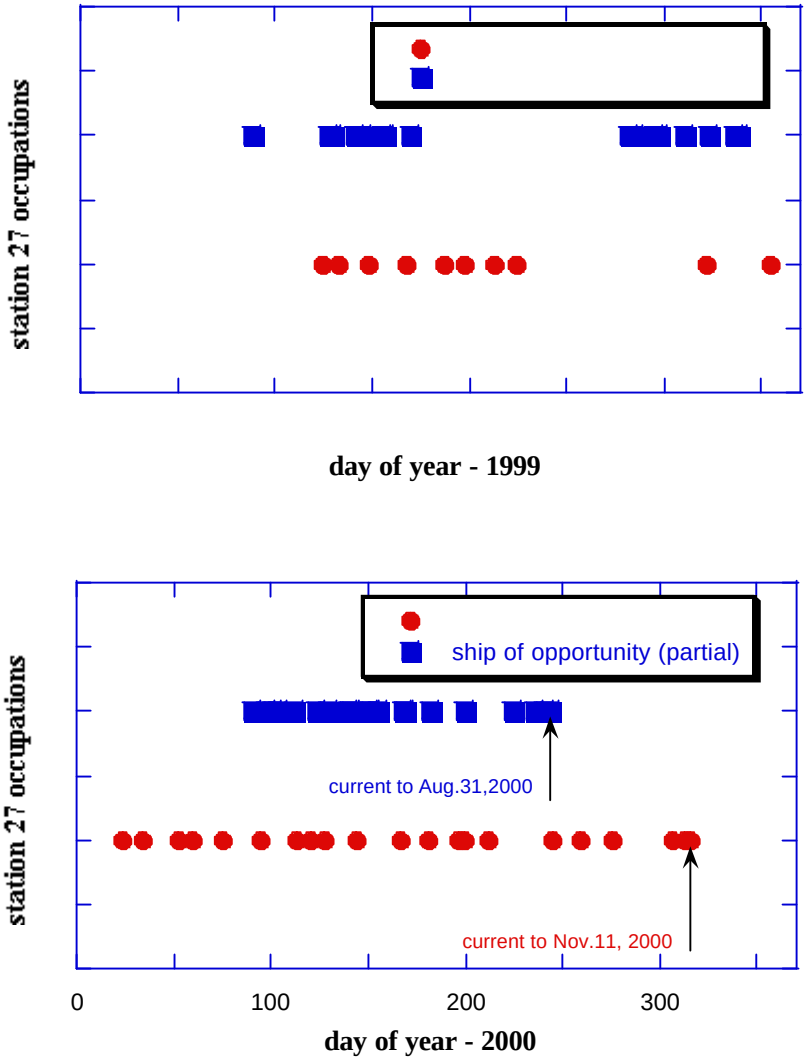


Figure N2. Station locations along major transects collected during Zonal Monitoring activities in the Newfoundland Region. Symbols represent where CTD, XBT and complete (physical/chemical/biological) samplings were conducted.

Spring 2000 – Teleost 302

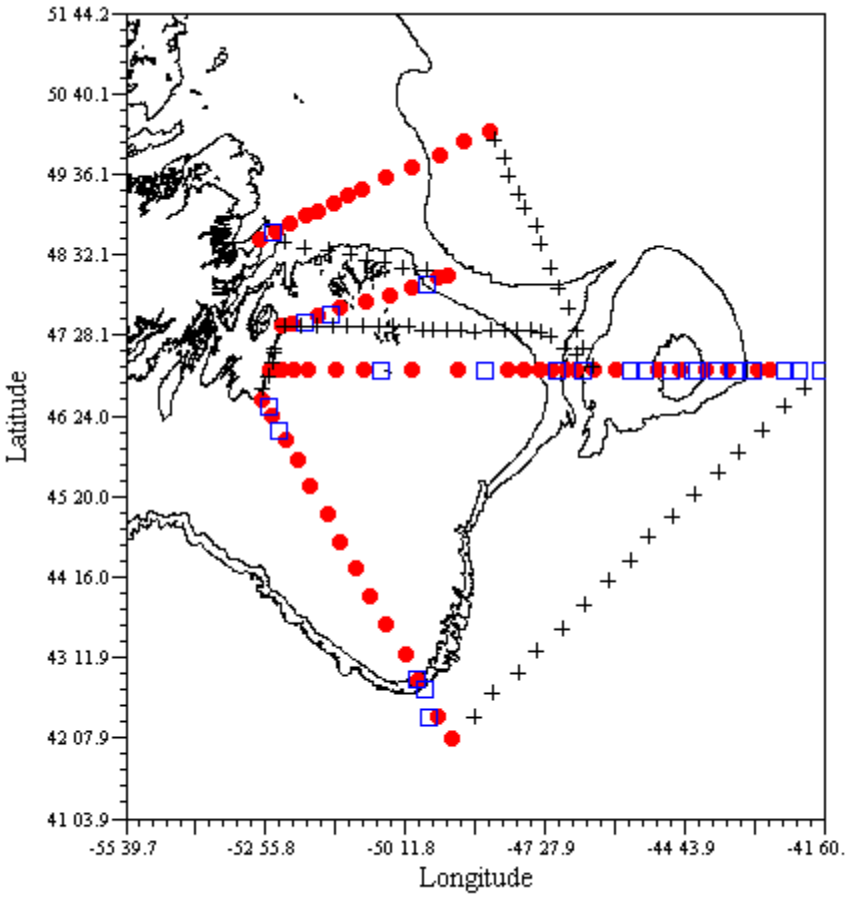


Figure N2. Continued.

