

PHOTOGRAMMETRY BRANCH
COASTAL MAPPING PROGRAM

PROJECT CM-8606
COMPLETION REPORT

MICHIGAN .
LAKE MICHIGAN
POINT PATTERSON TO POINT AUX BARQUES

TP-01463, TP-01464, TP-01465, TP-01466
And TP-01467
Agency Vault-Original Report

**PHOTOGRAMMETRY BRANCH
COASTAL MAPPING PROGRAM**

**PROJECT CM-8606
COMPLETION REPORT**

MICHIGAN

LAKE MICHIGAN

**Point Patterson to Point Aux Barques
TP-01463, TP-01464, TP-01465, TP-01466, and TP-01467**

Year of Source -1987

**UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
NAUTICAL CHARTING DIVISION**

Agency Vault - Original Report

PHOTOGRAMMETRY BRANCH
COASTAL MAPPING PROGRAM

PROJECT CM-8606
COMPLETION REPORT

Michigan
Lake Michigan
Point Patterson to Point Aux Barques
TP-01463, TP-01464, TP-01465, TP-01466, and TP-01467

Clearance and Approval

This report summarizes the photogrammetric operations related to project completion and is submitted for approval. The maps, associated data, and this report meet the requirements and standards of the Photogrammetry Branch Coastal Mapping Program. Clearance for project registration is requested.

Submitted by,

John A. Mooney
John A. Mooney
Chief, Compilation Section B
Photogrammetry Branch, NCD

Approved by,

Lewis A. Lapine
Commander Lewis A. Lapine, NOAA
Chief, Photogrammetry Branch
Nautical Charting Division
Office of Charting and Geodetic Services

July 29, 1991
Date

COASTAL MAPPING PROJECT CM-8606
MICHIGAN

Lake Michigan - Point Patterson to Point Aux Barques

TABLE OF CONTENTS

Clearance and Approval	ii
Introduction	1
Planning	1
Field Operations	
Field Surveying	1
Photography	1
Aerotriangulation	4
Compilation	4
Final Review	5
Dissemination of Project Data	5
FIGURES	
1. Project Site Location Diagram	2
2. Project Diagram	3
APPENDICES	
A. Project Field Instructions	7
B. Field Operations Reports	15
Project Geodetic Control	16
C. Aerotriangulation Report	18
D. Map Compilation Sources	27
E. Geographic Names List	28
F. Cartographic Features of Charting Interest	30

COASTAL MAPPING PROGRAM PROJECT CM-8606

Introduction

Coastal Mapping Program Project CM-8606 consists of five 1:20,000 scale coastal survey maps and two 1:10,000 scale insets depicting the shoreline and other cartographic features of mapping interest in the coastal zone of Lake Michigan from Point Patterson to Point Aux Barques. The assigned map identifiers for this project were TP-01463 through TP-01467. Refer to FIGURE 1 for the project site location diagram which depicts the area coverage and FIGURE 2 for the project diagram which delineates the geographic limits of the maps. Final map manuscripts use the Lambert Conformal Conic Projection. The full line projection shows the North American Datum of 1983; the unlabeled offset ticks plotted at twice the interval of the NAD 1983 projection shows the North American Datum of 1927.

This project provides contemporary coastal zone survey data to maintain the National Ocean Service Nautical Charting Program.

