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Atlases which could be prepared from hydrographic data in the ICNAF Area<sup>1</sup>

by

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Introduction

Recommendations are made, as a basis for discussion, for four kinds of atlas which could be prepared from hydrographic data in the ICNAF area. One is based on the data from the ICNAF Larval Herring Surveys since 1971. The others would draw on the historical data going back to 1950 which are now in the archives at Marine Environmental Data Service (MEDS), supplemented by the backlog of data which have not yet been transmitted to MEDS. In all cases the work could be largely accomplished by computer when the data are made available in appropriate format on magnetic tape. Preparation of suitable data inventories is recommended as an essential first step.

1. A recommendation for the preparation of an atlas utilizing the oceanographic data collected on the cooperative ICNAF Larval Herring Survey was made in a previous document (Schlitz, 1975). In this way the data collected since 1971 would be presented completely in a consistent manner instead of various subsets being treated by individual investigators. Although the data for the first years were limited to primarily temperature, the number of parameters sampled in fall 1975 expanded considerably to include salinity, dissolved oxygen, nutrients, and chlorophyll. As the data center for ICNAF, the Marine Environmental Data Service (MEDS) would be the organization best suited for the preparation of such an atlas. The six month reporting schedule accepted for oceanographic data by ICNAF would allow the timely preparation of an atlas. However, the preparation of any atlas involving many oceanographic parameters is an extremely long process because of the consistency that is needed between parameters on any data set. Therefore, an initial volume using only the temperature values (BT or XBT data in many cases) is recommended because these data are most complete. The other oceanographic data, including meteorological observations, should be considered for later volumes. The temperature atlas should include both horizontal and vertical sections, an appropriate index of heat content for individual oceanic areas, and an indication of the level of stratification within the water column. The precise format of any volume would depend on the data distribution, and the amount of processing that could be done by machine.

To that end it is recommended that, as soon as possible after the six-month reporting period, MEDS produce monthly data distribution charts, giving station position, type of observation and depth of deepest observation for stations which do not reach the bottom.

2. Distribution of oceanographic stations in the ICNAF area for each month of each year, 1950-1959, is shown in a MEDS catalog (MEDS 1975a). In a few regions enough sections have been made in different months to warrant

<sup>1</sup> Presented as Working Paper 76/IV/102 at Environmental Working Group Meeting, Szczecin, Poland, April 1976.

preparation of a chronological series of actual sections to show the annual variation for both late winter (March to May) and the summer (July to September). It is assumed that the coverage since 1959 is at least as good as for 1950-1959, and that the stations shown go to the bottom or at least 200 m, whichever is deeper.

The best coverage on the Scotian Shelf in the 1950's is the Halifax section which was occupied in all but two summers and all but three winters. The Cape Breton section was occupied half the winters and eight of the 10 summers, and the Cape Sable sections were done about half the time in both seasons.

On the Grand Banks the winter coverage is probably too sparse for a time series such as proposed here, but good sections both to the northeast and southeast of Cape Bonavista are shown for nine out of 10 summers. Further north the annual International Ice Patrol sections across the Labrador Sea to Cape Farewell are the only regular sets of data.

3. From the MEDS monthly summary catalog (MEDS 1975b) it appears that there are enough observations throughout the ICNAF area to prepare horizontal charts of average temperature and salinity by one-degree squares at various depths for each of the four seasons, similar to the atlas of Schroeder (1963). The averaging can be done readily by computer and the contouring could be either by machine or by hand. Charts could be done for the sea surface and several depths to 200 m, or deeper if the data base is adequate. Standard sampling depths would be best to reduce interpolation error. At each depth there should also be a chart showing the range of values encountered in each degree square and/or the maxima and minima. This could also be done as a computer display like the horizontal array summaries produced by NODC (NOAA 1976). Plots of temperature vs. salinity for selected subdivisions of the ICNAF area would also be useful.

4. In the center of the Labrador Sea at 56-57° N, 50-52° W, there are 1426 observations 1950 to 1973, with 60 to 100 stations each month from September through February and 119 to 172 in the warmer months (MEDS 1975b). These data could be plotted against time in the manner of Huyer and Verney (1975) to show the long-term variation in the water column of temperature, salinity, and sigma-t at a single location.

5. MEDS has noted that its historical data files for the ICNAF area are incomplete. As a first step in bringing them up to date it is recommended that an inventory be prepared in each member nation by its designated national representative who is responsible for submission of oceanographic data to MEDS (Recommendation 4, Annual Meeting 1975).

