Netley Libau Marsh Lake Bathymetry

Aquatics Environmental Services Inc.
St. Andrews, Manitoba

Netley-Libau Marsh Lake Bathymetry

1. Lake Names

2. Changes in the Marsh Lakes

3. Methods

4. Deliverables
    - Charts
    - XYZ Datasets
    - Lake Volume Calculations

5. Netley Cut

6. Channels

7. Closing

Netley-Libau Marsh Lake Bathymetry

1. **Lake Names**

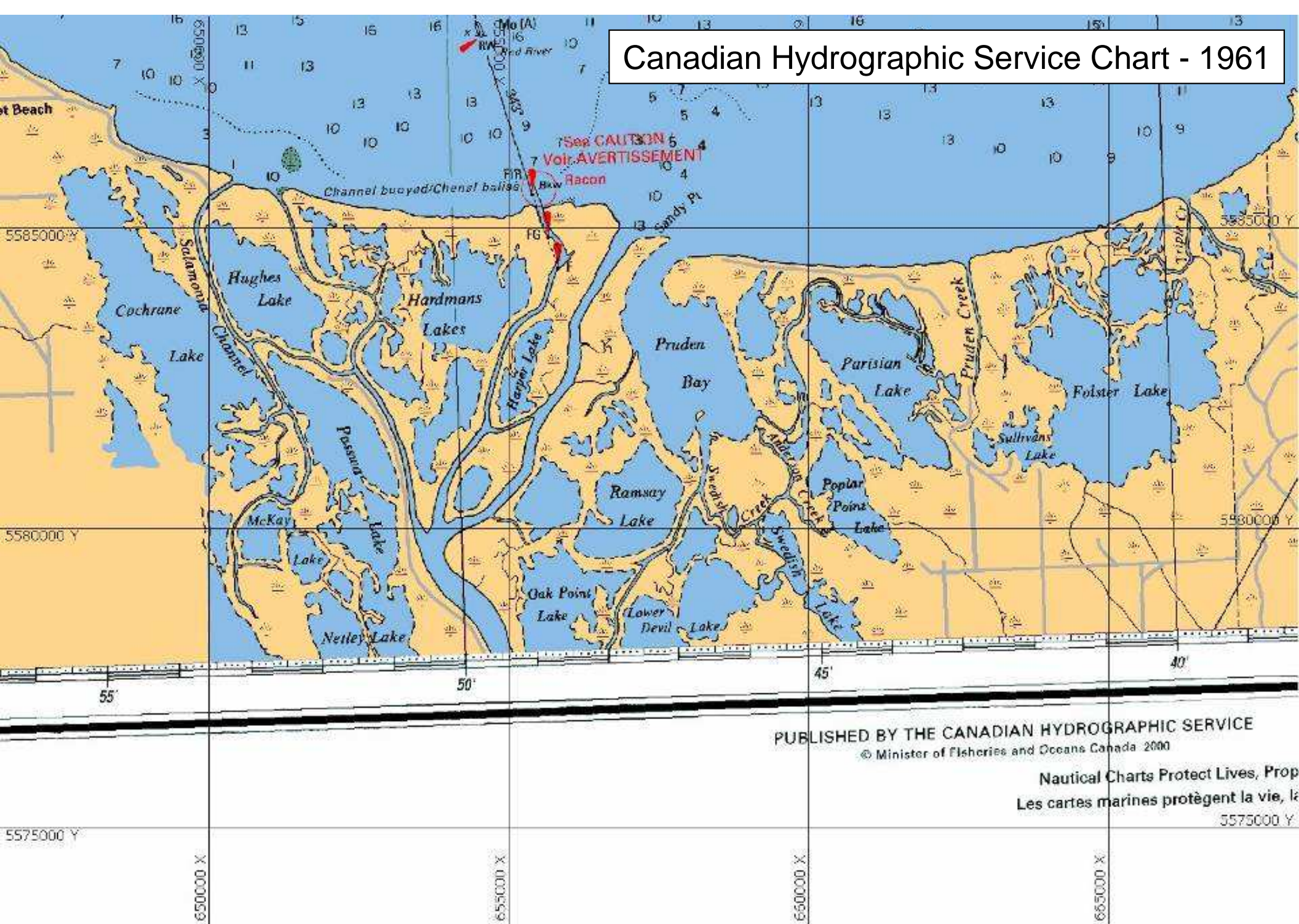2. Changes in the Marsh Lakes

3. Methods

4. Deliverables
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   - XYZ Datasets
   - Lake Volume Calculations

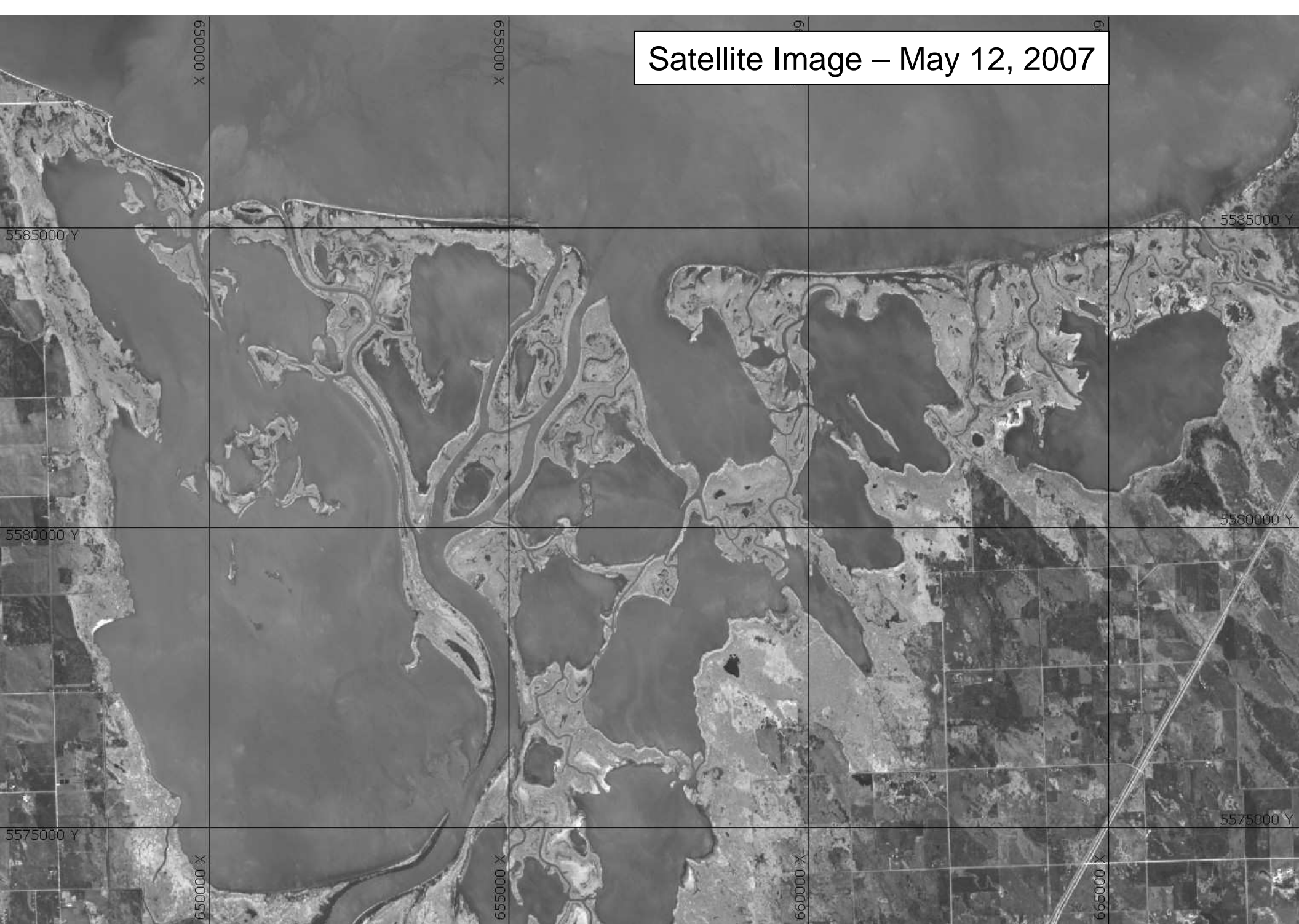5. Netley Cut

6. Channels

7. Closing

Mo (A)
RW
Red River

See CAUTION
Voir AVERTISSEMENT
Racon

Channel buoyed/Chenal balisé
FlR
Bkw
FG
Sandy Pt

ot Beach

Salamona Channel
Hughes Lake
Cochrane
Lake
Hardmans
Lakes
Harper Lake
Pruden
Bay
Parisian
Lake
Pruden Creek
Folster Lake
Sullivans
Lake

Passua Lake
McKay
Lake
Ramsay
Lake
Swedish Creek
Andrews Creek
Swedish Lake
Poplar
Point
Lake

Oak Point
Lake
Lower
Devil Lake
Netley Lake

55'   50'   45'   40'

5585000 Y
5580000 Y
5575000 Y
6500000 X
655000 X
660000 X
665000 X
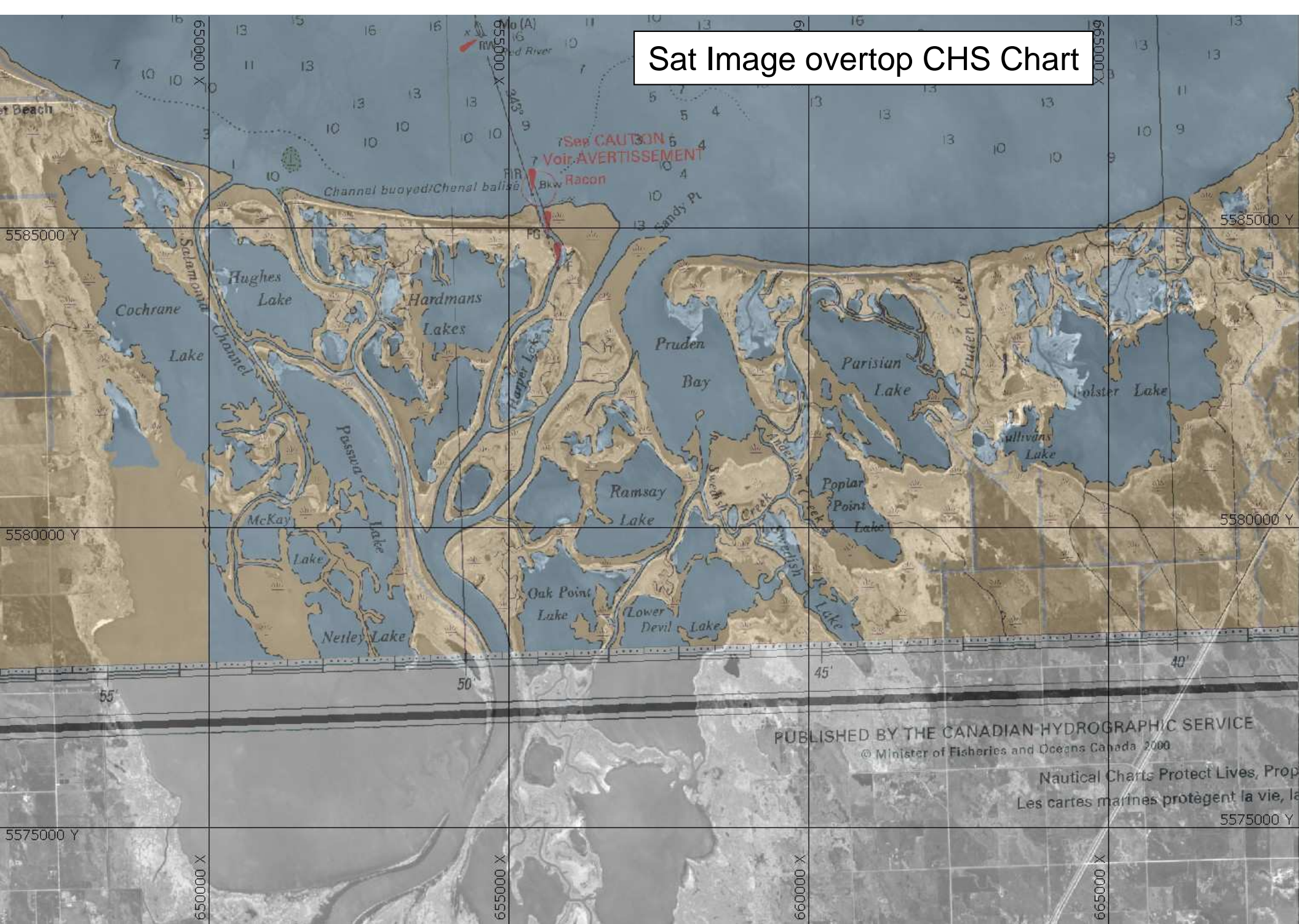
Satellite Image – May 12, 2007

Sat Image overtop CHS Chart

PUBLISHED BY THE CANADIAN HYDROGRAPHIC SERVICE
© Minister of Fisheries and Oceans Canada 2000