Summer 2000 – Teleost 305

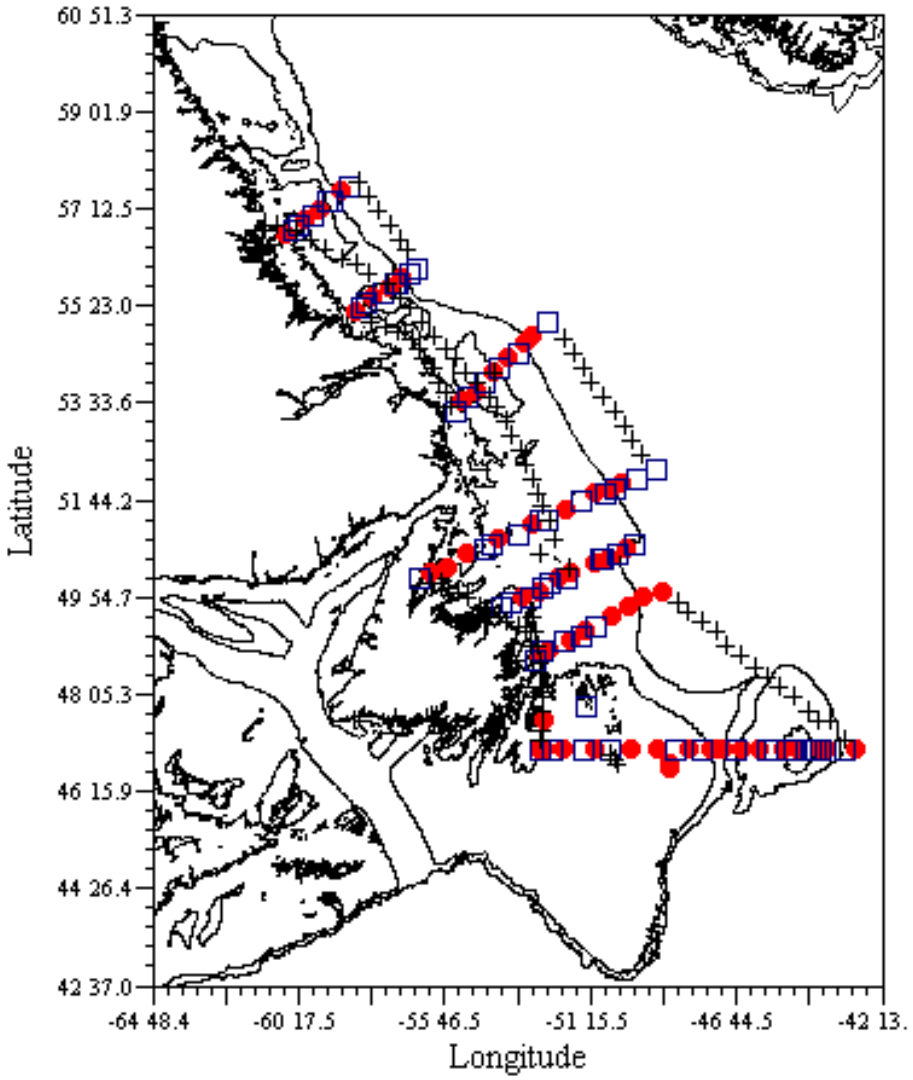


Figure N2. Continued

Fall 2000 – Hudson 060

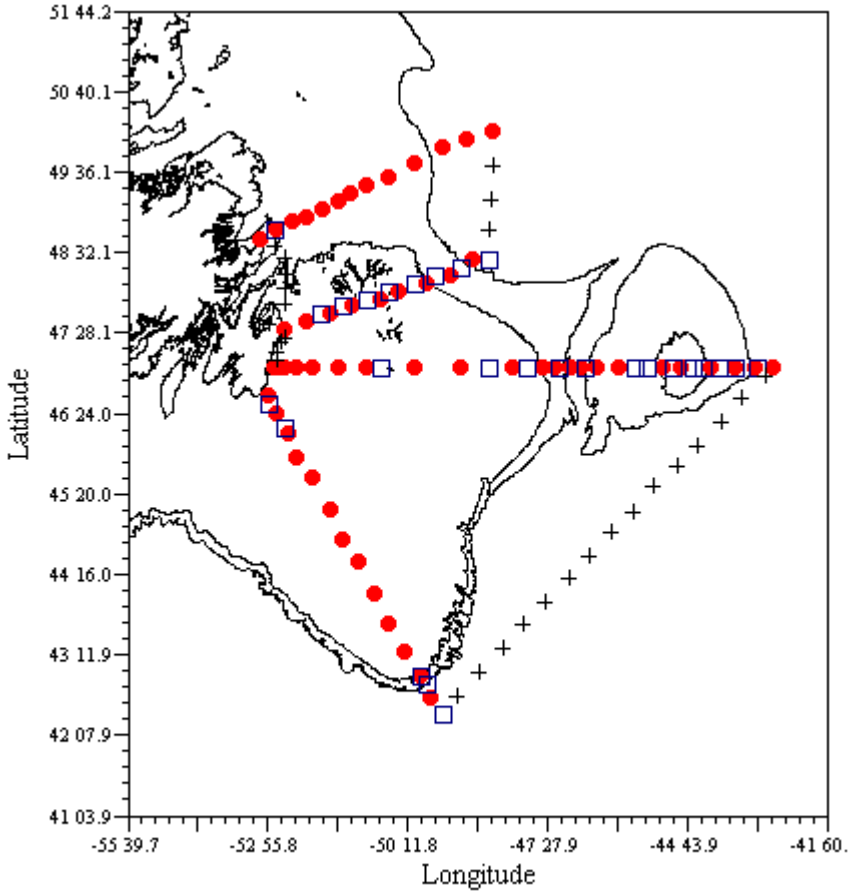
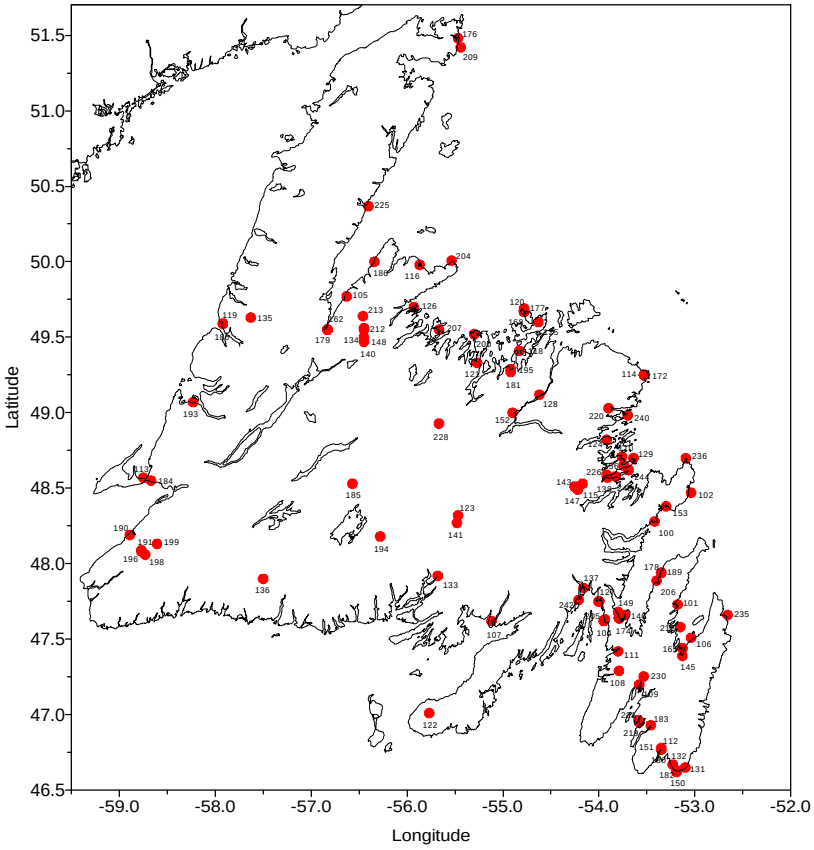


Figure N3. Thermographs sample locations 2000.