The inventory should include all cruises of member nation ships in the ICNAF area on which substantial numbers of oceanographic observations were made, regardless of method, since 1950, whether or not the cruise was part of an ICNAF program. The reporting could be accomplished most conveniently by the ROSCOP II form (attached) which provides for a good summary of observations. In addition a list of station positions should be given with depth of deepest observation at each station, so that MEDS can update its summary maps. Finally, the report should include a realistic appraisal of the quality of the data and an estimate of time required to reduce it to acceptable computer format.

#### References

- Huyer, Adriana, and Andrew Verney. 1975. Temperature, salinity and sigma-t at Station 27 (47°33'N, 52°35'W), 1950-1959. Marine Environmental Data Service, Technical Report No. 3, Dept. of the Environment, Ottawa.
- Marine Environmental Data Service, 1975a. Monthly distributions of oceanographic stations in the ICNAF area, 1950-1959. Department of the Environment, Ottawa.
- Marine Environmental Data Service, 1975b. Monthly summaries of oceanographic stations in the ICNAF area, 1950-1973. Department of the Environment, Ottawa.

- NOAA Environmental Data Service. 1976. NODC Applications Products NOAA S/T 76-1941.
- Schlitz, R. 1975. A preliminary summary of hydrographic data collected on ICNAF larval herring surveys, 1971-1975. ICNAF Res. Doc. 75/111.
- Schroeder, Elizabeth H. 1963. North Atlantic temperatures at a depth of 200 meters. Serial Atlas of the Marine Environment, Folio 2, American Geographical Society, New York.

NOAA FORM 24-23  
(4-74)

U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
ENVIRONMENTAL DATA SERVICE  
NATIONAL OCEANOGRAPHIC DATA CENTER

FORM APPROVED:  
O.M.B. NO. 41-R2765  
EXPIRES: 12-31-79

**REPORT OF OBSERVATIONS/SAMPLES COLLECTED BY OCEANOGRAPHIC PROGRAMS  
(ROSCOP II)**

PREPARED FOR USE BY U.S. ACTIVITIES IN ACCORDANCE WITH SPECIFICATIONS OF THE  
INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

**SECTION A - GENERAL INFORMATION PLEASE READ INSTRUCTIONS ON COVER BEFORE COMPLETING THIS FORM**

DATA CENTER 01 <		REFERENCE NUMBER > 02 <	COUNTRY 03 <		COUNTRY CODE (For Data Center use) >
INSTITUTION 04 <					
SHIP/PLATFORM 05 <			RADIO CALL SIGN 06 <	PLATFORM TYPE 07 <	
CRUISE NUMBER/NAME 08 <			EXPEDITION/PROJECT 09 <		
CHIEF SCIENTIST(S) 10 <			START DATE 11 <		END DATE 12 <
TYPE OF MARINE ZONES (Optional) 13 <		GENERAL OCEAN AREA (Optional) 14 <		DECLARED NATIONAL PROGRAM (If part, specify in "Remarks") 15 <	
EXCHANGE RESTRICTED (If part, specify in "Remarks") YES NO PART 16 < <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> >		COOPERATIVE PROGRAM YES NO 17 < <input type="checkbox"/> <input type="checkbox"/> >		PROGRAM NAME 18 <	
INTERNATIONALLY COORDINATED 19 < <input type="checkbox"/> <input type="checkbox"/> >		BY WHOM 20 <			
FIXED STATION 21 <	LATITUDE ° ' >		LONGITUDE ° ' >		QUADRANT: 23 <
				NE 1	SE 3
				SW 5	NW 7
FEDERAL SUPPORT 24 <					

**DISPOSITION OF DATA**

CODE	25	WHOM TO QUERY	CODE	26	FINAL DISPOSITION
01	<	>	51	<	>
02	<	>	52	<	>
03	<	>	53	<	>
04	<	>	54	<	>
05	<	>	55	<	>
06	<	>	56	<	>
07	<	>	57	<	>
08	<	>	58	<	>
09	<	>	59	<	>
10	<	>	60	<	>