Nautical Charts Protect Lives, Prop
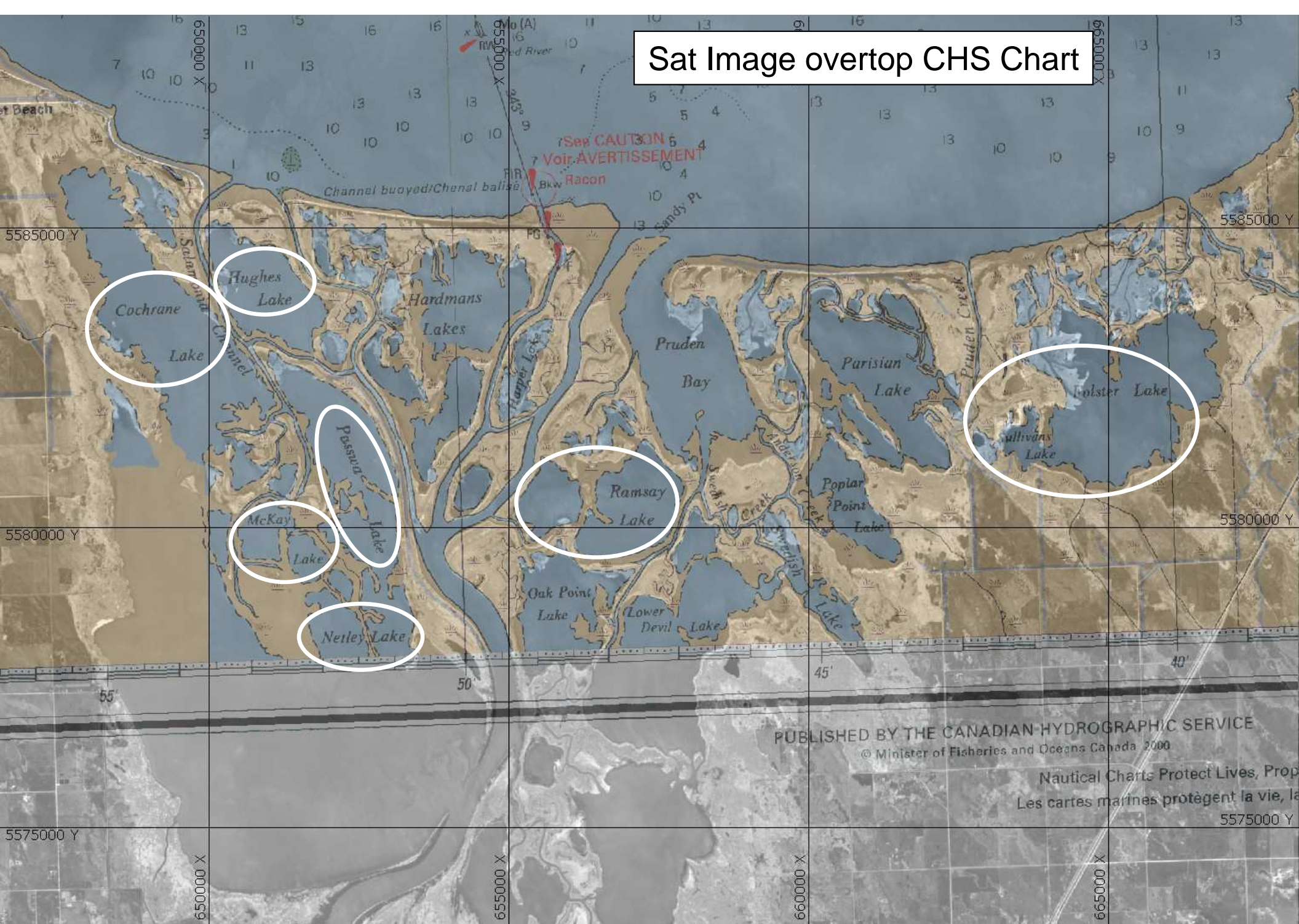Les cartes marines protègent la vie, la

See CAUTION
Voir AVERTISSEMENT
Racon

Channel buoyed/Chenal balisé

Salamonia Channel
Hughes Lake
Cochrane Lake
Hardmans Lakes
Harper Lake
Pruden Bay
Parisian Lake
Bolster Lake
Pruden Creek
Sullivans Lake
Passwa Lake
Ramsay Lake
Swedish Creek
Anderson Creek
Swedish Lake
Poplar Point Lake
McKay Lake
Oak Point Lake
Lower Devil Lake
Netley Lake
Sandy Pt
Beach

5585000 Y
5580000 Y
5575000 Y
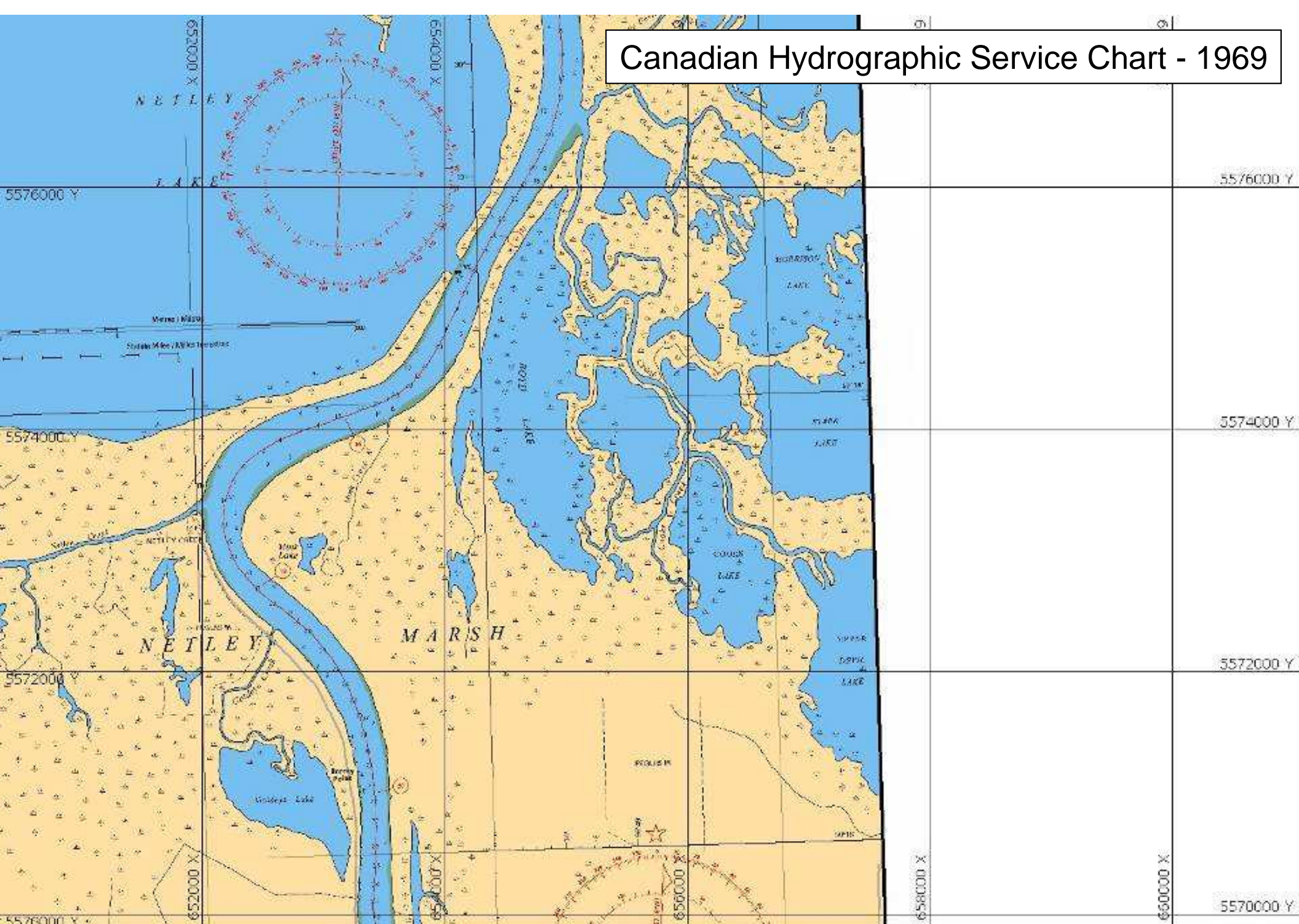
650000 X
655000 X
660000 X
665000 X

50'
55'
45'
40'