ANNEX II

LAURENTIAN REGION: SUMMARY OF ZONAL MONITORING ACTIVITIES 2000-2001

Oceanographic Sampling

Fixed Stations

Gaspé Current station: Located in the Gaspé Current, near Mont-Louis, about 4 km from the coastline

Anticosti Gyre station: Located in the middle of the Anticosti Gyre, about 52 km from the north shore and 57 km from the south shore.

Sampling: Every 2 weeks on an opportunity basis starting in 1998. Standard measurements included : CTD, nutrients, chlorophyll, salinity, dissolved oxygen, net tows (202 μm).

Problems: Securing ship time for the Gaspé Current and Anticosti Gyre stations has been a problem particularly during winter (January) and spring (March-April, 2000). The major factor has been that a CCG ship is required to escort the ship Nordic Express all the way to Blanc Sablon every week due to ice presence (trips back and forth require 4 to 5 days each). Another factor is the lower priority placed on the occupation of stations compared with other vessel activities such as search and rescue.

A summary of the fixed station occupations is given in Table 1 below. The stations were occupied only 9 times in 1998, 22 times in 1999, and 17 times in 2000.

Sections

The St. Lawrence Estuary, Mont-Louis, Anticosti, Magdalen Islands and Northeast Gulf sections were occupied during the June Redfish research survey (10 – 26 June) and during the November ice forecast cruises (26 November – 9 December). Sampling includes complete hydrographic collections as well as nutrients, chlorophyll, phytoplankton and zooplankton. In addition, the Cabot Strait section was occupied during the August 2000 groundfish survey (CTD).

The basic strategy is to look for opportunities to sample the different sections in the Gulf as often as possible. Our monitoring staff is ready to participate to this sampling as required.

Problems: Zooplankton samples were only collected at every two stations during the June Redfish survey because of lack of ship time. The frequency of sampling at most sections in not sufficient to describe the seasonal cycle.

Table 1. Summary of Gaspé Current and Anticosti Gyre station occupations in 2000		
DATE	**VESSEL**	**CRUISE**
09-Feb-2000	Des Groseillers	IML00-01,001, 002
26-Feb-2000	Des Groseillers	IML00-01,003, 004
09-Mar-2000	G.R. Pearkes	IML00-01,005, 006
07-May-2000	M.L. Black	IML00-01,007, 008
25-May-2000	M.L. Black	IML00-01,009, 010
02-Jun-2000	M.L. Black	IML00-22 10,TSi4,M000101
11-Jun-2000	M.L. Black	IML00-024,001,004
05-Jul-2000	M.L. Black	IML00-01,017,018
09-Aug-2000	Tracy	IML00-01,019,020
24-Aug-2000	Tracy	IML00-01,021,022
12-Sep-2000	M.L. Black	IML00-01, 023, 024
26-Sep-2000	G.R. Pearkes	IML00-01, 025, 026
13-Oct-2000	Tracy	IML00-01, 027, 028
25-Oct-2000	M.L. Black	IML00-01, 029, 030
08-Nov-2000	G.R. Pearkes	IML00-01, 031, 032
20-Nov-2000	M.L. Black	IML00-01, 033, 034
03-Dec-2000	Hudson	M00-62, 047, 050

Activities related to the AZMP

Oral presentations

- Harvey, M. (2000). Conditions Océanographique dans l'estuaire maritime et le Nord Ouest du Golfe du Saint-Laurent en 1999: Zooplancton. Revue annuelle d'évaluation des stocks. 10 février 2000. Institut Maurice-Lamontagne.
- Harvey, M. (2000) Oceanographic conditions in the Estuary and the Gulf of St. Lawrence in 1999: Zooplankton. Fisheries Oceanography Committee. 22-25 February, St-John's, Newfoundland.
- Starr, M. (2000). Conditions Océanographique dans l'estuaire maritime et le Nord Ouest du Golfe du Saint-Laurent en 1999: Phytoplancton. Revue annuelle d'évaluation des stocks. 10 février 2000. Institut Maurice-Lamontagne.
- Starr, M. (2000) Oceanographic conditions in the Estuary and the Gulf of St. Lawrence in 1999: Phytoplankton. Fisheries Oceanography Committee. 22-25 February, St-John's, Newfoundland.
- Gilbert, D. (2000) Real time acquisition of data on ships of opportunity in the Laurentian region. Atlantic Zone Monitoring Committee, 27-29 November, Montréal, Québec.
- Gilbert, D. (2000) Correlations at the Gaspé Current Monitoring Station. Atlantic Zone Monitoring Committee, 27-29 November, Montréal, Québec.
- Plourde, J. (2000). Conditions océanographiques du Golfe du Saint-Laurent en 1999. Revue annuelle Mont-Joli.
- Plourde, J. (2000). Oceanographic conditions in the Gulf of St. Lawrence during 1999. Fisheries Oceanographic Committee. 22-25 February, St-John's.
- Plourde, J. (2000). A preview of oceanographic conditions in the Gulf of St.Lawrence during 2000. Redfish Zonal Assessment Process, 14-16 November 2000, Moncton.

- Plourde, J. (2000). A preview of oceanographic conditions in the Gulf of St.Lawrence during 2000. Atlantic Zone Monitoring Programme annual meeting, 27-29 November 2000, Montreal..