**SECTION B**

**27 GEOGRAPHIC LOCATION (If more space is needed, use blank paper)**

DISCIPLINE/PARAMETER (Parameter entries are optional)	10° X 10° SQUARES			1° X 1° SQUARES (Recommended but not mandatory)									
	Qc	La	LoLo	1° X 1°	1° X 1°	1° X 1°	1° X 1°	1° X 1°	1° X 1°	1° X 1°	1° X 1°	1° X 1°	1° X 1°
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SECTION C	PARAMETERS MEASURED/TYPES OF STUDIES (CODE)	NUMBER	QUERY	FINAL DISPOSITION	FORMAT
<b>G-GEOLOGY/GEOPHYSICS</b>					
<b>GL-MEASUREMENTS MADE AT A SPECIFIC LOCATION</b>					
	DREDGE	G01			
	GRAB	G02			
	CORE-ROCK (Number of cores)	G03			
	CORE-SOFT BOTTOM (Number of cores)	G04			
	SAMPLING BY DIVERS	G05			
	SAMPLING BY SUBMERSIBLE	G06			
	DRILLING	G07			
	BOTTOM PHOTOGRAPHY	G08			
	SEA FLOOR TEMPERATURE ( $\leq 1m$ . from bottom)	G09			
	ACOUSTICAL PROPERTIES OF THE SEA FLOOR	G10			
	ENGINEERING PROPERTIES OF THE SEA FLOOR	G11			
	MAGNETIC PROPERTIES OF THE SEA FLOOR	G12			
	GRAVIMETRIC PROPERTIES OF THE SEA FLOOR	G13			
	RADIOACTIVITY MEASUREMENTS	G14			
	OTHER MEASUREMENTS (Specify in "Remarks")	G70			
<b>GU-MEASUREMENTS UNDERWAY</b>					
	MOTION PICTURE OF THE SEA FLOOR	G21			
	BATHYMETRY-WIDE BEAM (Number of miles)	G22			
	BATHYMETRY-NARROW BEAM (Number of miles)	G23			
	SIDE-SCAN SONAR	G24			
	SEISMIC REFLECTION	G25			
	SEISMIC REFRACTION	G26			
	GRAVIMETRY	G27			
	MAGNETISM	G28			
	OTHER MEASUREMENTS (Specify in "Remarks")	G80			
<b>GS-TYPES OF STUDIES</b>					
	PHYSICAL ANALYSIS OF SEDIMENTS	G31			
	CHEMICAL ANALYSIS OF SEDIMENTS	G32			
	PALEONTOLOGY	G33			
	PALEOMAGNETISM/ROCK MAGNETISM	G34			
	PALEOTHERMY	G35			
	GEOOTHERMY	G36			
	GEOCHRONOLOGY	G37			
	MINERAL AND FOSSIL RESOURCES	G38			
	LITTORAL ZONE STUDIES	G39			
	OTHER MEASUREMENTS (Specify in "Remarks")	G40			
<b>D-DYNAMICS</b>					
	CURRENT METERS (Number of stations)	D01			
	CURRENT METERS (Average duration of measurements)	D02			
	CURRENTS MEASURED FROM SHIP DRIFT	D03			
	GEK	D04			
	DRIFTERS (Number)	D05			
	SWALLOW FLOATS (Number)	D06			
	DRIFT CARDS (Number released)	D07			
	BOTTOM DRIFTERS (Number released)	D08			
	TIDAL OBSERVATIONS (Duration)	D09			
	SEA AND SWELL (Number of observations)	D10			
	OTHER MEASUREMENTS (Specify in "Remarks")	D90			
<b>B-BIOLOGY</b>					
	PRIMARY PRODUCTIVITY	B01			
	PHYTOPLANKTON PIGMENTS	B02			
	SESTON	B03			
	PARTICULATE ORGANIC CARBON	B04			
	PARTICULATE ORGANIC NITROGEN	B05			
	DISSOLVED ORGANIC MATTER	B06			
	PELAGIC BACTERIA AND MICROORGANISMS	B07			
	PHYTOPLANKTON	B08			
	ZOOPLANKTON	B09			
	NEUSTON	B10			

SECTION C	PARAMETERS MEASURED/TYPES OF STUDIES (CODE)	NUMBER	QUERY	FINAL DISPOSITION	FORMAT
<b>B-BIOLOGY (Continued)</b>					
	NEKTON	B11			
	INVERTEBRATE NEKTON	B12			
	PELAGIC EGGS AND LARVAE	B13			
	PELAGIC FISHES	B14			
	AMPHIBIANS	B15			
	BENTHIC BACTERIA AND MICROORGANISMS	B16			
	PHYTOBENTHOS	B17			
	ZOOBENTHOS	B18			
	COMMERCIAL DEMERSAL FISHES	B19			
	COMMERCIAL BENTHIC MOLLUSCS	B20			
	COMMERCIAL BENTHIC CRUSTACEANS	B21			
	ATTACHED PLANTS AND ALGAE	B22			
	INTERTIDAL ORGANISMS	B23			
	BORERS AND FOULERS	B24			
	BIRDS	B25			
	MAMMALS AND REPTILES	B26			
	DEEP SCATTERING LAYERS	B27			
	ACOUSTICAL REFLECTIONS ON MARINE ORGANISMS	B28			
	BIOLOGICAL SOUNDS	B29			
	BIOLUMINESCENCE	B30			
	VITAMIN CONCENTRATIONS	B31			
	AMINO ACID CONCENTRATIONS	B32			
	HYDROCARBON CONCENTRATIONS	B33			
	LIPID CONCENTRATIONS	B34			
	ATP-ADP-AMP CONCENTRATIONS	B35			
	DNA-RNA CONCENTRATIONS	B36			
	TAGGINGS	B37			
	OTHER MEASUREMENTS (Specify in "Remarks")	B80			
<b>B5-TYPE OF STUDIES</b>					
	IDENTIFICATION	B51			
	SPATIAL AND TEMPORAL DISTRIBUTION	B52			
	MONITORING AND SURVEILLANCE	B53			
	BIOMASS DETERMINATION	B54			
	DESCRIPTION OF COMMUNITIES	B55			
	FOOD CHAINS ENERGY TRANSFERS	B56			
	POPULATIONS AND ENVIRONMENTS	B57			
	POPULATION STRUCTURES	B58			
	TAXONOMY, SYSTEMATICS, CLASSIFICATION	B59			
	PHYSIOLOGY	B60			
	BEHAVIOR	B61			
	PATHOLOGY, PARASITOLOGY	B62			
	TOXICOLOGY	B63			
	GEAR RESEARCH	B64			
	EXPLORATORY FISHING	B65			
	COMMERCIAL FISHING	B66			
	AQUACULTURE	B67			
	OTHER MEASUREMENTS (Specify in "Remarks")	B90			
<b>REMARKS (Please use plain sheets of paper, if additional space is required.)</b>					