Sat Image overtop CHS Chart

Satellite Image - 2007

Canadian Hydrographic Service Chart - 1969

NETLEY

LAKE

NETLEY CREEK

NETLEY

MARSH

5576000 Y
5574000 Y
5572000 Y
5570000 Y

5576000 Y
5574000 Y
5572000 Y
5570000 Y

652000 X
654000 X
656000 X
658000 X
660000 X
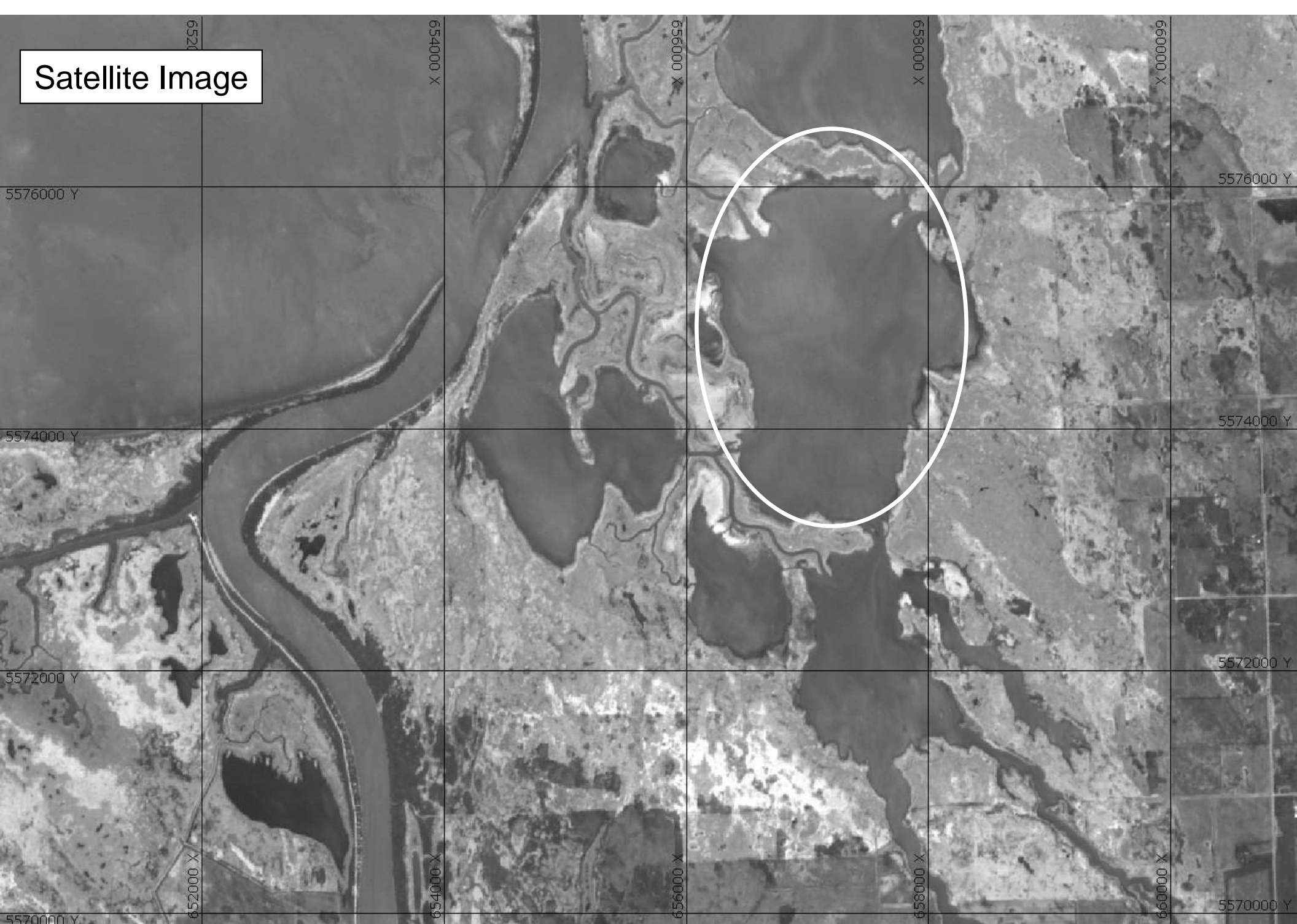
Satellite Image 2007
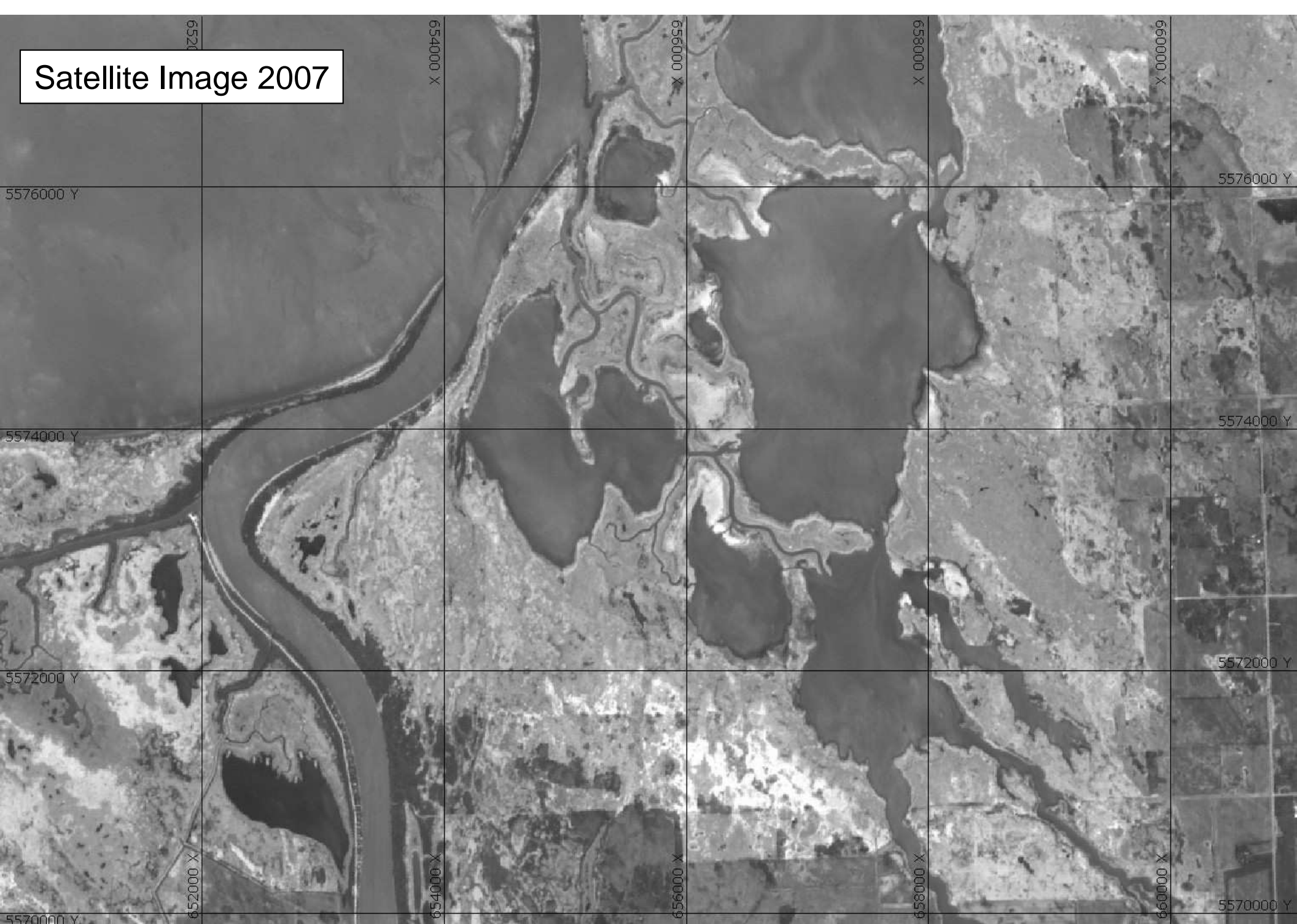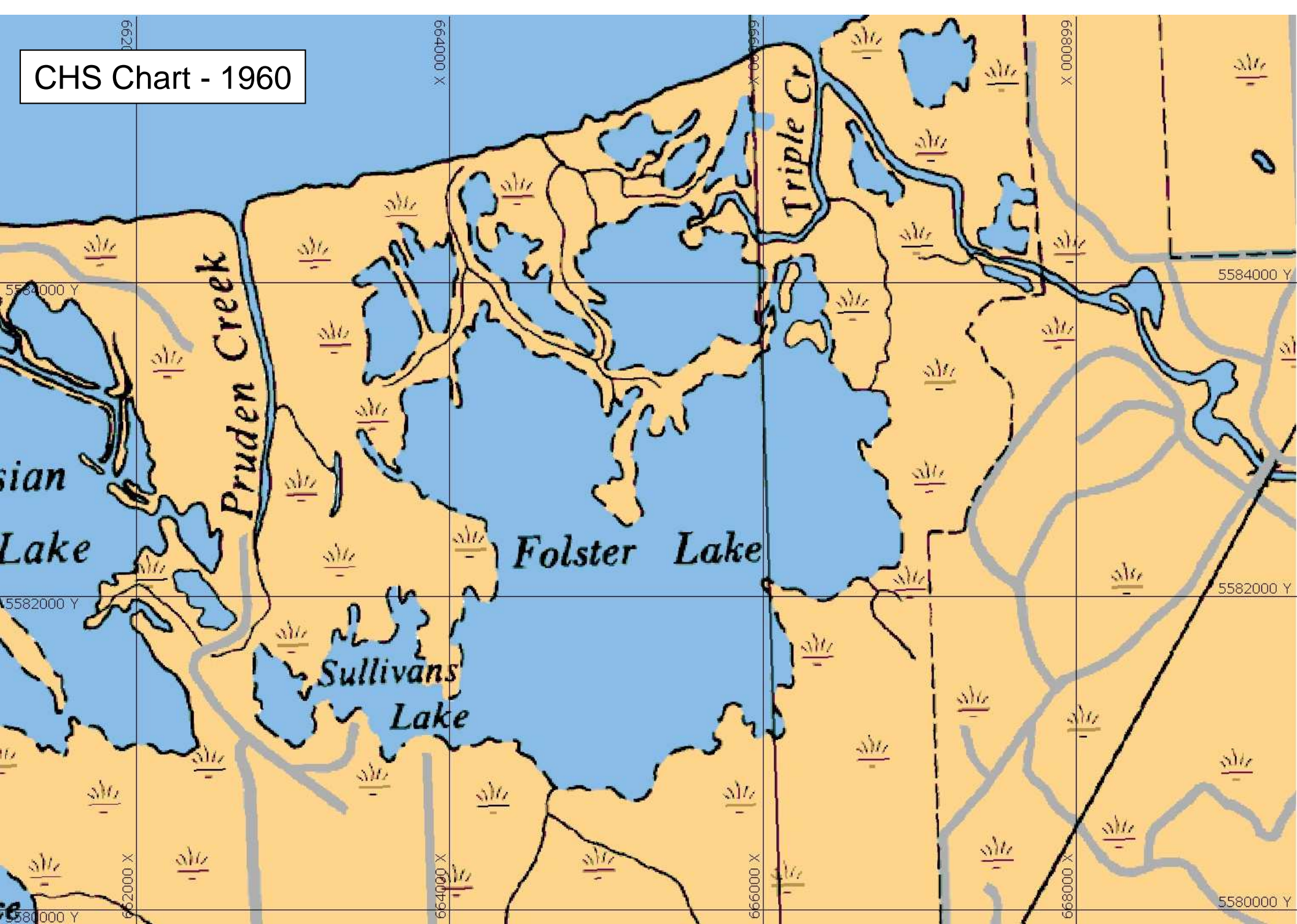
Combined
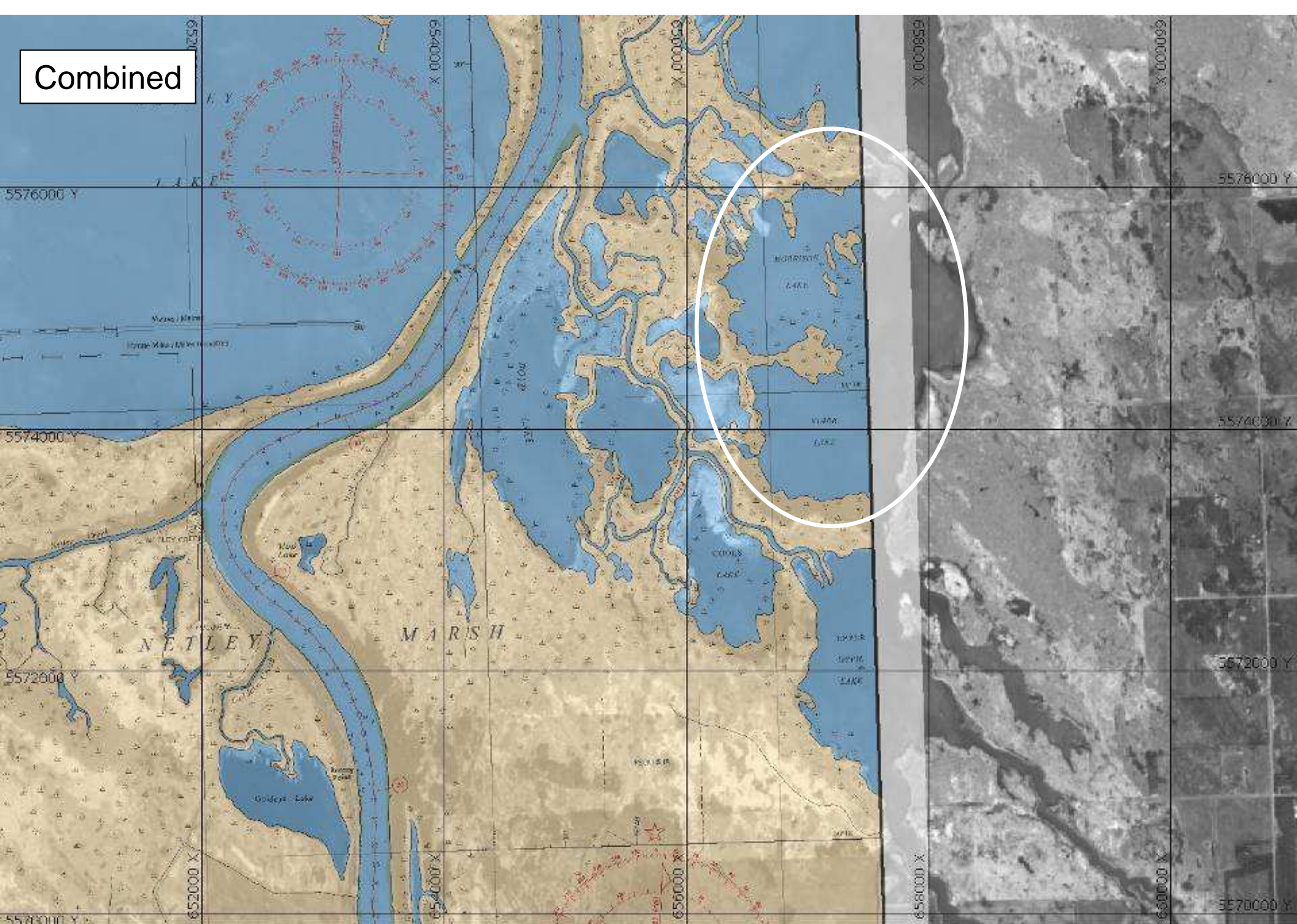
Satellite Image