Publications

- Harvey, M., J.A. Runge, J.F. St-Pierre and P. Joly (2000). Oceanographic conditions in the Estuary and the Gulf of St. Lawrence in 1999: Zooplankton. DFO Can. Stock assessment Sec. Res. Doc. 2000/117, 19 p.
- DFO, 2000. State of phytoplankton and zooplankton in the Estuary and northwestern Gulf of St. Lawrence during 1999. DFO Science Stock Status Report C4-18 (2000).
- Harvey, M., Starr, M., Levasseur, M. (2000). L'état du plancton dans l'estuaire maritime et le golfe du Saint-Laurent en 1999. Nat. Can. 125: 68-70.
- Starr, M. Harvey, M., M. Levasseur, L'état du plancton dans l'estuaire maritime et le golfe du Saint-Laurent en 1999. Nouvelles des Sciences. 11:4-9.
- Gilbert D. Temperature and salinity data from the 2000 summer shrimp and groundfish survey in the Gulf of St. Lawrence. [On line: 12 December 2000] http://www.osl.gc.ca/en/donnees/annexes/std-needler/needler2000ctd_en0.html> (Web pages accessed 12 December 2000).
- Gilbert, D, J. Plourde, Aperçu climatique pour 2000. Nouvelles des Sciences. 11(16) : 3-4.
- DFO, 2000. Oceanographic conditions in the Gulf of St.Lawrence during 1999. DFO Science Stock Status Report G4-01 (2000).
- MPO, 2001. Les conditions océanographiques dans le Golfe du Saint-Laurent en 1999. MPO Sciences, Rapport sur l'état des stocks G4-01 (2001)
- Plourde, J. 2001.The most important cold period of the recent climatic history of the Gulf of St. Lawrence. In : Atlantic Zone Monitoring Programme Annual Report (K. Drinkwater (ed)), in prep.

Databases: Although significant progress has been made, a major effort is still required at IML to develop a transparent process for handling the different monitoring data collected through different programs. We are planning to use the "St. Lawrence Observatory" to diffuse and show value added monitoring products, without duplicating MEDS' work. A very good partnership has been established with MEDS.

Personnel: In 1998, the three rejuvenation FTEs were used to cover AZMP dedicated staff. In 1999-2000, we had to give up one FTE to cover a shortage on the fisheries side at the request of the Science Director. This FTE should, however, be returned to the AZMP for fiscal year 2000-2001

Budget Summary

The table below is a budget summary for the first 3 years of the program. These resources include the AZMP as well as the A-base funding that was used for monitoring in the Laurentian region. Salaries / FTEs therefore include AZMP associated programs as well as ship time (e.g, Ice-Forecast, or spring helicopter cruises). All the overtime was covered by A-base funding.

Laurentian region: AZMP+ A-Base Funding	**1998-99 $K**	**1999-2000 $K**	**2000-2001 $K**
O&M			
Field Sampling (including supplies)	58.0	42.0	52.0
Data Processing and analysis	10.0	24.0	26.0
Sample processing (phyto- & zooplankton + nutrients)	24.0	36.0	43.0
Meetings/travel	12.0	15.0	13.5
Remote Sensing	20.0	15.6	14.0
Capital	10.0	25.0	15.0
Overtime	52.8	59.4	60.0
Total O&M	**186.8**	**217.0**	**223.5**
Salary/FTE's	**449.0 / 8.4**	**376.0 / 7.1**	**467.5 / 8.5**
Total (Direct AZMP funding)	**636.6**	**593.0**	**691.0**

Other Monitoring programs	**1998-99 $K**	**1999-2000 $K**	**2000-2001 $K**
Ice Forecast	10.0	10.0	10.0
LTTMP	8.0	7.0	8.0
Toxic algae	28.0	25.0	25.0
Zooplankton Biomass	20.0	18.0	21.0
Remote sensing	15.0	15.0	16.0
Total	**81.0**	**75.0**	**80.0**

Ship time (dedicated to AZMP)	**445.0**	**481.0**	**500.0**

Total monitoring related funding	**1081.6**	**1074.0**	**1,191.0**

AZMP Allocation	**265.0**	**265.0**	**265.0**

ANNEX III

MARITIMES REGION: SUMMARY OF ZONAL MONITORING ACTIVITIES IN 2000

Oceanographic Sampling

Fixed Stations

Prince 5, located off Grand Manan Island, near the mouth of Passamaquoddy Bay, run by St. Andrews Biological Station, sampling approximately every 2 weeks, CTD, nutrients, chlorophyll, salinity, dissolved oxygen, net tows (200 μ& 76 μ).

Station 2, off Halifax, originally part of Halifax Section, run by BIO, sampling nominally every 2 weeks, CTD, nutrients, chlorophyll, salinity, dissolved oxygen, net tows (200 μ & 76 μ).

Shediac Valley, southern Gulf of St. Lawrence off Shippegan, run by Gulf Fisheries Centre, sampling nominally every 2 weeks, April to November, CTD, nutrients, chlorophyll, salinity, dissolved oxygen, net tows (200 μ & 76 μ).

Problems: Securing ship time for Sta. 2 and the Shediac Valley Station has been a problem. The major factor has been weather and, in the Gulf, the requirement to piggyback on other cruises for as long as a week in order to get a single occupation of the Shediac station . Another factor is the low priority placed on the occupation of stations compared with other vessel activities, especially at Station 2 where the designated primary vessel is a Coast Guard SAR boat. Similarly, when using vessels of opportunity, the lack of proper equipment to carry out survey work can present further difficulties.

A summary of the fixed station occupations is given in Table 1 below:

Table 1. Summary of fixed station occupations 2000

STA. 2	SHEDIAC	PRINCE 5
DATE	**DATE**	**DATE**
JAN 10	APR 18	JAN.28
JAN 31	MAY 1	FEB 21
FEB 15	MAY 15	MAR 2
MAR 1	JUN 2	MAR.13
MAR 16	JUN 26	MAR 29
APR. 07	JUL 23	APR.25
APR. 12	AUG 14	MAY 17
APR 23	AUG 29	MAY 31
MAY 2	SEP 17	JUN 15
MAY 9	SEP 27	JUN 28
MAY 20		JUL 11
JUN 7		JUL 31
JUN 14		AUG 15
JUN 29		SEP 14
JUL 15		SEP 25
JUL 29		OCT 16
AUG 22		NOV 6

SEPT 12	NOV 15
SEPT 30	NOV 29
OCT 16	DEC 19
OCT 24	DEC 28
NOV 22	
DEC 8	

Sections

Halifax Section – occupied on spring and fall cruises in 2000. In addition, the **Cabot Strait, Louisbourg and Cape Sable sections** were occupied though they are not part of the long-term monitoring program. We shall try to occupy these sections as long as possible. CTD, dissolved oxygen, nutrients and net tow data were collected on the sections.