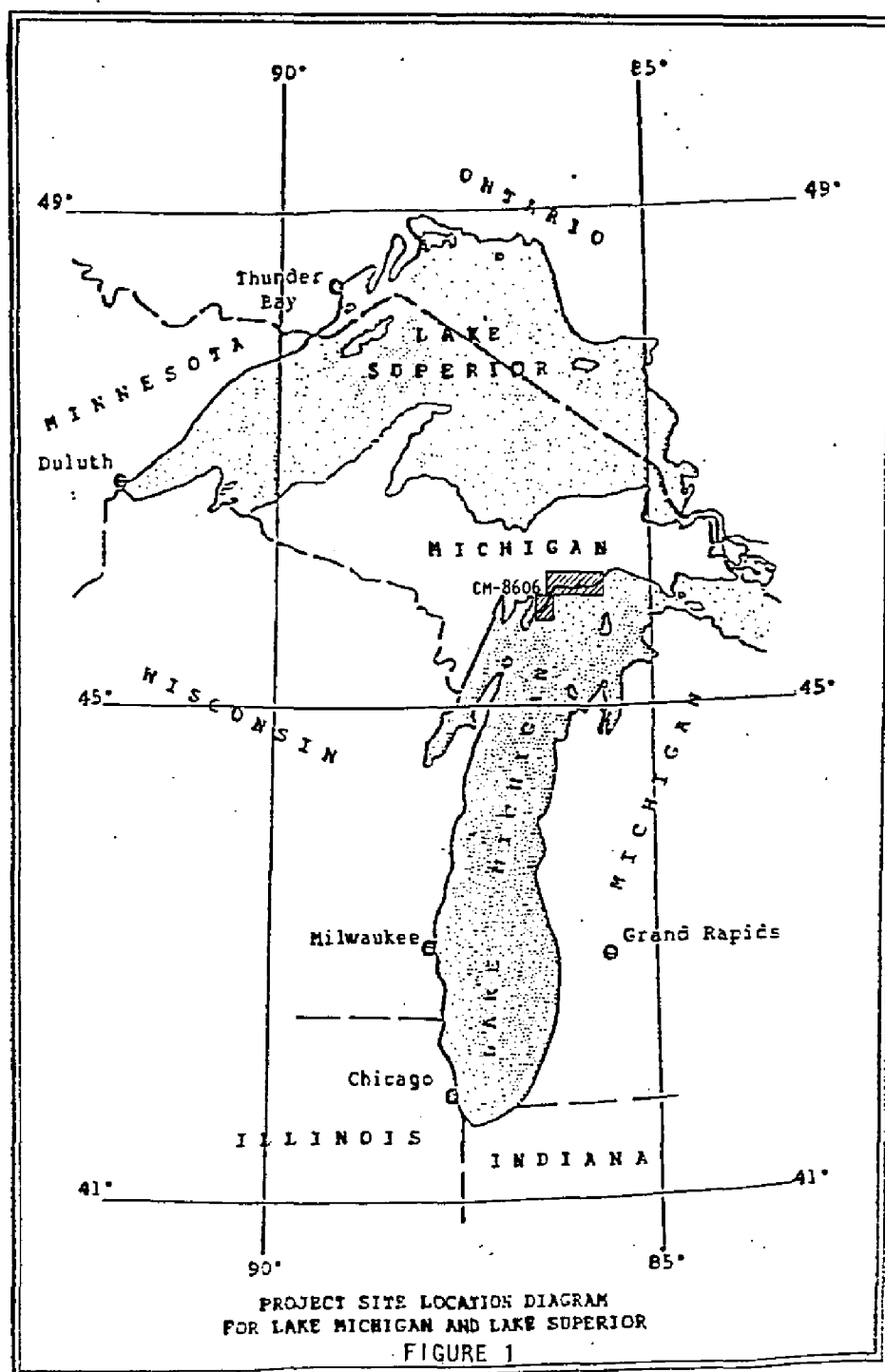
Planning

The Coastal Planning Unit, Headquarters Office, initiated the planning phase for this project in March 1986. The Atlantic Marine Center Coastal Surveys Unit performed all horizontal control activities. Aerial photography was the responsibility of the Flight Operations Unit, Headquarters Office. The Chief of Nautical Charting Division issued the field instructions on May 14, 1987. See Appendix A for the Field Instructions.

Field Operations

Field operations occurred between May 11 and June 11, 1987, and consisted of acquiring the aerial photography and recovering, establishing, and identifying (premarking) the horizontal control necessary for aerotriangulation. The Party Chief summarized the field operations in a report bound in Appendix B. See Appendix B for information on the horizontal control related to this project.

A Turbo Commander aircraft (N57074) flew the photographic operations in June 1987. Aerotriangulation and map compilation used natural color photographs at 1:50,000 and 1:30,000 scales using a Wild RC-8 camera with the "E" cone which has a calibrated focal length of 152.71 mm. The Coastal Planning Unit, reviewed the aerial photographs of the project site in June 1987, for proper endlap, horizontal control, target visibility, and adequate coverage of the project site. The Quality Control Unit, Headquarters Office, reviewed the aerial photographs of the project site in June 1987, for proper qualities required for mapping photographs as defined in the quality assurance program.



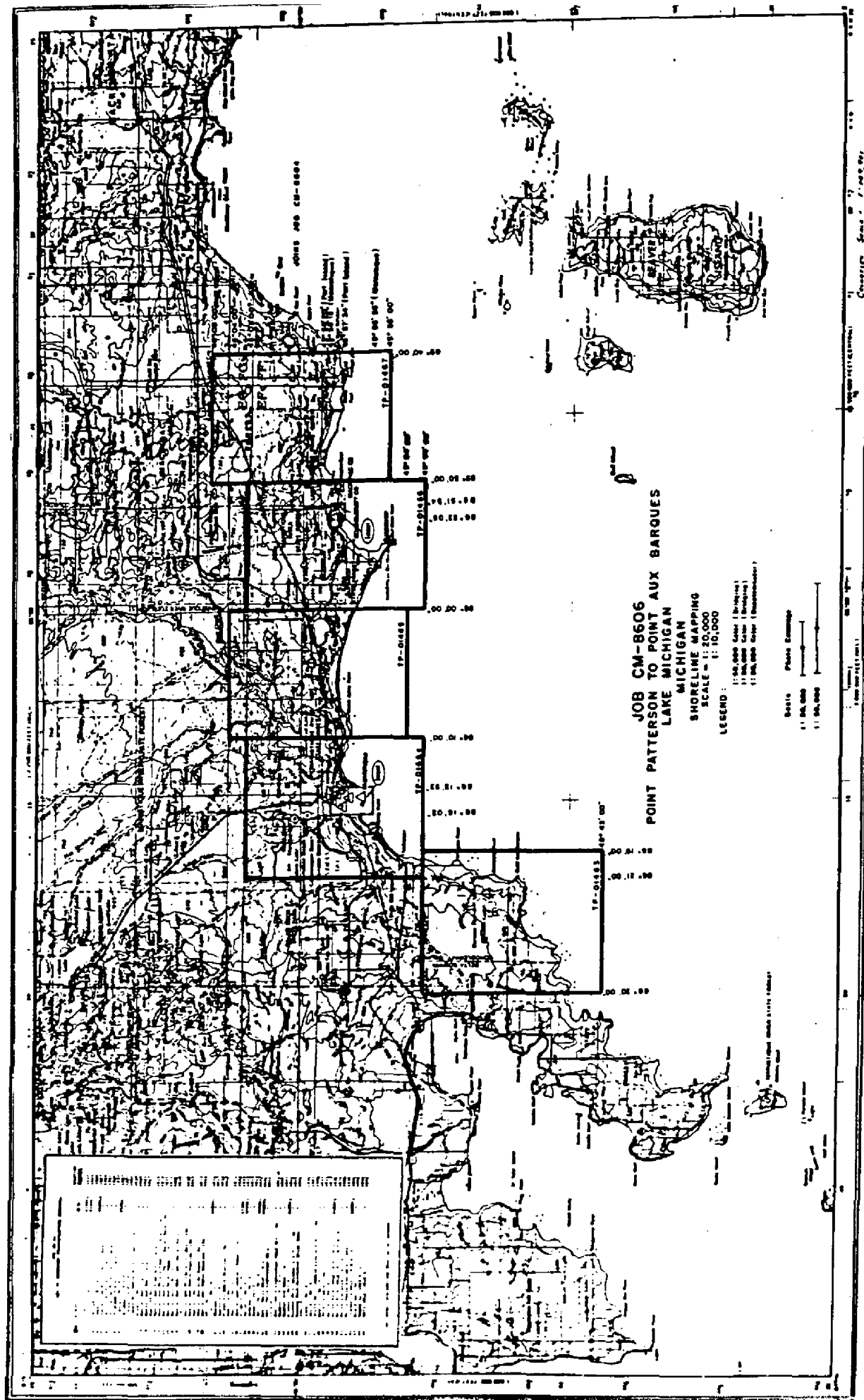


FIGURE 2

Aerotriangulation

The Aerotriangulation Unit, Headquarters Office, completed the aerotriangulation phase in September 1988. See Appendix C for the Aerotriangulation Report that contains information on placement of horizontal control, photographs selected for data acquisition, fit to control statistics, and a summary of the procedures employed.

Compilation

Compilation is based on aerotriangulation that has met the requirements for National Standards of Map Accuracy and on office interpretation of aerial photographs. Compilation, processing, and dissemination of all applicable amending NOS Photogrammetric Instruction and data are in accordance with the C&GS Topographic Manual, Part II, and approved sections of the new Coastal Mapping Operations Manual.

The Compilation Unit, Section B, Headquarters Office, initiated the compilation phase in August 1990 and completed it in December 1990. The photogrammetric work stations used in data acquisition were Wild B-8's (S/N's: 1132, 1540, 5014, 5597). The Compilation Unit used standard analog compilation techniques.