16 Distinct Lakes

1. Sullivan & Folsters
2. Cooks Lake
3. Morrison & Starr
4. Upper Devil Lake
5. Boyd Lake
6. Sweedish Lake
7. Unnamed Lake (between Middle & East Channels)
8. Ramsay & Unnamed Lakes
9. Hardmans Lake
10. Lower Devil Lake
11. Oak Point Lake
12. Parisian Lake
13. Poplar Point Lake
14. Pruden Bay
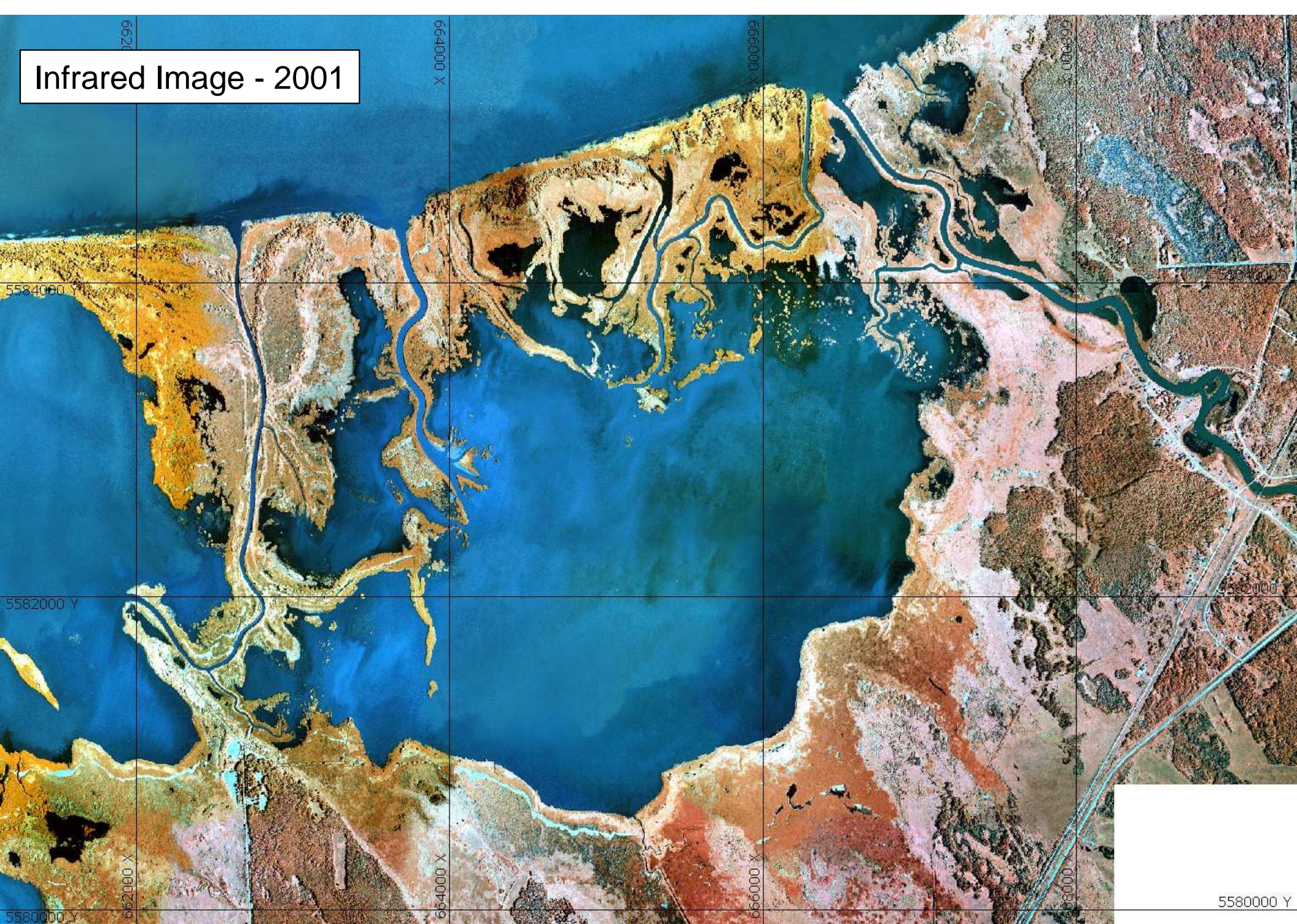15. Unnamed Lake East of Pruden Bay
16. Netley Lake

Netley-Libau Marsh Lake Bathymetry

1. Lake Names

2. **Changes in the Marsh Lakes**

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   - Charts
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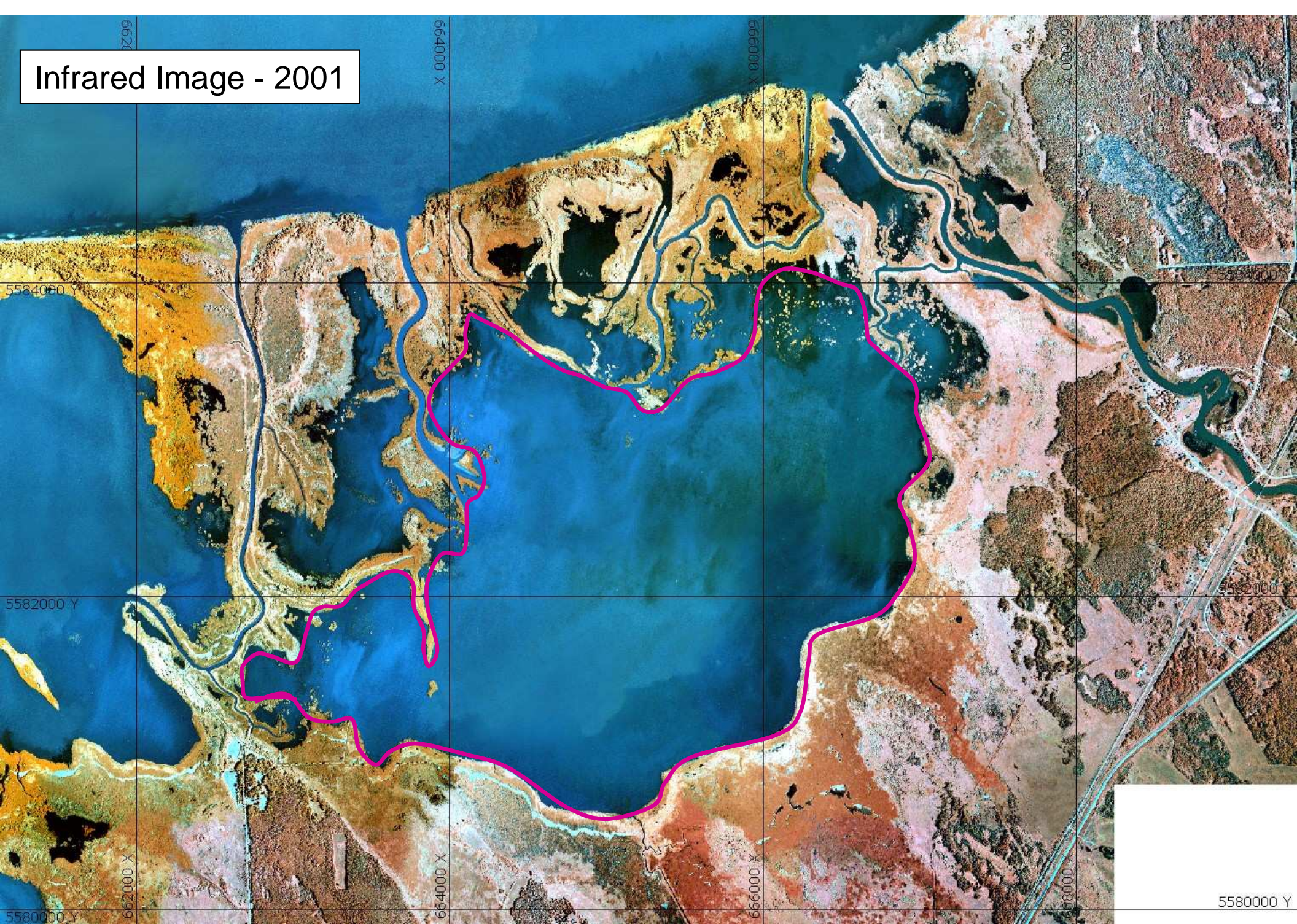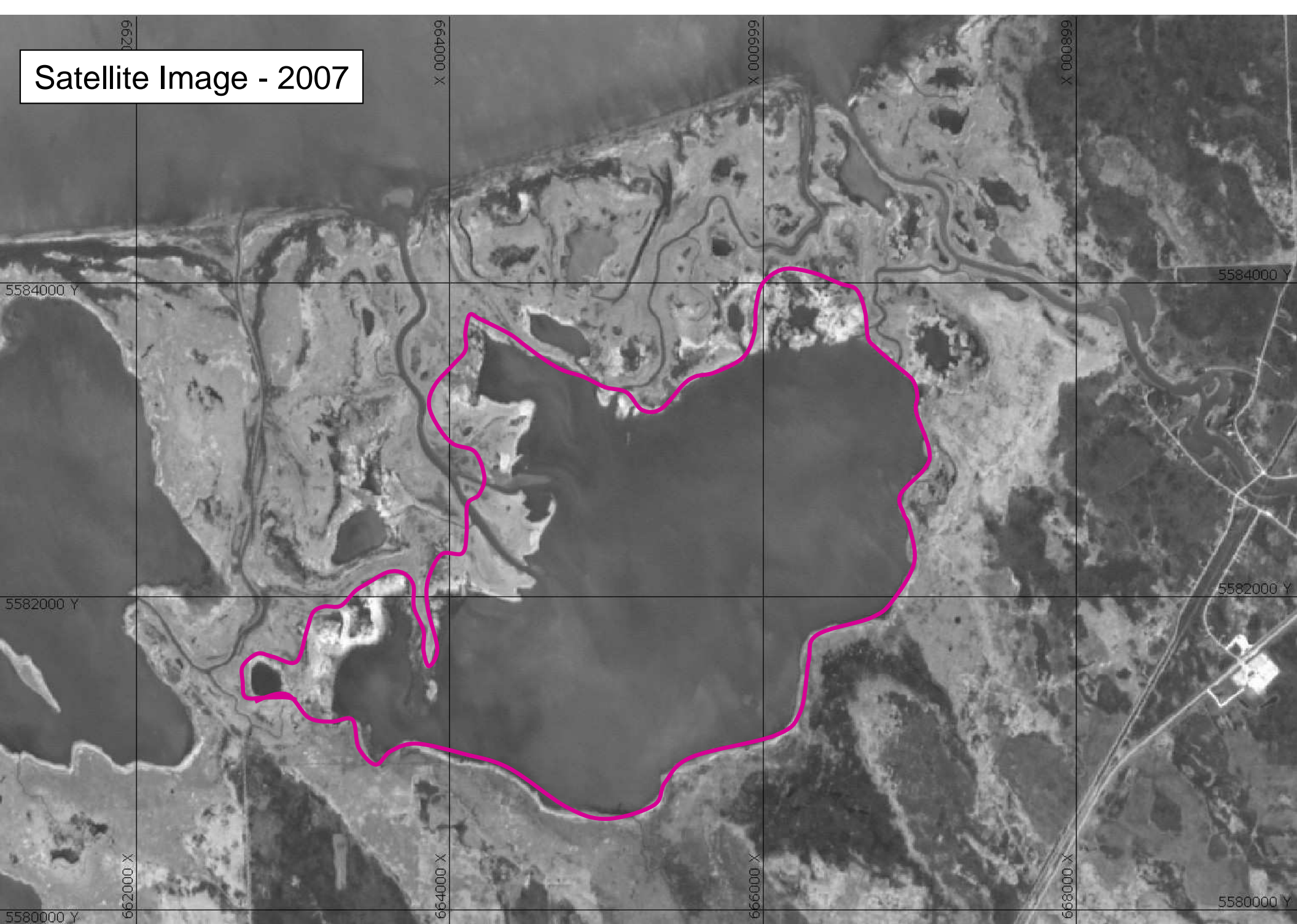5. Netley Cut