Hydrographic and nutrient data (surface and bottom samples) were collected on the February shrimp survey on the eastern Scotian Shelf (nutrients only), the winter groundfish surveys on Georges Bank and eastern Scotian Shelf , summer (July) Scotian Shelf - Bay of Fundy, and September southern Gulf of St. Lawrence groundfish surveys. In 2000, AZMP personnel participated on the winter, July and September groundfish survey cruises. Net tows were collected on 22 stations during the eastern Scotian Shelf March survey, 14 stations during the Georges Bank winter survey, 38 stations of the July Scotian Shelf-Gulf of Maine survey, and 19 stations of the September southern Gulf of St. Lawrence survey.

A June survey of the Halifax Section was also completed on a cruise of opportunity.

Problems: Processing the phytoplankton and zooplankton data is backed up. All of the phytoplankton counts are done in house; however, the person who does the phytoplankton counting also participates in the field activities which reduce the time available for the counts. The flow of data between the Gulf region, St. Andrew's and BIO and between divisions at the same and different locales has not been optimal. This was reviewed at a recent meeting and modifications to the overall data flow have been undertaken.

Databases

Processing the SeaWifs data and producing biweekly images continues for the entire zone. There was a major re-processing of the SeaWifs data in 2000 that took several months and a number of personnel to complete. In addition to the ocean colour (i.e., chlorophyll) estimates, biweekly estimates of primary productivity were also produced and are available on the OSD website. Analysis of small scale variations of the ocean colour data has indicated that storing the data in anything less than full spatial resolution may be ill-advised. The vast amounts of storage required for such an undertaking has prompted us to rethink the geographical coverage that we shall attempt for the database. The MCSST database has been updated to September 2000; thus, 19 years of sea surface temperatures are available online for data recoveries. The monthly image files of SST and SST anomalies for the Gulf, Newfoundland Shelf, Scotian Shelf, and WOCE region have been updated to August, 2000.

The CPR database has been updated to the end of 1999. Development is continuing on the BIOCHEM database with significant progress expected in 2001.

Personnel
The term oceanographic technician position, occupied K. Pauley, has been converted to a full-time position and is based at the Gulf Fisheries Centre in Moncton. One contractor was hired to assist with the data analysis.

Processing Archived Biological Data
Biological Oceanography Section continues to assemble, quality control and archive chlorophyll data collected in the region over the past 25 years. Combined with data residing in the MESD nutrient database, some 23,000 chlorophyll data records have been recovered. These data have been used to construct seasonal climatologies of chlorophyll distribution on the Scotian Shelf with an emphasis on vertical structure.

Phytoplankton samples processed at the Gulf Fisheries Centre in 2000 included the Scotian Shelf spring and fall cruises (14 samples), the Shediac Valley (10), Prince 5 (21) and Station 2 (23)

Budget Summary

The table below is a budget summary for the Maritime Region. The figures include AZMP as well as other A-base funding for monitoring activities. The 2000-2001 O&M allotment for the Maritime Region was $123.3K. Included in the 2000-2001 column but omitted in the previous year summaries are AZMP Remote Sensing activities and the Scotian Shelf Secondary Productivity Surveys. The table includes some estimates and contracts not yet completed.

Maritimes region: AZMP+ A-Base Funding	**1998-99 $K**	**1999-2000 $K**	**2000-2001 K$**
O&M:			
Biological - Chemical Database (BIOCHEM)	50.0	5.0	15.1
Field Sampling	42.3	39.7	41.7
Data Processing and Analysis	10.2	36.2	15.0
Sample analysis (Zooplankton & nutrients)	18.0	34.5	23.8
Meeting (travel)	15.6	12.5	19.0
Remote Sensing			15.6
Capital	19.2	22.0	00.0
Overtime	20.0	35.2	59.3
Total O&M	**175.3**	**185.1**	**189.5**
CPR	**80.0**	**80.0**	**80.0**
Salary/FTE's	**229.0 / 4.3**	**269.0 / 6.1**	**374/6.8PY**
Total (Direct AZMP funding)	**484.3**	**534.1**	**643.5**

Other Monitoring programs	**1998-99 $K**	**1999-2000 $K**	**2000-2001 K$**
Fish Surveys	20.0	20.0	20.0
LTTMP	14.0	14.0	14.0
Toxic algae	10.0	10.0	10.0

Supp. Environmental data	10.0	10.0	12.0
Remote sensing	15.0	15.0	15.0
Scotian Shelf Secondary Productivity Survey			15.0
Total	**69.0**	**69.0**	**86.0**

Ship Time (dedicated to AZMP)	**419.0**	**594.0**	**612.5**

Total monitoring related funding	**972.3**	**1,197.1**	**1,342.0**

AZMP Allocation	**345.0**	**345.0**	**346.7**

Summary of Maritimes Region AZMP Work (2000-2001)

Table 1 summarizes the cruises that the Maritimes AZMP participated in during the year. They include the shrimp survey in February, the groundfish surveys in March (Georges Bank, Eastern Scotian Shelf), July (Scotian Shelf, Gulf of Maine) and September (Southern Gulf of St. Lawrence). In addition to these co-operative cruises, there were the dedicated AZMP cruises in April and October that sampled the sections on the shelf. There was an opportunistic occupation of the Halifax Section in June as well. The status of data processing is also summarized in Table 1; note that the CTD data from these cruises has been processed.

The sampling of the three fixed stations is summarized in Table 1 and Figure 1. Notable in this year's data collection was that the spring bloom was captured at all 3 stations as well as on the April section cruise. The Cabot Strait and eastern Scotian Shelf sections appeared to have been sampled at or near the bloom maximum. Chlorophyll-a concentrations exceeding 12 mg m^{-3} were observed at both sections.