For information on the photographs used in the compilation phase, refer to the control photographs diagram of the Aerotriangulation Report. Map Compilation Sources (MCS) pages also provide information on the photographs used in the completion of each map. See Appendix D for the Map Compilation Sources (MCS) for this project.

The inset's southern latitude limit was changed to 45°56'30", allowing the inset to be applied within TP-01464. The final maps were smooth drafted except for annotation applied by using waxed back stripper film. The NOS Staff Geographer approved the geographic names applied to the map. The geographic names are derived from corresponding NOS nautical charts and USGS quadrangles. See Appendix E for the Final Geographic Names listings.

Project CM-8606 and the adjoining project CM-8702 had photographs acquired at different dates. The lake level at Port Inland, Michigan, on Lake Michigan was 1.3 feet higher for project CM-8606 than it was for project CM-8702. The different water levels account for the discrepancy of the juncture of the shoreline datum for CM-8606 (TP-01463) and CM-8702 (TP-01481).

Compilation Unit, Section B, performed the office review of the project in October 1990. A Chart Maintenance Print generated for each map shows a comparison with the NOS nautical charts.

Agency Archives

Registration Copy of Each Map
Original Project Completion Report

Photogrammetric Electronic Data Library

No project digital data is maintained in the library

Reproduction Branch, Aeronautical Charting Division

8X Reduction Negative of each Map

Mapping and Charting Branch

Chart Maintenance Print of Each Map
Abbreviated Copy of this Project Completion Report

Production Control Unit, Headquarters Office, received all final project data and products for registration and dissemination.

APPENDIX A



7
UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

May 12, 1987

N/CG2313:JDM

TO: N/MOA - Ray E. Moses
FROM: N/CG2 - *Christian Andreasen* Christian Andreasen
SUBJECT: PROJECT INSTRUCTIONS: FIELD - Job CM-8606, Lake
Michigan, Point Patterson to Point Aux Barques,
Michigan, Shoreline Mapping

Subject instructions are forwarded for signature and issue to the
Chief, Photogrammetry Branch.

The copies required for distribution by this office have been
retained.

Attachment





8

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

May 12, 1987

N/CG2313:JDM

Chief, Photogrammetry Branch
Atlantic Marine Center

PROJECT INSTRUCTIONS: FIELD - Job CM-8606, Lake Michigan, Point Patterson to Point Aux Barques, Michigan, Shoreline Mapping

1.0. PURPOSE

These instructions provide specifications and a schedule for placing targets on horizontal control stations required for aerotriangulation.

2.0. AREA

Mapping at 1:20,000 scale will cover the shoreline and adjacent waterways from Point Patterson to Point Aux Barques, Michigan. Mapping at 1:10,000 scale will cover the harbors at Manistique and Port Inland, Michigan.

3.0. PHOTOGRAPHY

3.1. Aerotriangulation photography at 1:50,000 scale and supplemental bridging and compilation photography at 1:30,000 scale will be obtained using color film.

3.2. If target configuration and placement necessitate it, target identification photography may be obtained at 1:15,000 scale and at less than optimum photographic conditions.

4.0. ASSIGNMENT

You are assigned all field operations required to place targets on horizontal control stations. The Chief, Air Photo Mission 2, will be responsible for scheduling photography at the required times.

5.0. HORIZONTAL CONTROL

5.1. The horizontal datum for this project is NAD 83.

5.2. Horizontal control requirements for aerotriangulation have been furnished as part of the field data.



5.3. Limit recovery of horizontal control stations to those needed to meet aerotriangulation requirements. Prepare and submit recovery notes for each station for which a search was made.

5.4. New control stations, where needed, shall be established by triangulation, trilateration, traverse, satellite positioning, or a combination of the four methods, in accordance with Third-Order, Class I specifications provided in Standards and Specifications for Geodetic Control Networks, dated September 1984.

5.5. New stations will be monumented if they are required for future work in the area needing geodetic control.

5.6. Notify N/CG2313 if recovery of existing control does not meet aerotriangulation requirements. An alternative will be selected, if possible, to avoid establishing new control.

6.0. PREMARKING OF CONTROL

6.1. As soon as possible after all control stations have been paneled, the field party will forward to N/CG2313 a chart section, quad, or any graphic depicting the station location, panel array used, and the panel number. This will assist in the film quality review and target identification and will help expedite the results to the field unit.

6.1.1. Wing panels will be used with all targets in accordance with established specifications but may be modified to conform with local terrain conditions.

6.2. Aerotriangulation Control

6.2.1. Panel each station selected to meet horizontal control requirements in accordance with specifications given on the attached sheet for 1:50,000-scale photography.

6.2.2. Use panel array No. 1 for targets with a normal background; it may be modified, as necessary, to conform with local terrain conditions. Any deviation from given panel and spacing dimensions should be indicated on the large-scale sketch on NOAA Form 76-53, Control Station Identification Card.

6.2.3. Panel array No. 3 shall be used in areas where the background offers poor contrast to the center panel, such as on sandy terrain.

6.2.4. The distance given for dimension "C" may be increased, but not decreased.

6.2.5. Panel substitute stations wherever shadows or relief displacement will obscure the specified control stations. Monumented stations (reference marks, azimuth marks) are preferred substitute stations.

6.2.6. Substitute stations will be positioned to the specifications stated in Photogrammetric Instruction No. 22, Revised September 30, 1965, section 4.02.2.

6.2.7. In cases where the target might be subject to vandalism, select two photoidentifiable objects. Observe directions and distances to them from the home station and record with sketch and description on separate NOAA form 76-53.

7.0. CONTROL STATION IDENTIFICATION CARD

Prepare and submit a NOAA form 76-53 for each paneled station. Observe Photogrammetric Instruction No. 22, Revised September 30, 1965, except as follows:

a. Record distances and directions in the usual manner to the center of the station panel of all targets used as substitutes for horizontal control stations.

b. In the space provided for the sketch of Substitute Station A, make a large-scale sketch of the immediate vicinity showing the array used.

c. In the space provided for a sketch of Substitute Station B, make a smaller scale sketch that shows the relationship of the target to the surrounding terrain. Include one or more salient features to assist office personnel in locating the target on the photographs.

d. Indicate on suitable chart bases the approximate locations of all targets placed.

8.0. SCHEDULE

All stations shall be premarked and ready for photography by June 8, 1987. If premarking is not completed by this date, inform N/CG2313 so this information can be relayed to the air photo mission.