6. Channels

7. Closing

CHS Chart - 1960

Triple Cr

Pruden Creek

sian

Lake

Folster   Lake

Sullivans

Lake

5584000 Y

5584000 Y

5582000 Y

5582000 Y

5580000 Y

5580000 Y

662000 X

664000 X

666000 X

668000 X

662000 X

664000 X

666000 X

668000 X

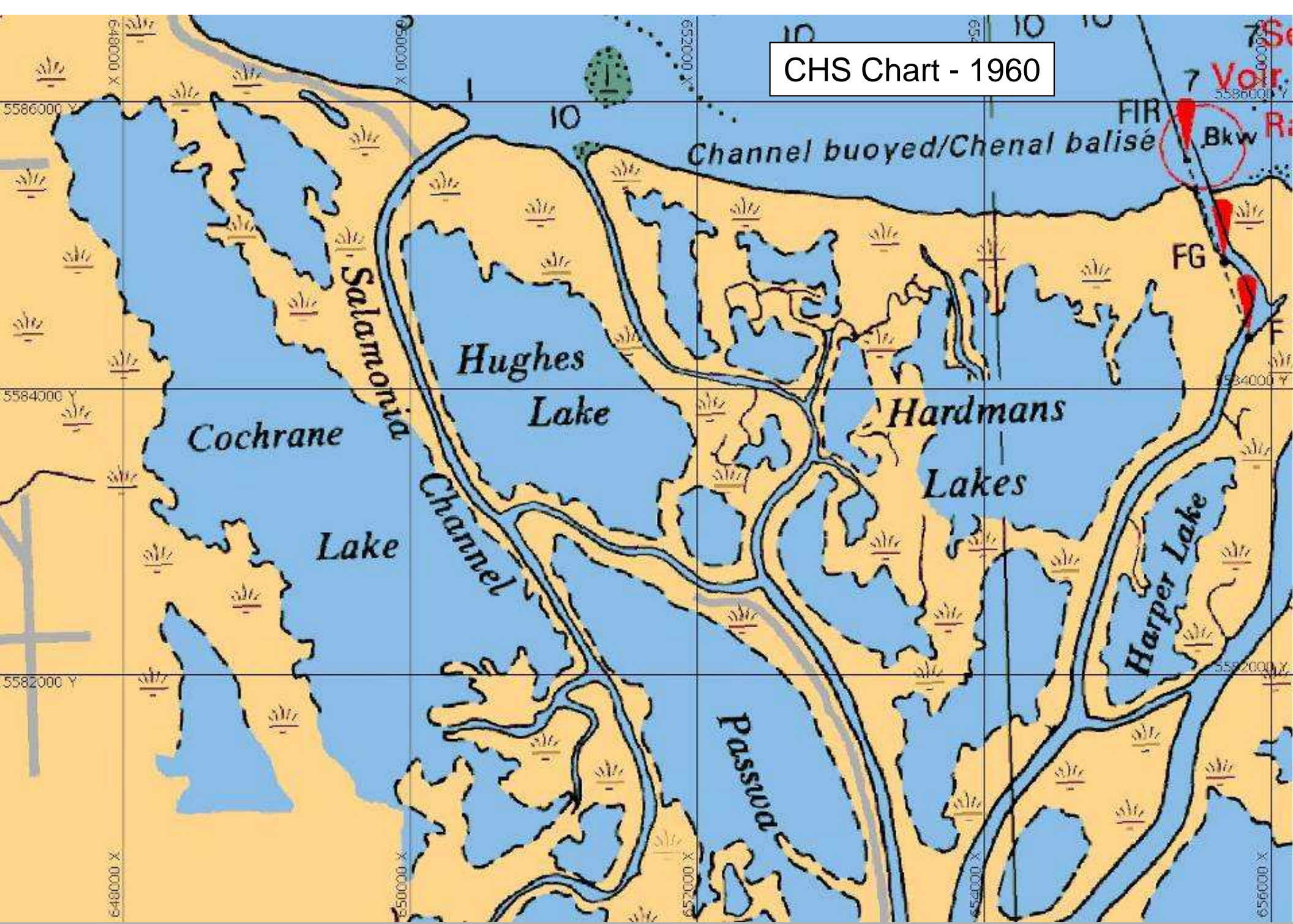Infrared Image - 2001

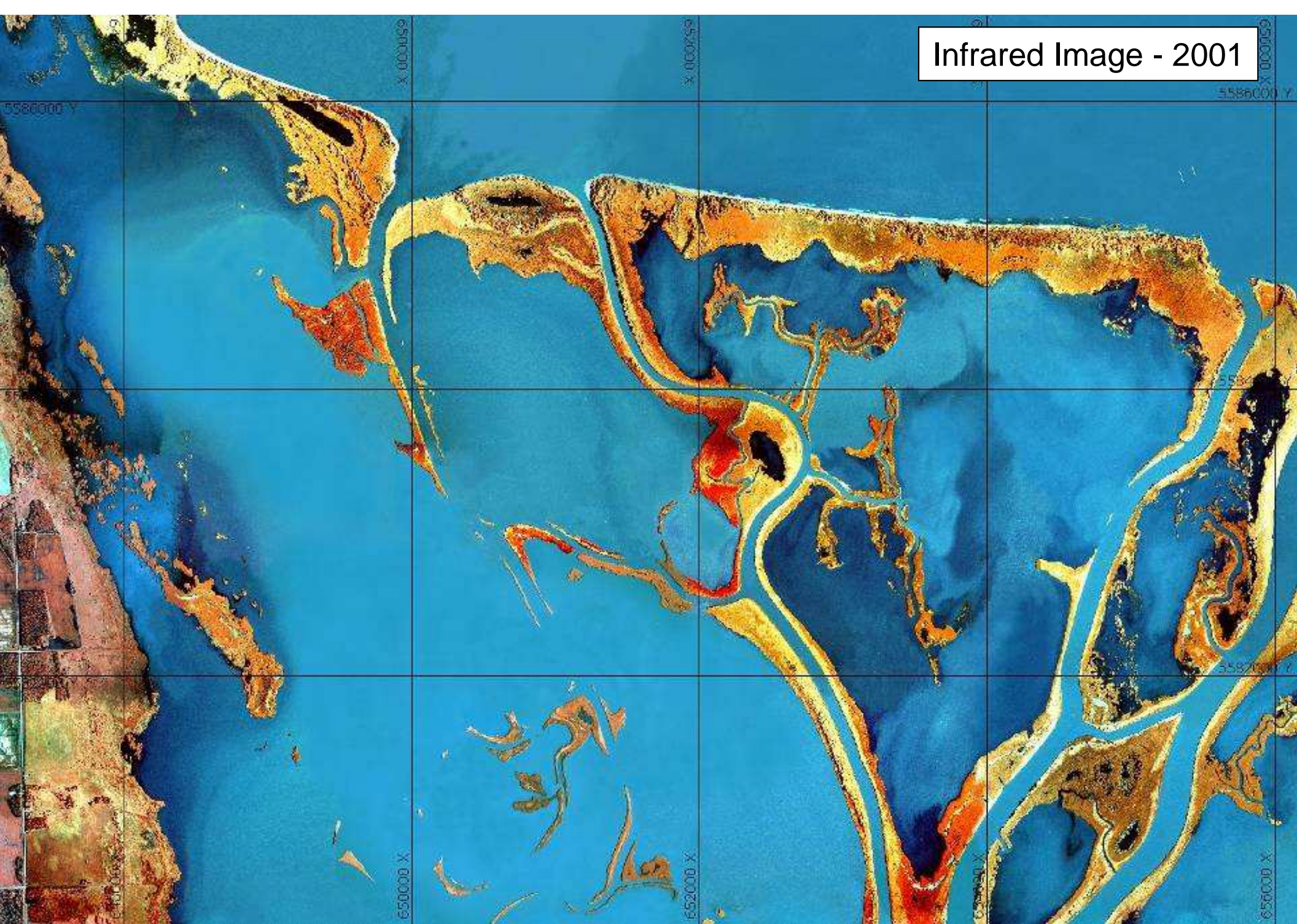Satellite Image - 2007

Infrared Image - 2001

Satellite Image - 2007

Pruden Creek

Triple Cr

sian

Lake

Folster   Lake

Sullivans

Lake

Channel buoyed/Chenal balisé

FIR

Bkw

FG

Salamonia Channel

Hughes Lake

Cochrane Lake

Hardmans Lakes

Harper Lake

Passwa

10

10

10

10

7

Voir

R

F

648000 X

650000 X

652000 X

654000

648000 X

650000 X

652000 X

654000 X

656000 X

5586000 Y

5586000 Y

5584000 Y

5584000 Y

5582000 Y

5582000 Y
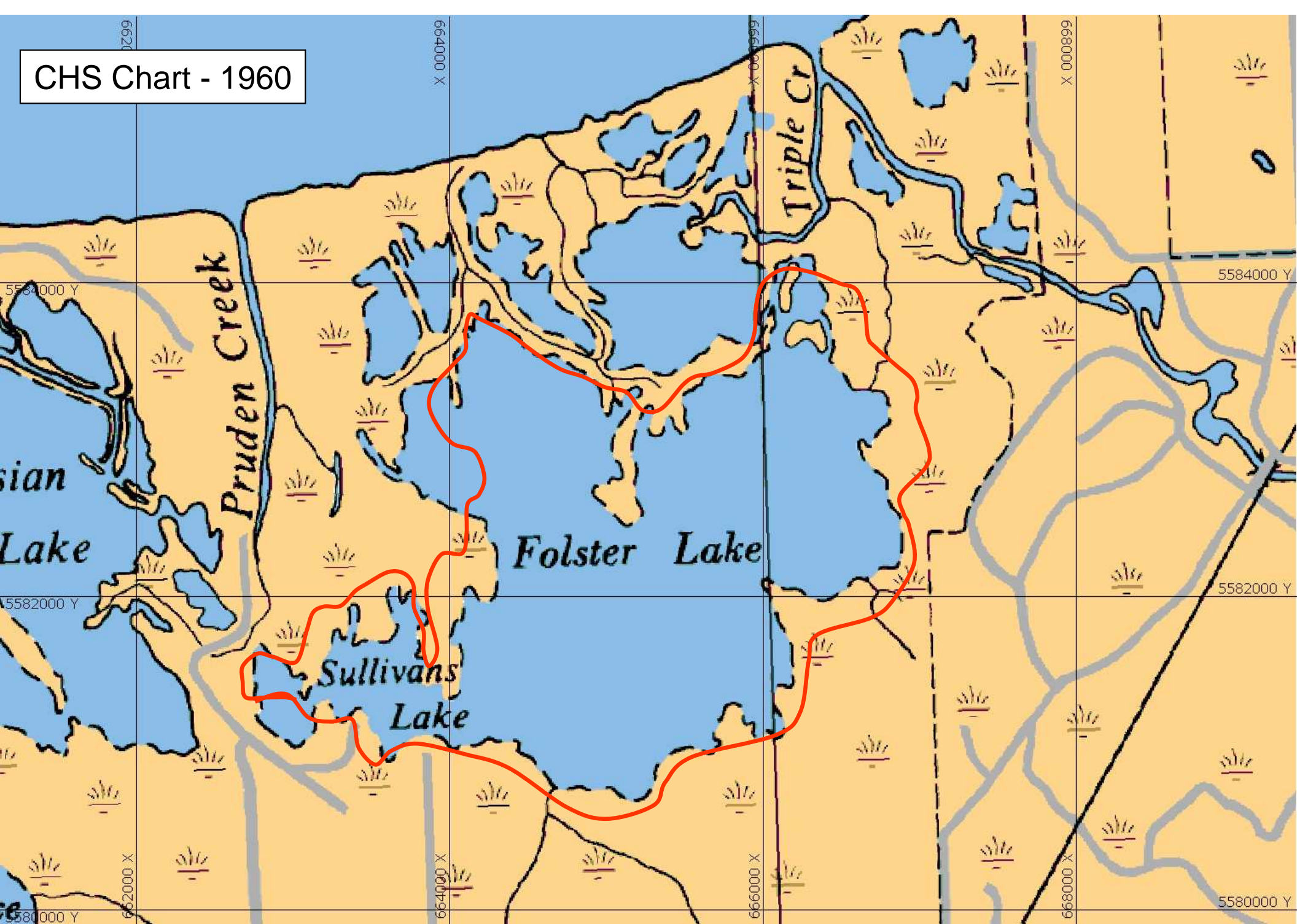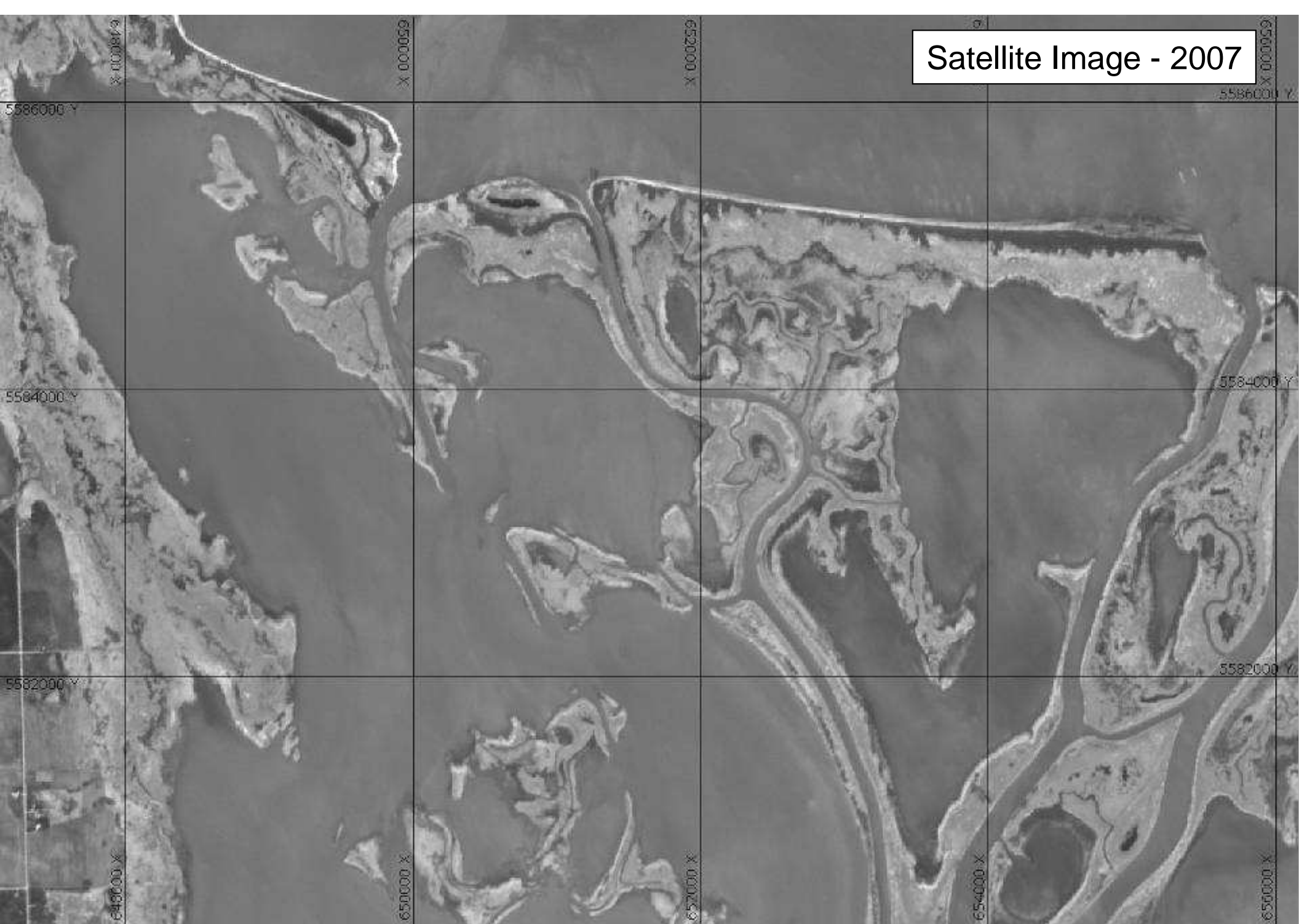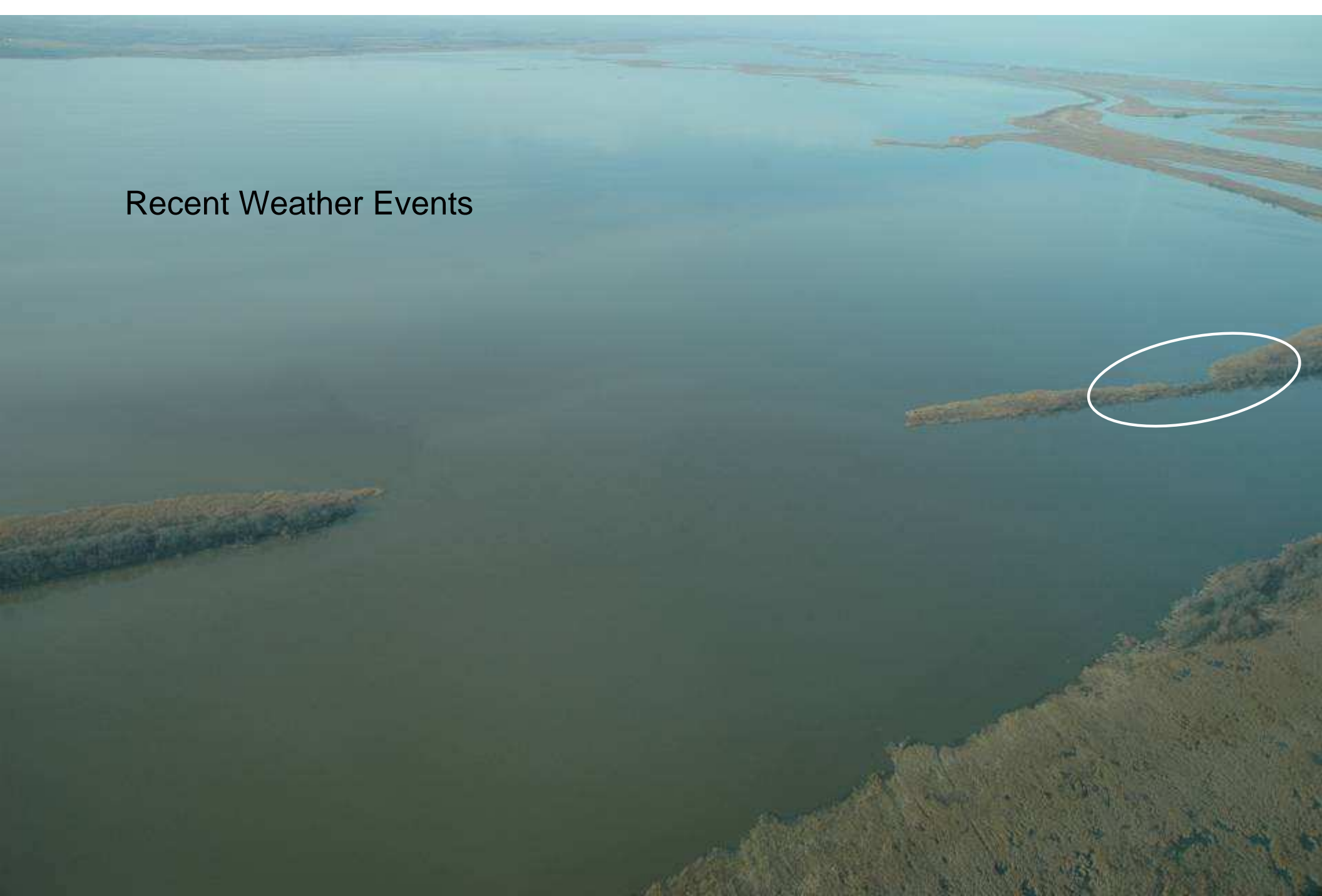
Infrared Image - 2001