There were some successes and a number of concerns that arose during the year:
Successes:
1. Able to carry out both spring and fall surveys in spite of major ship availability problems (ship refits, reallocation to C&P, breakdown)
2. Achieve reasonable sampling of the Shediac Valley station
3. Seahorse deployment at Halifax Station 2 (see data below, where a small, near-surface chlorophyll peak associated with upwelling is seen to develop in the fall)

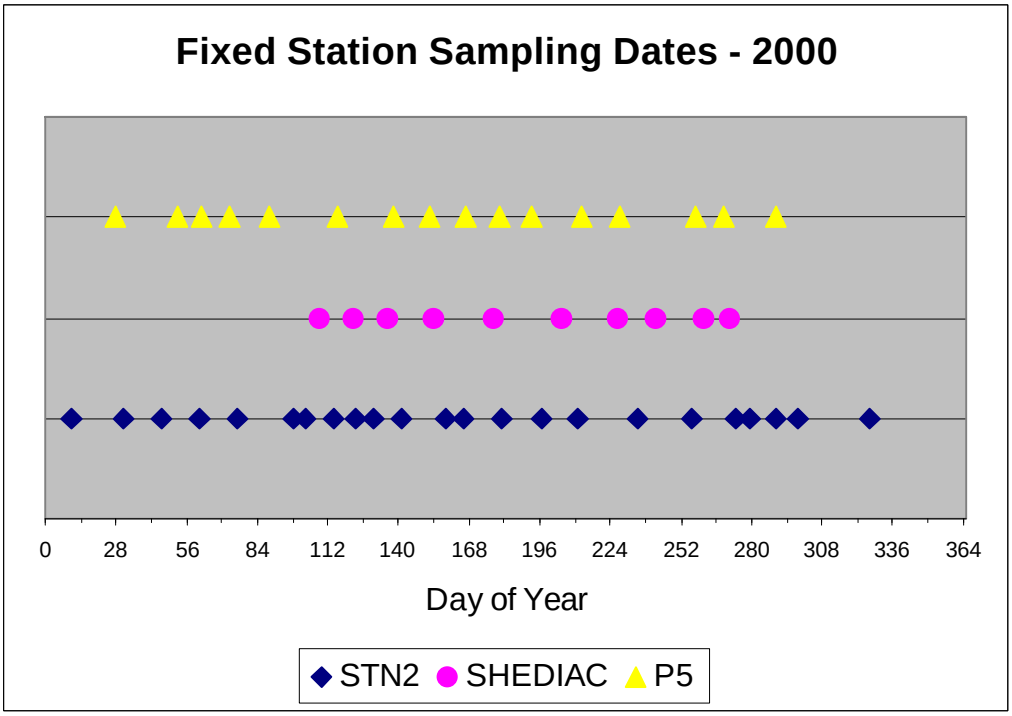
Concerns:
1. Amount of OT leave accumulated by staff on cruises (ZMP and cruises of opportunity); A-base funds not available to pay OT in cash.
2. Priority given to science by CCG: SAR boat not being available for sampling station 2 on the only decent day, because of commitment to a film crew.
3. Difficulty in scheduling sampling operations at the Shediac Valley station: achieved reasonable sampling frequency but at great expense of time.

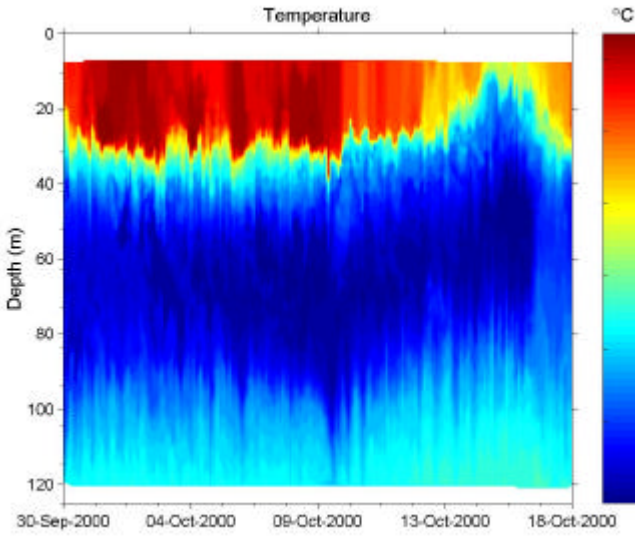
Table 1: Summary of oceanographic cruises and fixed station occupations, 2000.

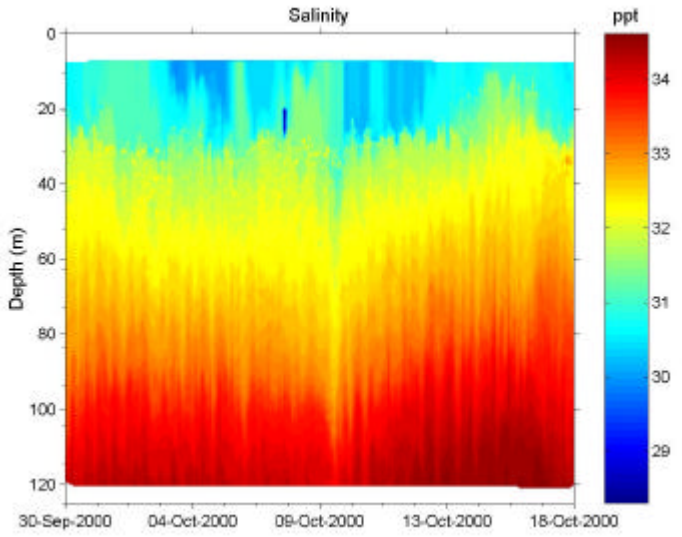
ANALYSIS OF 2000 SAMPLE SUMMARY – TO NOV. 6/2000

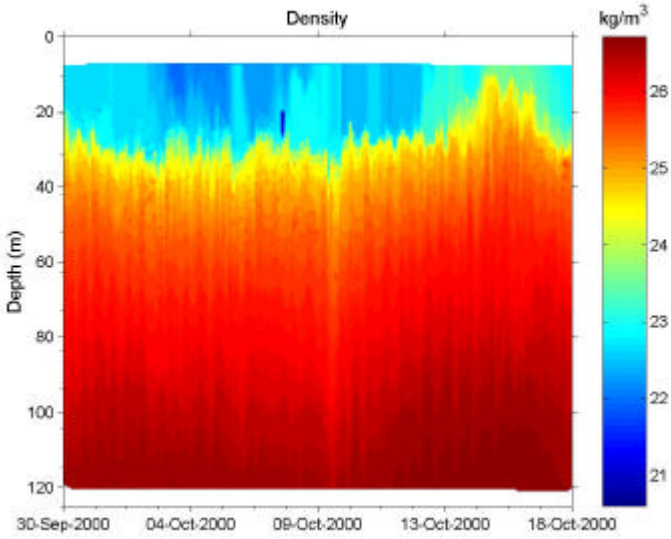
CRUISE	CHL	NUTS	ZOOP (200u RING NETS)	PHYTOPLANK
NED99064 FEB ESS	NONE	ANALYZED	NONE	NONE
NED99065 FEB GEORGES	ANALYZED	ANALYZED	NOT ANALYZED	NOT ANALYZED
NED99066 MAR ESS	ANALYZED	ANALYZED	NOT ANALYZED	NOT ANALYZED
PAR2000002 APR SSHELF	ANALYZED	ANALYZED	NOT ANALYZED	NOT ANALYZED
PAR2000075 JUNE HFX LINE	ANALYZED	NOT ANALYZED	NOT ANALYZED	NOT ANALYZED
NED2000026/031 JULY SSHELF	ANALYZED	ANALYZED	NOT ANALYZED	NOT ANALYZED
NED2000045 SEPT GULF	ANALYZED	NOT ANALYZED	NOT ANALYZED	NOT ANALYZED
HUD2000050 OCT SHELF	ANALYZED	NOT ANALYZED	NOT ANALYZED	NOT ANALYZED
STATION 2 2000	ANALYZED To Date	IN PROGRESS 1	ANALYZED To Date	NOT ANALYZED
SHEDIAC ST. 2000	ANALYZED To Date	IN PROGRESS 2	IN PROGRESS 1	NOT ANALYZED
PRINCE 5 2000	ANALYZED To July2000	IN PROGRESS 3	IN PROGRESS 2	NOT ANALYZED