9.0. REPORT

A field operations report covering all pertinent field work performed is required upon completion of the field phase of this project.

10.0. RECORDS

All field records will be sent through N/MOA2222 for review prior to being forwarded to N/CG2313.

11.0. MODIFICATIONS OF INSTRUCTIONS

If changes in procedures and methods seem advisable, please make appropriate recommendations to this office.

12.0. COSTS

All costs incurred on this assignment shall be charged to Task 8K6C01.

13.0. RECEIPT

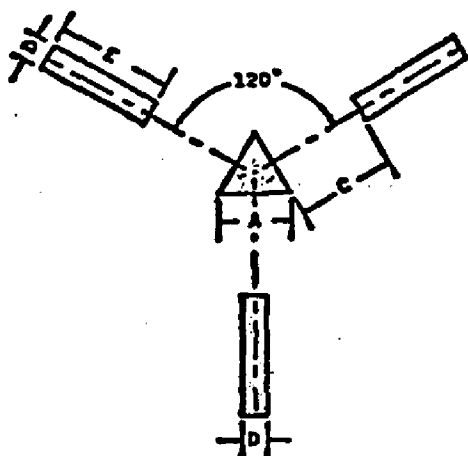
Acknowledge receipt of these instructions.

Ray E. Moses
Director
Atlantic Marine Center

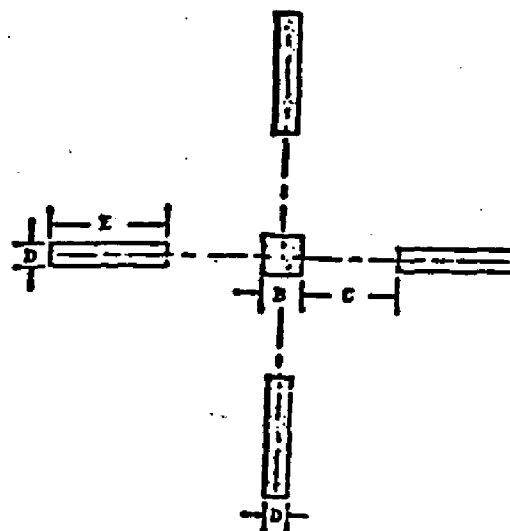
Christian Andreasen
Christian Andreasen
Chief, Nautical Charting Division
Charting and Geodetic Services

SPECIFICATIONS FOR PREMARKING CONTROL STATIONS
 Revised November 23, 1976

ARRAY NO. 1

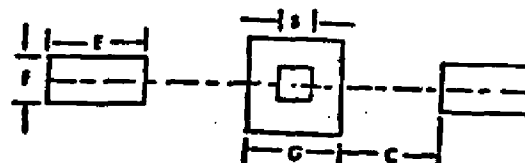


ARRAY NO. 2

**NOTE:**

1. The dimensions and centering of center panel over station or substitute station are critical.
2. Panel array No. 1 is preferred but No. 2 is acceptable.
3. Array No. 3 - for contrast in very light colored areas. The border surrounding center panel and the recognition panels shall be black.
4. Chief of party will select array that makes best application of field conditions and is authorized to adjust or omit one of the recognition panels if terrain is not suitable for placement of entire array.

ARRAY NO. 3



Photography
Scale

PANEL AND SPACING DIMENSIONS (IN METERS)

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>
1:10,000	0.5	0.3	1.3	0.2	0.9	0.9	1.5
1:20,000	1.1	0.7	2.6	0.4	1.8	0.9	1.9
1:30,000	1.6	1.0	3.9	0.5	2.7	0.9	2.2
1:40,000	2.2	1.3	5.2	0.7	3.6	0.9	2.5
1:50,000	3.2	2.0	7.8	1.1	5.4	1.8	3.8
1:60,000	3.8	2.3	9.1	1.3	6.3	1.8	4.1
1:70,000	4.4	2.6	10.4	1.4	7.2	1.8	4.4
1:80,000	5.0	3.0	11.7	1.5	8.0	1.8	4.8
1:100,000	6.4	4.0	18.2	2.2	10.8	3.6	7.6

R E C E I P T

TO: N/CG2 - Christian Andreasen
ATTN: N/CG23

THRU: N/MOA - Ray E. Moses

Receipt of Project Instructions *FIELD* - Job CM-8606, Lake Michigan, Point Patterson to Point Aux Barques, Michigan, Shoreline Mapping, dated May 12, 1987, is acknowledged.

Chief, Photogrammetry Branch
Atlantic Marine Center

Date

APPENDIX B

LAKE MICHIGAN, POINT PATTERSON TO POINT AUX BARQUES

MICHIGAN

PROJECT REPORT

SHORELINE MAPPING - PHOTO CONTROL

CM-8606

1.0 PURPOSE:

This project was accomplished to provide targets for horizontal control stations required for aerotriangulation according to PROJECT INSTRUCTIONS: FIELD - Job CM-8606, Lake Michigan, Point Patterson to Point Aux Barques, Michigan dated May 12 1987.

2.0 AREA:

Shoreline and waterways mapping will cover from Point Patterson to Point Aux Barques Michigan.

3.0 PARTICIPATION:3.1 Personnel:

Party Chief	M. Johnson
Assistants	P. Walbolt
	G. Vose

3.2 Equipment:

- 1 4x4 Carry-all Trucks
- 1 Wild T-2 Theodolites
- 1 EDM HP-3810B
- 2 MX 350 Radios
- 3 MX 1502 Satellite Receiver

4.0 FIELD ACTIVITY:4.1 FIELD METHODS:

Seven (7) targets were located for aerotriangulation photography. Recovery notes were submitted for each horizontal control station used on this project.

4.2 CONTROL:

The North American Datum of 1983 was the controlling horizontal datum.

4.3 DISCUSSION OF RESULTS:

Panels were located using the following methods:

Circle #1. Satellite station translocated from ST IGNACE E BASE then straightline adjusted to NAD 83 using the mean delta Lat and Long of stations DELTA and GARDEN.

Panel. #1 LAT 45-45-54.104 LON 86-31-00.320

Circle #2. Located direct from station BURSAW.

Panel. #2 LAT 45-49-38.4662 LON 86-22-15.5717

Circle #3. Located direct from station STONY, using Solar for Azimuth.

Panel. #3 LAT 45-55-57.0806 LON 86-17-09.9124

Circle #4. Located direct from station CRAFT, using reverse Solar for Azimuth.

Panel. #4 LAT 46-01-08.0114 LON 86-16-12.9442

Circle #5. Paneled station GULLIVER RM 2 Direct. RM's position computed from the "box score".