Satellite Image - 2007

Recent Weather Events

Near Netley Cut, Red River side. A lot of new erosion on banks. Very 'thin' and subject to increased erosion.

Evidence of large flooding overtop land between Red River and Netley Lake. All debris washed out.
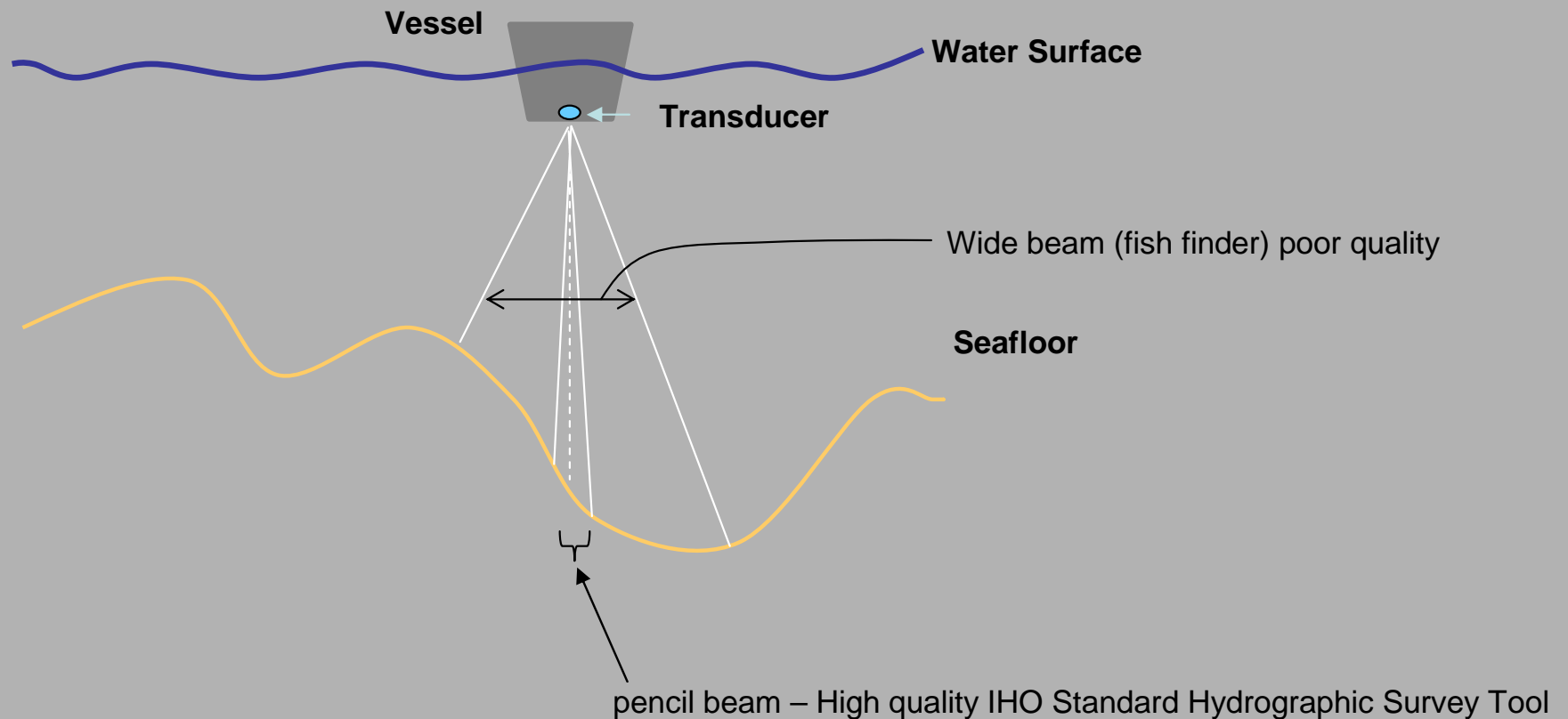
Netley-Libau Marsh Lake Bathymetry

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Equipment

1. Single Beam Sonar System

2. GPS System for horizontal & Vertical position
   - Real Time Kinematic (RTK) GPS

3. Acquisition Computer with Software / Navigation System

4. Boat

5. Post Processing Software Suite

6. Operators

Single Beam Survey Equipment

- Professional grade hydrographic survey equipment
- Complies with IHO (International Hydrographic Organization) standards

Vessel

Water Surface

Transducer

Wide beam (fish finder) poor quality

Seafloor

pencil beam – High quality IHO Standard Hydrographic Survey Tool

Positioning: RTK GPS
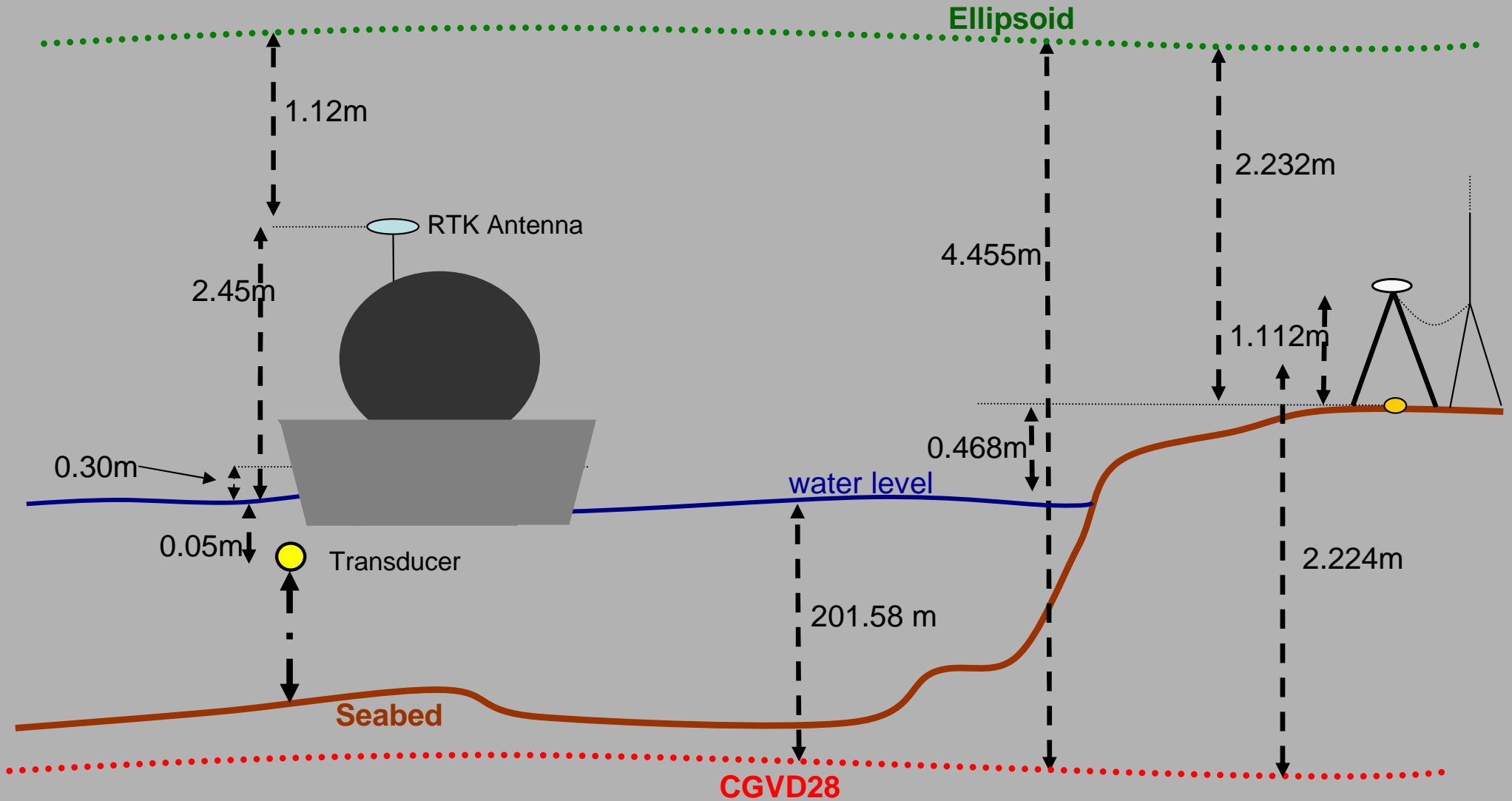
Real Time Kinematic
- Requires control points (known points)
- Base station, radio & receiver
- Avoid tide station use
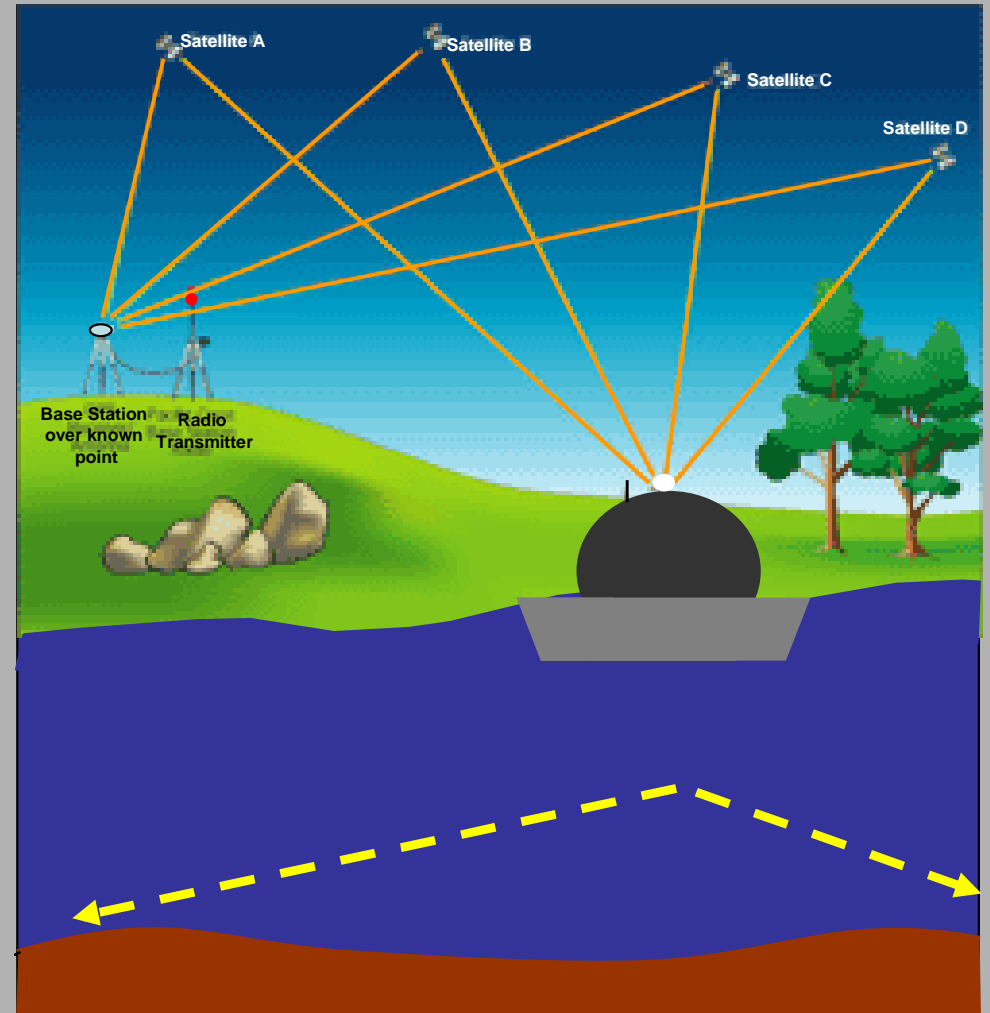
Important:	Can float anywhere on the water, will always Measure the elevation of the seabed. Water level is not important.