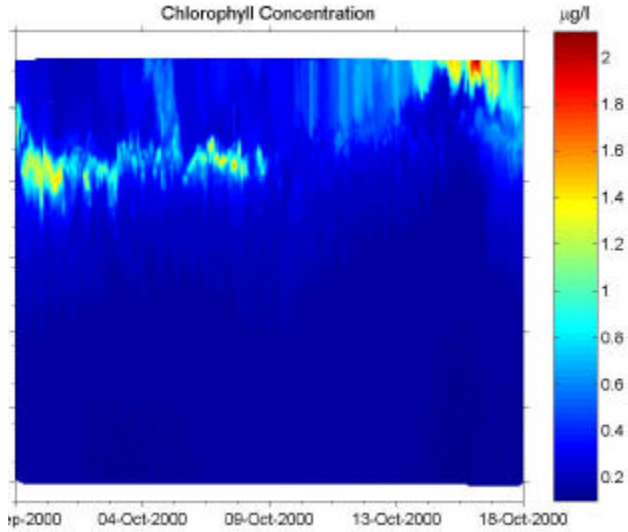
* Data not yet available


Fixed Station Sampling Dates - 2000
0
28
56
84
112
140
168
196
224
252
280
308
336
364
Day of Year
STN2
SHEDIAC
P5


Temperature
°C
Depth (m)
0
20
40
60
80
100
120
30-Sep-2000
04-Oct-2000
09-Oct-2000
13-Oct-2000
18-Oct-2000


Salinity
ppt
Depth (m)
0
20
40
60
80
100
120
34
33
32
31
30
29
30-Sep-2000
04-Oct-2000
09-Oct-2000
13-Oct-2000
18-Oct-2000


Density
kg/m3
Depth (m)
0
20
40
60
80
100
120
26
25
24
23
22
21
30-Sep-2000
04-Oct-2000
09-Oct-2000
13-Oct-2000
18-Oct-2000


Chlorophyll Concentration
µg/l
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
04-Oct-2000
09-Oct-2000
13-Oct-2000
18-Oct-2000

ANNEX IV

MEDS : SUMMARY OF ZONAL MONITORING ACTIVITY IN 2000

The main thrust at MEDS in 2000/01 was to further develop the AZMP website and migrate data from all Atlantic Regions to the website, and to participate in the development of BIOCHEM database. Regular communication was established with the Atlantic Regions to enhance and monitor the data flow, to share expertise and to streamline the data management.

The developments on the web site include:

- Addition of long-term means of salinity, temperature and density for all fixed stations (Data obtained from the Climate database at BIO using the Climate application on the web).
- Building of the web pages for each 'monitoring section'. These pages include inventories, data sets as well as contour plots for each section.
- Addition of remote sensing links to BIO and MLI
- Addition of sea level data pages for 9 stations in the AZMP area. All archived historical data associated with these stations are available from these pages as hourly heights and hourly heights passed through a tide filter (Godin Low pass filter).
- Enhancement of the web to allow data from ALL sea level stations available in our databases available online (it's almost ready).
- Addition of Climate Indices pages. We copied the climate indices pages from the BIO web site, gave them an "AZMP" web site look and updated the graphs using data provided by Roger Pettipas.
- Work in progress to implement a web-based query application to allow users to search and retrieve records from MEDS CTD, TESAC and Bottle archives by time and area.
- The site is completely bilingual.

To allow better coordination and timely data flow the following activities were undertaken:

- Established a new transfer protocol with NAFC with regards to discrete data. All their AZMP discrete data up to 1999 were migrated to MEDS archives
- Established data transfer protocols with BIO for fixed station CTD data and for fixed station chlorophyll and bottle oxygen data. All up-to-date data for climate indices were transferred. The cooperation was excellent in helping us figure out how to calculate the indices.
- Data transfers with MLI continue to go well as per last year's agreement on data flow to MEDS
- Visited MLI to:
  1. Talk about transfers of AZMP data to MEDS (more specifically nutrients)
  2. Talk to AZMP mission chiefs to gather information on sections that would be useful for the development of the web site
  3. Learn about their QC procedures in Matlab
  4. Learn from MLI experts their new web-based data query application and Matlab for potential use on the AZMP web site and applications.
  5. Discuss with the "Observatoire" web master on possibilities to integrate the " AZMP web site and the MEDS AZMP web site
  6. Initiate talks with Denis Lefaivre on submitting bathythermograph data to MEDS (data from the Cicero)

Participation in the BIOCHEM included

- testing the components of the data base
- migrating selected JGOFS data sets to the data base
- sharing the expertise among the BIOCHEM team.