Panel. #5 LAT 45-59-27.0441 LON 86-04-10.5739

Circle #6. Located direct from station HUGHES USLS, using reverse Solar for Azimuth.

Panel. #6 LAT 45-58-00.7334 LON 85-50-44.8408

Circle #7. Station SCOTT POINT USLS 1917 paneled direct.

Panel. #7 LAT 45-57-32.10461 LON 85-41-29.24103

5.0 SCHEDULE:

The field party departed Norfolk Va. May 11 1987 and returned June 11 1987. There were many delays do to weather (heavy rain and fog).

6.0 STATISTICS:

Number of targets	7
Number of stations recovered	10

7.0 RECORDS:

All original records will be forwarded to Rockville, Md. N/CG2313. A copy of all field data and this report will be maintained at Atlantic Marine Center's Coastal Surveys Unit, N/MOA2222.

June 15, 1987

Submitted by:


Michael W. Johnson

Approved:


Jim D. Shea
Chief, Coastal Surveys

APPENDIX C

AEROTRIANGULATION REPORT
CM-8606
POINT PATTERSON TO POINT AUX BARQUES
LAKE MICHIGAN
MICHIGAN
SEPTEMBER, 1988

AREA COVERED

This report covers the shoreline and adjacent waterways from Point Patterson to Point Aux Barques, Michigan. The project consists of five 1:20,000 scale sheets; TP-01463 through TP-01467, and two 1:10,000 scale insets, M - inset and PI - inset will cover the harbors at Manistique and Port Inland, Michigan respectively.

METHOD

Three strips of 1:50,000 scale and two strips of 1:30,000 scale color photographs were bridged by analytical aerotriangulation methods and adjusted to ground using the General Integrated Analytical Triangulation Program (GIANT). The strips were measured using the WILD STK comparator. Horizontal control consists of pre-marked stations and office identified stations. Common points were transferred between strips to ensure adequate junctioning.

Ratio values were determined for the bridging photographs. A copy of these values and a sketch of the photo coverage are attached to this report.

Worksheets and final manuscripts were plotted on the Kongsberg Plotter. The sheets were plotted in the Michigan State Plane Coordinate System, North Zone. This is a Lambert conformal conic projection. All positions are based on NAD 1983. In addition, 10 mm ticks depicting NAD 1927 projection intersections were plotted at twice the interval of the NAD 1983 projection intersections.

ADEQUACY OF CONTROL

The control meets the National Ocean Service requirements for manuscripts. A listing of closures to control is attached.

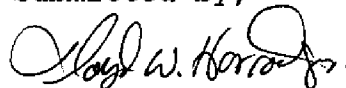
SUPPLEMENTAL DATA

USGS topographic quadrangles were used to obtain vertical control for bridging. NOS Nautical Charts were used to locate aids and landmarks.

PHOTOGRAPHY

The coverage, overlap, and quality of the color photographs were adequate of the job.

Submitted by,



Lloyd W. Harrod Jr.

Approved and Forwarded



Don O. Norman
Chief, Aerotriangulation Unit

FIT TO CONTROL

<u>STATION NAMES</u>	<u>POINT NO.</u>	<u>VALUES IN FEET</u>	
		<u>X</u>	<u>Y</u>
▲ 1. Panel #1	(447101)	0.2	-0.2
▲ 2. Panel #2	(450101)	-0.4	-0.5
▲ 3. Panel #3	(453101)	-0.4	1.8
▲ 4. Panel #4	(471101)	0.9	-0.8
▲ 5. Panel #5 Direct	(468100)	-0.7	-0.4
▲ 6. Panel #6	(464101)	0.2	0.3
▲ 7. Panel #7 Direct	(462100)	0.1	0.0
8. MANISTIQUE LIGHTHOUSE	(470103)	-0.5	4.2
9. MANISTIQUE MUN. WATER TOWER	(604103)	0.9	1.9
10. MANISTIQUE MUNICIPAL TANK	(470102)	5.5	-1.5
11. MANISTIQUE RADIO KQG 653 MAST	(604101)	0.4	-2.1
12. MANISTIQUE GREY STACK	(605101)	2.2	3.2
13. MANISTIQUE TV. CABLE CO. MAST	(470101)	8.1	19.6
14. MANISTIQUE PULP PAPER CO. STACK	(604102)	1.2	0.9