Ellipsoid

1.12m

2.232m

2.45m

RTK Antenna

4.455m

1.112m

0.30m

0.468m

water level

0.05m

Transducer

201.58 m

2.224m

Seabed

CGVD28

Computer Monitor / Software

RTK Receiver Antenna

GPS Monitor / Control

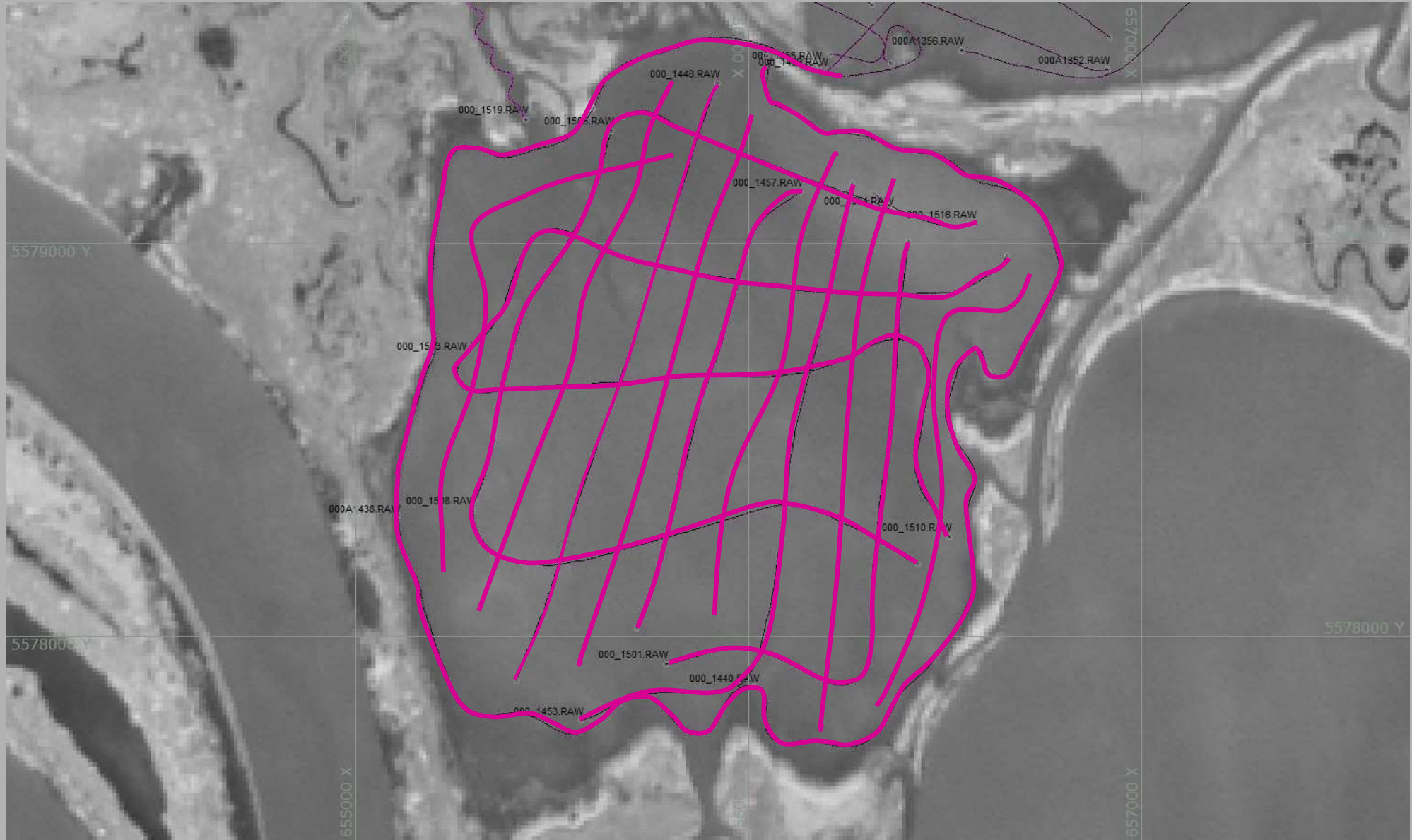Constant Groundings Inhibited Operations

New Survey Vessel Acquired Spring 2010

- RTK GPS System Established
- Sonar System, monitor, computer system mounted
- Retractable transducer mount built
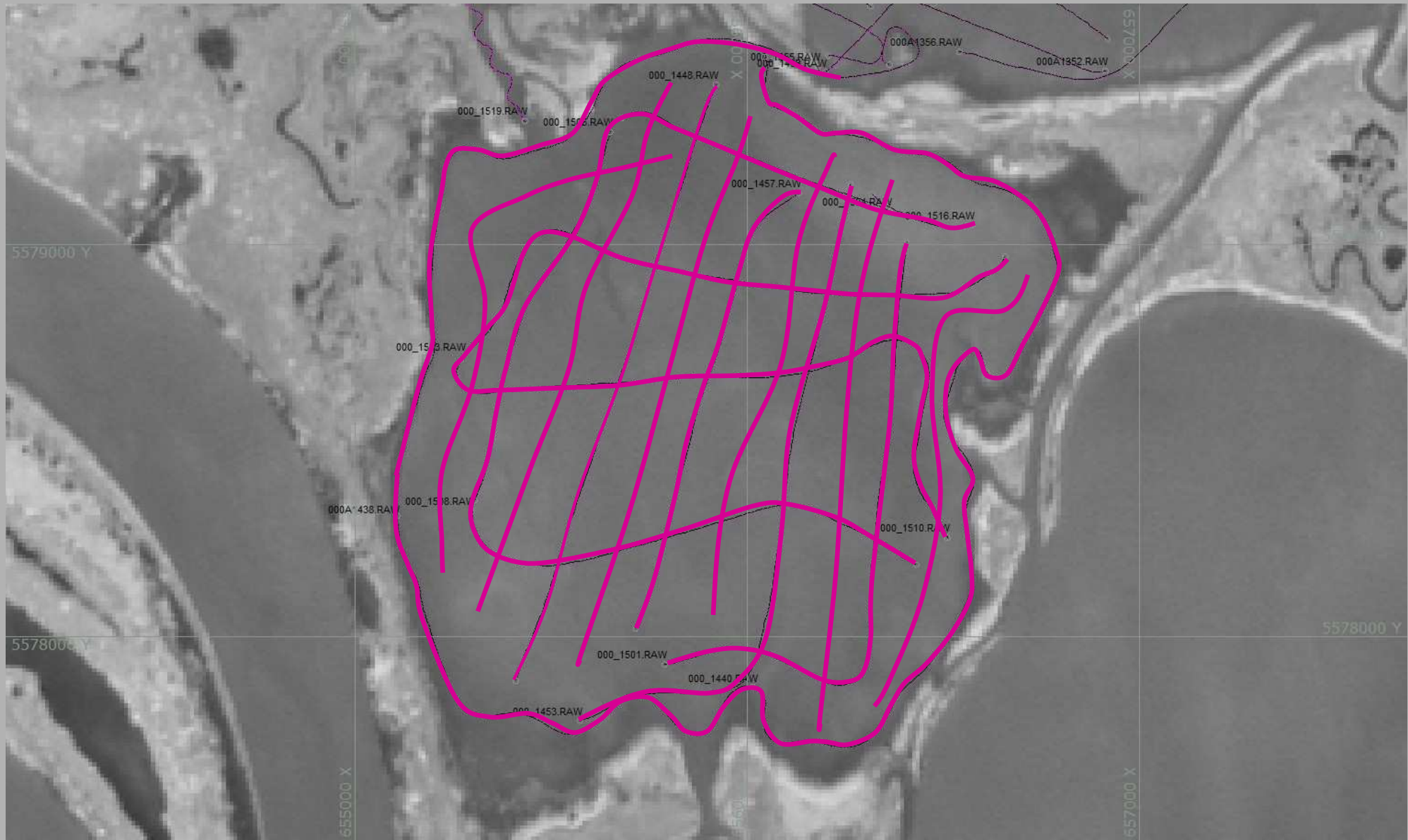
Parallel Lines, Cross Lines, Shoreline Runs

- Data collected is processed.
- Actual soundings are used to interpolate between lines run.
- Model is produced of the lake bottom.

Netley-Libau Marsh Lake Bathymetry

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Parallel Lines, Cross Lines, Shoreline Runs