SECTION C	PARAMETERS MEASURED/TYPES OF STUDIES (CODE)	NUMBER	QUERY	FINAL DISPOSITION	FORMAT
<b>M-METEOROLOGY</b>					
	UPPER AIR OBSERVATIONS	M01			
	INCIDENT RADIATION	M02			
	AIR-SEA INTERFACE STUDIES	M03			
	ICE OBSERVATIONS	M04			
	OCCASIONAL STANDARD MEASUREMENTS	M05			
	SYSTEMATIC STANDARD MEASUREMENTS	M06			
	OTHER MEASUREMENTS (Specify in "Remarks")	M90			
<b>H-PHYSICAL/CHEMICAL OCEANOGRAPHY</b>					
<b>HS-SURFACE</b>					
	CONTINUOUS TEMPERATURE RECORDING	H01			
	CONTINUOUS SALINITY RECORDING	H02			
	DISCRETE TEMPERATURE MEASUREMENTS	H03			
	DISCRETE SALINITY MEASUREMENTS	H04			
<b>HB-NEAR BOTTOM (<math>\leq 10m</math>. from bottom)</b>					
	CONTINUOUS TEMPERATURE RECORDING	H05			
	CONTINUOUS SALINITY RECORDING	H06			
	DISCRETE TEMPERATURE MEASUREMENTS	H07			
	DISCRETE SALINITY MEASUREMENTS	H08			
<b>HP-PHYSICAL</b>					
	CLASSICAL OCEANOGRAPHIC STATIONS	H09			
	VERTICAL PROFILES (STD/CTD)	H10			
	MEASUREMENTS NEAR SEA FLOOR	H11			
	MECHANICAL BATHY THERMOGRAPH (Number of drops)	H12			
	EXPENDABLE BATHY THERMOGRAPH (Number of drops)	H13			
	SOUND VELOCITY STATIONS	H14			
	ACOUSTIC STATIONS	H15			
	TRANSPARENCY	H16			
	OPTICS	H17			
	DIFFUSION (Dynamic)	H18			
	OTHER MEASUREMENTS (Specify in "Remarks")	H90			
<b>HC-CHEMICAL</b>					
	OXYGEN	H21			
	PHOSPHATES	H22			
	TOTAL - P	H23			
	NITRATES	H24			
	NITRITES	H25			
	SILICATES	H26			
	ALKALINITY	H27			
	pH	H28			
	CHLORINITY	H29			
	TRACE ELEMENTS	H30			
	RADIOACTIVITY	H31			
	ISOTOPES	H32			
	DISSOLVED GASES	H33			
	OTHER MEASUREMENTS (Specify in "Remarks")	H90			
<b>P-POLLUTION</b>					
	SUSPENDED SOLIDS	P01			
	HEAVY METALS	P02			
	PETROLEUM RESIDUES	P03			
	CHLORINATED HYDROCARBONS	P04			
	OTHER DISSOLVED SUBSTANCES	P05			
	THERMAL POLLUTION	P06			
	WASTE WATER: BOD	P07			
	WASTE WATER: NITRATES	P08			
	WASTE WATER: MICROBIOLOGY	P09			
	WASTE WATER: OTHER	P10			
	DISCOLORED WATER	P11			
	BOTTOM DEPOSITS	P12			
	CONTAMINATED ORGANISMS	P13			
	OTHER MEASUREMENTS (Specify in "Remarks")	P90			