▲ Points held in the adjustment

Panel numbers keyed to horizontal control sketch

RATIO VALUES
CM-8606

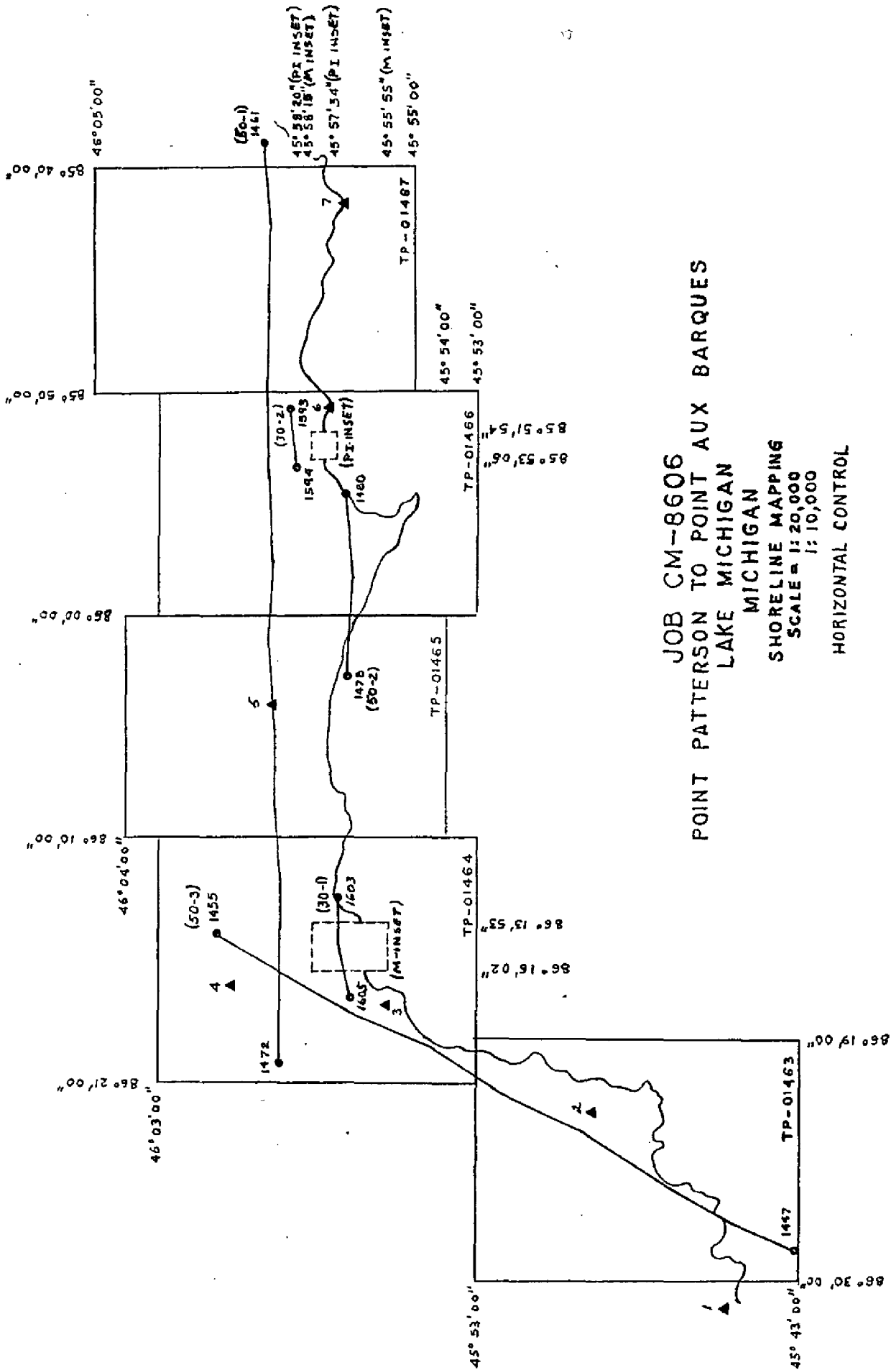
1:50,000 Bridging Photographs

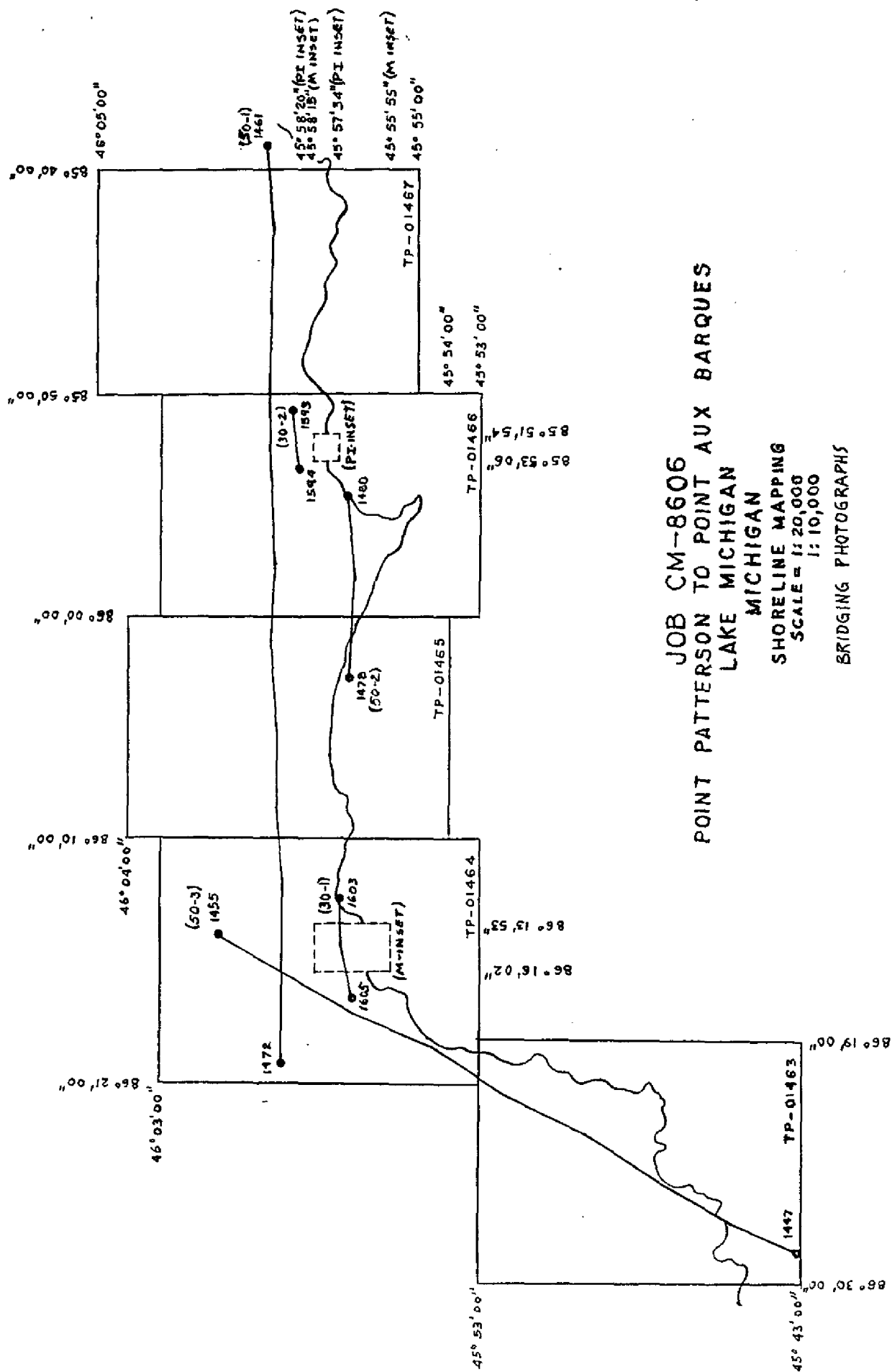
Ratio Value

87 E (C) 1461 - 1472	2.53
87 E (C) 1478 - 1480	2.63
87 E (C) 1447 - 1455	2.53

1:30,000 Bridging Photographs

87 E (C) 1593 - 1594	3.03
87 E (C) 1603 - 1605	3.03





DESCRIPTIVE REPORT CONTROL RECORD

JOB NO.		GEODETIC DATUM		ORIGINATING ACTIVITY	
CM-8606		NAD 83			
STATION NAME	SOURCE OF INFORMATION (Index)	AEROTRIANGULATION POINT NUMBER	COORDINATES IN FEET STATE MICHIGAN ZONE NORTH	GEOGRAPHIC POSITION φ LATITUDE λ LONGITUDE	REMARKS
PANEL # 1	PROJECT REPORT BOOK	447101	X= 26,369,991.556 Y= 358,348.840	φ 45-45-54.104 λ 86-31-00.320	
PANEL # 2		450101	X= 26,407,009.622 Y= 381,334.080	φ 45-49-38.466 λ 86-22-15.572	
PANEL # 3		453101	X= 26,428,307.326 Y= 419,864,818	φ 45-55-57.081 λ 86-17-09.912	
PANEL # 4		471101	X= 26,432,043.505 Y= 451,393.666	φ 46-01-08.011 λ 86-16-12.944	
PANEL # 5		468100	X= 26,483,135.109 Y= 441,701.347	φ 45-59-27.044 λ 86-04-10.574	DIRECT
PANEL # 6		464101	X= 26,540,143.267 Y= 423,707.946	φ 45-58-00.733 λ 85-50-44.841	
PANEL # 7	↓	462100	X= 26,579,429.499 Y= 431,418.242	φ 45-57-32.105 λ 85-41-29.241	DIRECT
			X= φ Y= λ		
			X= φ Y= λ		
			X= φ Y= λ		
			X= φ Y= λ		
			X= φ Y= λ		
COMPUTED BY	Ma. Mueland	DATE	4-28-88	COMPUTATION CHECKED BY	DATE
LISTED BY	B. Thornton	DATE	10-23-87	LISTING CHECKED BY	DATE
HAND PLOTTING BY		DATE		HAND PLOTTING CHECKED BY	DATE

DESCRIPTIVE REPORT CONTROL RECORD

MAP NO.		JOB NO.		GEODETTIC DATUM		ORIGINATING ACTIVITY	
		CM - 8606		NAD 83			
STATION NAME	SOURCE OF INFORMATION (Index)	AEROTRI-ANGULATION POINT NUMBER	COORDINATES IN FEET STATE MICHIGAN ZONE NORTH	GEOGRAPHIC POSITION φ LATITUDE λ LONGITUDE		REMARKS	
GARDEN 1954	PROJECT REPORT BOOK	1	X= 26,360,577.717 Y= 351,991.664	φ 45-44-51.886 λ 86-33-13.618			
DELTA 1965		2	X= 26,380,899.184 Y= 364,074.777	φ 45-46-49.949 λ 86-28-25.920			
TT-91-S-USGS 1965	NAD 83 ST. MARIUS GEODETTIC CENTRAL DATA BOOK	39 A	X= 26,577,694.110 Y= 451,263.882	φ 46 00 48.293 λ 85 41 49.186			
EARLY 1965	" " ST. MARIUS	39	X= 26,577,733.015 Y= 450,953.929	φ 46 00 45.227 λ 85 41 48.707			
BURSAW 1965	PROJECT REPORT BOOK	3	X= 26,407,025.020 Y= 381,303.207	φ 45-49-38.160 λ 86-22-15.358			
STONY 1965		12	X= 26,428,135.367 Y= 419,597.582	φ 45-55-54.458 λ 86-17-12.379			