Staffing and funding

		1998/99	1999/00	2000/01
Allocation				
ZMP		$20K	$20K	$20K
Leveraged resources	Sal	$25K	$25K	$25K
	OCP*	$20K	$30K	$60K
	MEDS A-Base	$10K	$10K	$30K
	TOTAL	**$75K**	**$85K**	**$135K**
Expenditures	Sal (.5 FTE)	$25K	$25K	$10K
	Transfer to Regions**	$35K	$40K	$100K
	students at MEDS	$10K	$10K	$15K
	Computer supplies and software	$5K	$10K	$5K
	Travel + Misc			$5K
	TOTAL	**$75K**	**$85K**	**$140K**

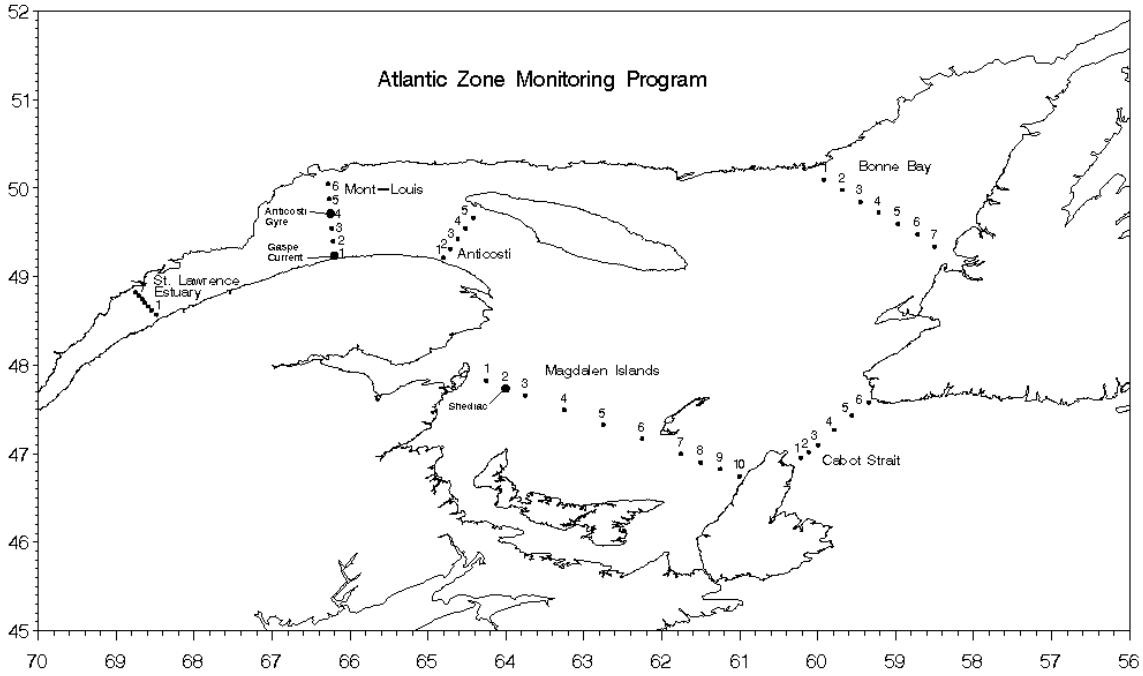
* these funds were for data management activities: data archeology in 98 and Biological data base development in 99 & 2000

** transfers were made to bring old data to database and to build BIOCHEM database.

Annex V

See Data Analysis Report attached.

Annex VI



Stations locations

Section	Station	Ordre	Latitude	Longitude
ANTICOSTI	ANTICOSTI1	1	49.21660	64.80000
ANTICOSTI	ANTICOSTI2	2	49.31660	64.71660
ANTICOSTI	ANTICOSTI3	3	49.43330	64.61660
ANTICOSTI	ANTICOSTI4	4	49.55000	64.51660
ANTICOSTI	ANTICOSTI5	5	49.66660	64.41660
BONNE BAY	BONNE BAY1	1	50.10000	59.91660
BONNE BAY	BONNE BAY2	2	49.98330	59.68330
BONNE BAY	BONNE BAY3	3	49.85000	59.45000
BONNE BAY	NORTHEAST GULF	4	49.72500	59.21670
BONNE BAY	BONNE BAY5	5	49.60000	58.96670
BONNE BAY	BONNE BAY6	6	49.48330	58.71670
BONNE BAY	BONNE BAY7	7	49.34330	58.50000
CABOT STRAIT	CABOT STRAIT1	1	46.95833	60.21667
CABOT STRAIT	CABOT STRAIT2	2	47.02333	60.11667
CABOT STRAIT	CABOT STRAIT3	3	47.10000	59.99167
CABOT STRAIT	CABOT STRAIT4	4	47.27167	59.78333
CABOT STRAIT	CABOT STRAIT5	5	47.43333	59.55833
CABOT STRAIT	CABOT STRAIT6	6	47.58333	59.34167
MAGDALEN ISLANDS	MAGDALEN ISLANDS1	1	47.83000	64.25000
MAGDALEN ISLANDS	SHEDIAC	2	47.74000	64.00000
MAGDALEN ISLANDS	MAGDALEN ISLANDS3	3	47.66000	63.75000
MAGDALEN ISLANDS	MAGDALEN ISLANDS4	4	47.50000	63.25000

MAGDALEN ISLANDS	MAGDALEN ISLANDS5	5	47.33000	62.75000
MAGDALEN ISLANDS	MAGDALEN ISLANDS6	6	47.17000	62.25000
MAGDALEN ISLANDS	MAGDALEN ISLANDS7	7	47.00000	61.75000
MAGDALEN ISLANDS	MAGDALEN ISLANDS8	8	46.90170	61.50000
MAGDALEN ISLANDS	MAGDALEN ISLANDS9	9	46.83000	61.25000
MAGDALEN ISLANDS	MAGDALEN ISLANDS10	10	46.74500	61.00000
MONT-LOUIS	GASPE CURRENT	1	49.24170	66.20000
MONT-LOUIS	MONT-LOUIS2	2	49.40000	66.21670
MONT-LOUIS	MONT-LOUIS3	3	49.55000	66.23330
MONT-LOUIS	ANTICOSTI GYRE	4	49.71670	66.25000
MONT-LOUIS	MONT-LOUIS5	5	49.88220	66.26670
MONT-LOUIS	MONT-LOUIS6	6	50.05000	66.28330
STL ESTUARY	STL ESTUARY1	1	48.57500	68.48750
STL ESTUARY	STL ESTUARY2	2	48.62500	68.54670
STL ESTUARY	STL ESTUARY3	3	48.66667	68.58333
STL ESTUARY	STL ESTUARY4	4	48.70833	68.62917
STL ESTUARY	STL ESTUARY5	5	48.75000	68.66667
STL ESTUARY	STL ESTUARY6	6	48.78750	68.70833
STL ESTUARY	STL ESTUARY7	7	48.82500	68.75000

ANNEX VII

See AZMP protocol document attached

ANNEX VIII

See AZMP zooplankton variability document attached

ANNEX IX

SEE fish related comments by K. Zwanenberg attached

ANNEX X

SEE fish related comments by Y. simard attached