CRAFT 1965		21	X= 26,432,042.117 Y= 451,726.728	φ 46-01-11.240 λ 86-16-12.921			
GULLIVER 1965		31	X= 26,483,235.486 Y= 441,703.437	φ 45-59-27.053 λ 86-04-09.152			
HUGHES USLS 1917		33	X= 26,541,345.303 Y= 432,739.239	φ 45-57-50.997 λ 85-50-28.025			
SCOTT PT. USLS, 1917	Y	40	X= 26,579,429.499 Y= 431,418.242	φ 45-57-32.105 λ 85-41-29.241			
COMPUTED BY	Thi M. Muel	DATE	COMPUTATION CHECKED BY				
LISTED BY	B. Thornton	DATE	LISTING CHECKED BY				
HAND PLOTTING BY		DATE	HAND PLOTTING CHECKED BY				

DESCRIPTIVE REPORT CONTROL RECORD

MAP NO.	JOB NO.	STATION NAME	SOURCE OF INFORMATION (Index)	AEROTRIANGULATION POINT NUMBER	GEODETIC DATUM		ORIGINATING ACTIVITY		REMARKS
					CM-860L	NAD 83	COORDINATES IN FEET STATE <u>MICHIGAN</u> ZONE <u>NORTH</u>	GEOGRAPHIC POSITION ϕ LATITUDE λ LONGITUDE	
				470103 (13)					
		MANISTIQUE LIGHTHOUSE MUN.	NAD 83 Geodetic Control Data						
		WATER TOWER		604103 (15)					
		MANISTIQUE MUNICIPAL TANK		470102 (16)					
		MANISTIQUE RADIO KQ9		604101 (18)					
		653 MAST		605101 (19)					
		MANISTIQUE GREY STACK		470101 (17)					
		MANISTIQUE TV CABLE CO MAST		604102 (15A)					
		MANISTIQUE PULP PAPER CO. STACK	NAD 83 Geodetic Control Data						
		SEUL CHOIX LIGHTHOUSE USLS 1916	Quadr 450854 Sta. 1011						Applied in compilation phase
									7.6 feet from SEUL CHOIX LIGHTHOUSE WORKS, 1916
COMPUTED BY	C. W. Harwood JR.			DATE	9/8/86	COMPUTATION CHECKED BY		DATE	
LISTED BY	C. W. Harwood JR.			DATE	8/30/88	LISTING CHECKED BY	B	DATE	9-12-88
HAND PLOTTING BY				DATE		HAND PLOTTING CHECKED BY		DATE	

SUPERSEDES NOAA FORM 76-41, 2-71 EDITION WHICH IS OBSOLETE.

APPENDIX D

MAP COMPILATION SOURCES for CM-8606

<u>MAP NUMBER¹</u>	<u>PHOTOGRAPHY²</u>	<u>DATE</u>	<u>TIME³</u>	<u>SCALE</u>	<u>LAKE LEVEL⁴/GAGE</u>
TP-01463	87 E (C) 1447-1451	06/04/87	10:48	1:50,000	+3.4 FEET LWD /PORT INLAND
TP-01464	87 E (C) 1451-1455	06/04/87	10:51	1:50,000	+3.4 FEET LWD /PORT INLAND
	87 E (C) 1469-1472	06/04/87	11:13	1:50,000	+3.4 FEET LWD /PORT INLAND
INSET	87 E (C) 1603-1605	06/05/87	09:42	1:30,000	+3.4 FEET LWD /PORT INLAND
TP-01465	87 E (C) 1466-1469	06/04/87	11:10	1:50,000	+3.4 FEET LWD /PORT INLAND
TP-01466	87 E (C) 1464-1467	06/04/87	11:09	1:50,000	+3.4 FEET LWD /PORT INLAND
	87 E (C) 1479-1480	06/04/87	11:29	1:50,000	+3.4 FEET LWD /PORT INLAND
INSET	87 E (C) 1593-1594	06/05/87	09:36	1:30,000	+3.4 FEET LWD /PORT INLAND
TP-01467	87 E (C) 1461-1464	06/04/87	11:06	1:50,000	+3.4 FEET LWD /PORT INLAND

REMARKS:

1. Maps were compiled at a scale of 1:20,000 and the insets at a scale of 1:10,000
2. Photography type (C) denotes Natural Color
3. Standard Time is referenced to Eastern Time Zone (Meridian = 075°)
4. Referenced to Low Water Datum (LWD). LWD for Lake Michigan is 576.8 feet

Office Reviewer - James E. Schrad May 1, 1991
Date

APPENDIX E

GEOGRAPHIC NAMES

FINAL NAME SHEET

CM-8606 (Point Patterson to Point aux Barques, Michigan)

TP-01463

Barques, Point aux
Bourassas Point
Bursaw Creek
Cole Point
Garden Creek
Garden Peninsula
Halfmoon Lake
Hiram Point
Little Harbor
McGinn Lake
Michigan, Lake
Miller Point
O'Keefe, Point
Parent Bay
Parent Creek
Pillows Point
Poodle Pete Creek
Wiggins Point

TP-01464

Bear Town Slough
Brassel Slough
Camp No 11 Slough
Catfish Slough
Clear Slough
Copenhagen Beach (locale)
Evergreen Shores (locale)
Goulds Slough
Harrison Beach (locale)
Indian Lake
Indian River
Island Lake Slough
Island Slough
Jamestown Slough

Manistique

Manistique River
Michigan, Lake
Minor Beach (locale)
Ossawinamakee Beach (locale)
Schoolcraft County Airport
Smith Creek
Smith Slough
Soo Line (RR)
Stony Point
Sturgeon Hole Creek
Sturgeon Hole Slough
Sunset Beach (locale)
Thompson
Woodruff Lake

TP-1465

Anderson Lake
Clear Lake
Cookson Lake
Dutch Johns Point
Gulliver
Gulliver Lake
Gulliver Lake Outlet
Little Muddy Lake
Manistique River
Marblehead Creek
Marblehead Lake
Merwin Lake
Michigan, Lake
Minnow Lake
Nelson Creek
Palmer Lake
Rocky Point
Schoolcraft County Airport
Soo Line (RR)

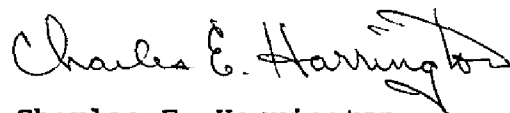
TP-01466

Bulldog Creek
Clear Lake
Cranberry Lake
Ferna Creek
Goadreaus Harbor
Heinz Lake
Hughes Point
Inland Harbor
Loon Lake
McDonald Lake
Michigan, Lake
Milakokia River
Millaquaka Lake
Port Inland
Seul Choix Bay
Seul Choix Point
Shoepac Lake
Shuberts Lake
Soo Line (RR

TP-01467

Batty Doe Lake
Birch Point
Bruders Lake
Cozy Point
Heinz Lake
Island Lake
Michigan, Lake
Milakokia River
Point Patterson Creek
Sand Lake
Scott Point
Seiners Point
Stone Lake
Swan Marsh

Approved:



Charles E. Harrington
Chief Geographer, Nautical
Charting Division

APPENDIX F

CARTOGRAPHIC FEATURES OF CHARTING INTEREST

COASTAL MAPPING PROGRAM: CM-8606

NOS NAUTICAL CHART COVERAGE: 14908 and 14911

GEODETTIC DATUM: NAD 83

The following features are recommended for charting based on field and photogrammetric observations. Refer to Nautical Charting Division Standard Digital Data Exchange Format documentation for quality code (QC) criteria and clarification of cartographic codes (CC). Please note that cartographic code 993 is a photogrammetric source code for cartographic features of possible landmark value.

<u>FEATURE DESCRIPTION</u>	<u>NCD CC</u>	<u>GEOGRAPHICAL POSITION</u>		<u>NCD QC</u>	<u>DATE OF SOURCE</u>
		<u>LATITUDE</u>	<u>LONGITUDE</u>		
- TP-01463	N/A				
- TP -01464 MANISTIQUE TV CABLE CO. MAST	198	45-57-32.827	86-13-46.614	3	155/987
-INSET MANISTIQUE LIGHT- HOUSE	020	45-56-41.296	86-14-51.280	3	156/987
MANISTIQUE MUN. WATER TOWER	086	45-57-46.086	86-15-01.815	3	156/987
MANISTIQUE PULP & PAPER CO. STACK	086	45-57-34.922	86-15-21.136	3	156/987
MANISTIQUE MUNICIPAL TANK	086	45-57-31.583	86-14-15.710	3	156/987
MANISTIQUE RADIO KQG 653 MAST	086	45-57-52.884	86-14-30.054	3	156/987
MANISTIQUE GREY STACK	086	45-58-03.513	86-14-44.427	3	156/987
MANISTIQUE WEST BREAKWATER LIGHT	200	45-56-43.05	86-14-56.19	4	156/987
MANISTIQUE WEST PIERHEAD LIGHT	200	45-56-51.77	86-14-48.94	4	156/987

2

<u>FEATURE DESCRIPTION</u>	<u>NCD CC</u>	<u>GEOGRAPHICAL POSITION</u>		<u>NCD QC</u>	<u>DATE OF SOURCE</u>
		<u>LATITUDE</u>	<u>LONGITUDE</u>		
- TP-01465	N/A				
- TP-01466 SEUL CHOIX LIGHT- HOUSE USLS 1916	020	45-55-16.811	85-54-43.853	2	155/987
-INSET PORT INLAND LIGHT	200	45-57-45.40	85-52-31.93	6	156/987
PORT INLAND OUTER RANGE FRONT LIGHT	208	45-58-07.30	85-52-37.97	6	156/987
PORT INLAND OUTER RANGE REAR LIGHT	209	45-58-14.95	85-52-37.96	6	156/987
PORT INLAND INNER RANGE FRONT LIGHT	208	45-58-07.08	85-52-08.00	6	156/987
PORT INLAND INNER RANGE REAR LIGHT	209	45-58-11.20	85-52-01.69	6	156/987
- TP-01467	N/A				
-end-					

Listing approved by: James E Schad May 1, 1991
SIGNATURE Date