- Data collected is processed.
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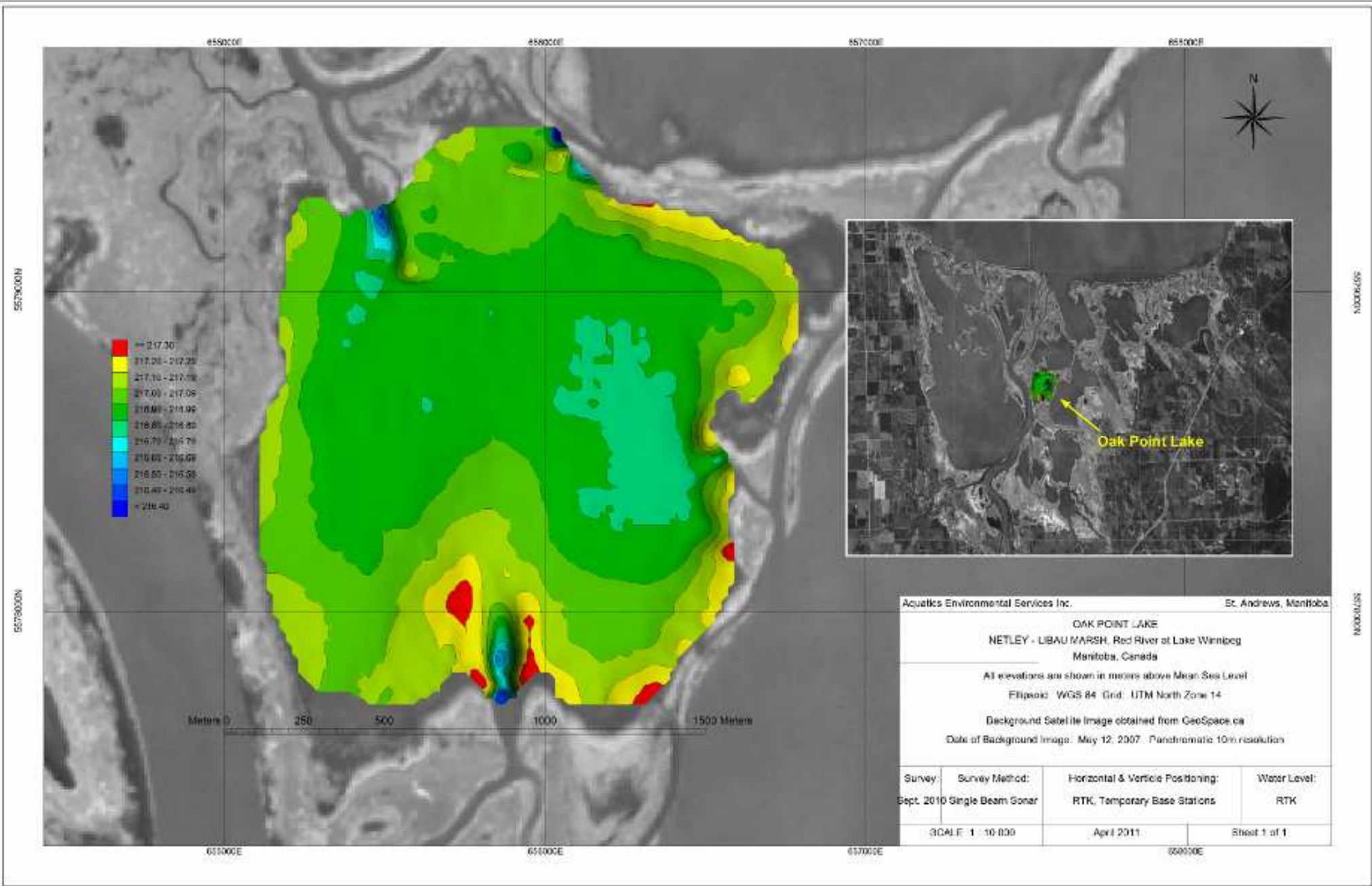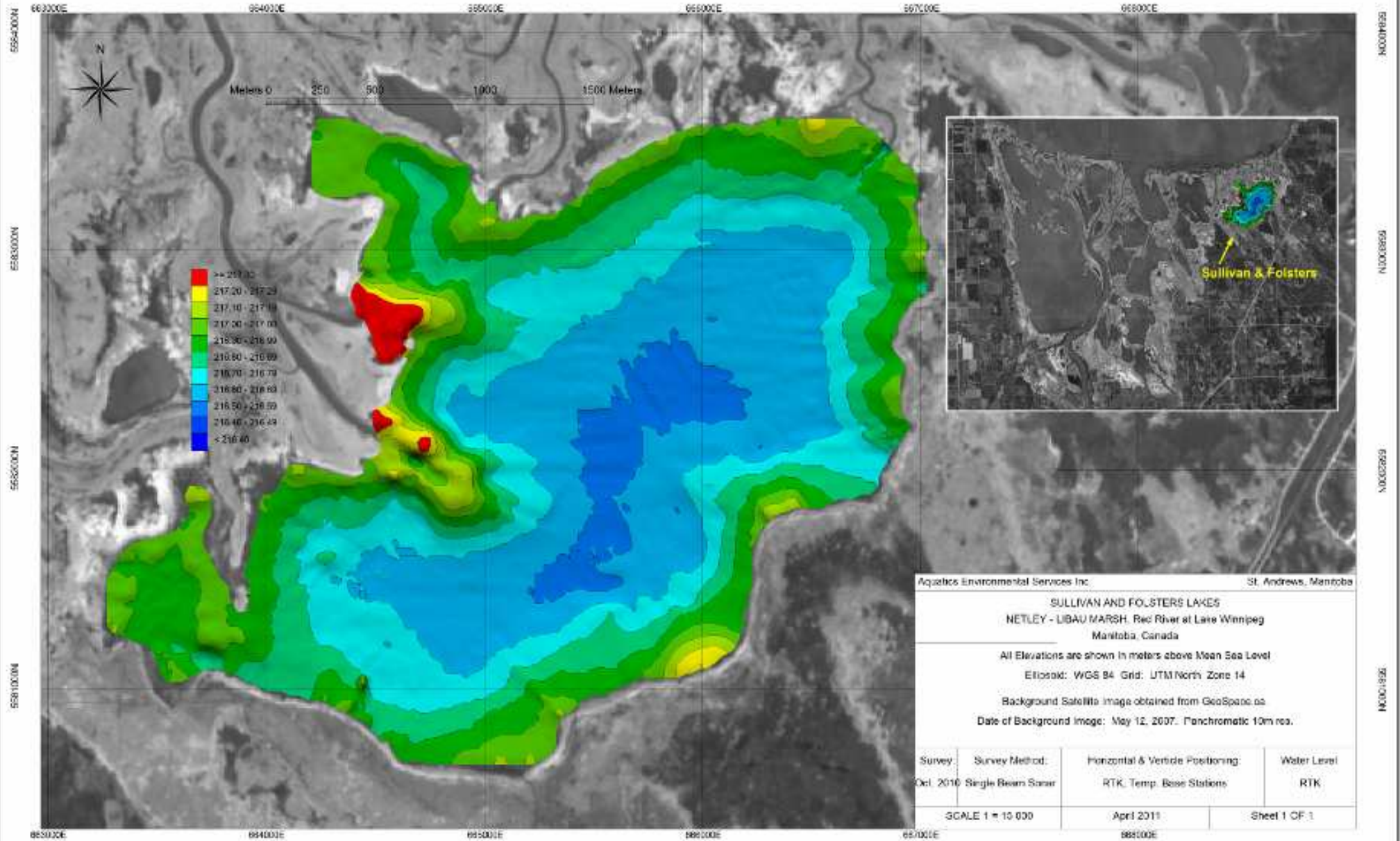# Model is generated and plotted against the georeferenced backdrop
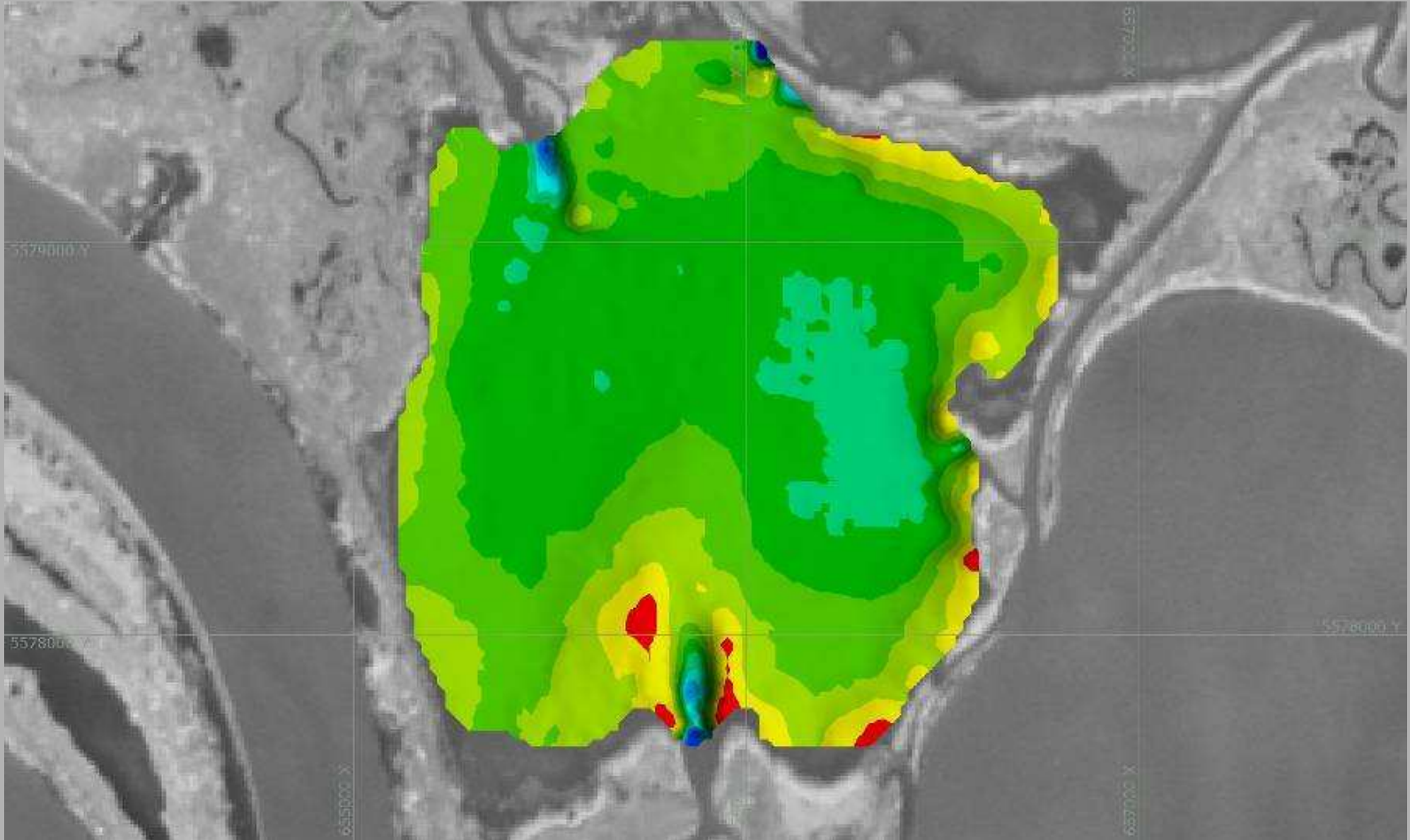
• Points are generated every 3 meters – interpolated based on actual soundings

Contour Lines are Generated, Files saved as DXF's
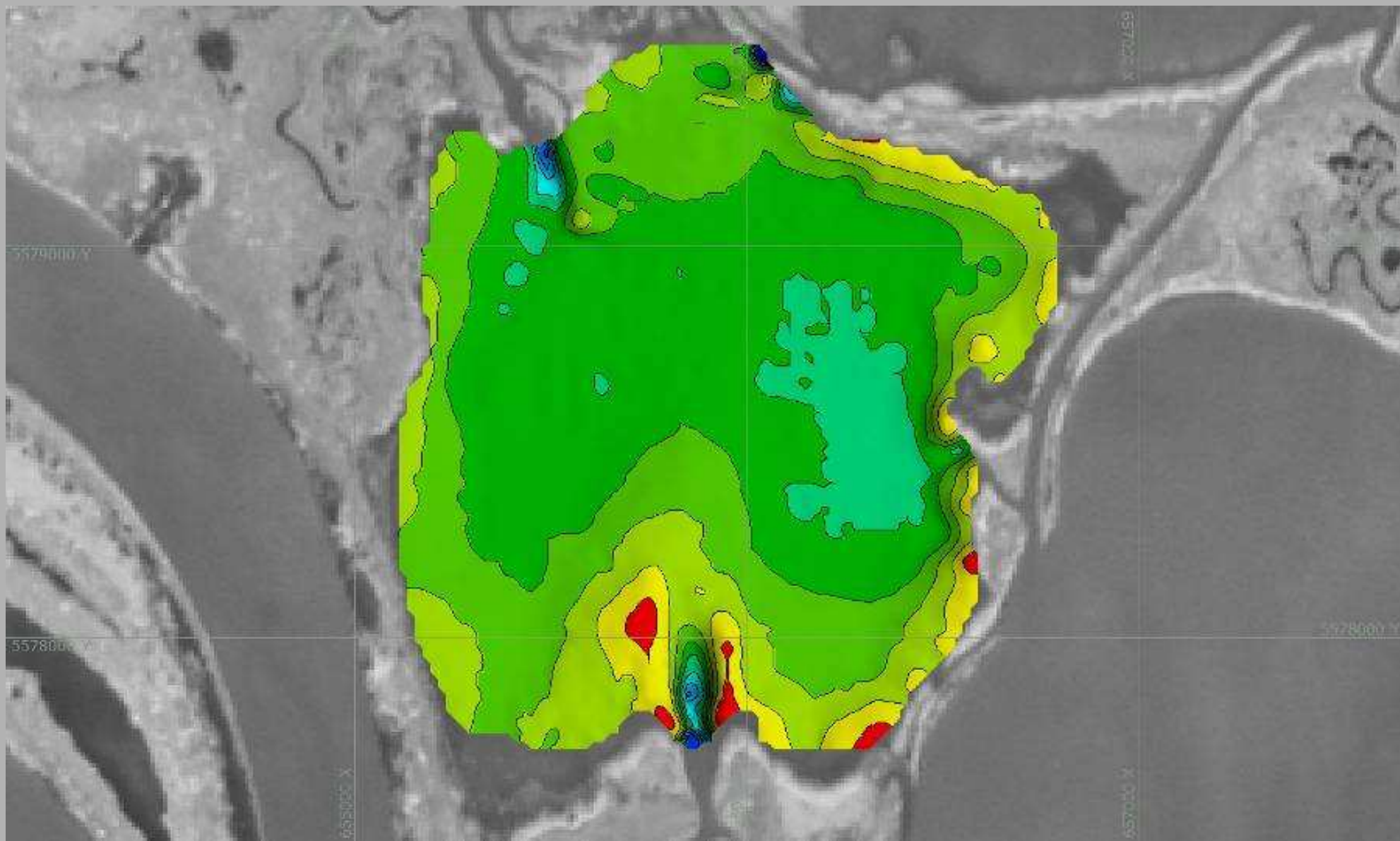
Final Charts Produced for Each Lake

SULLIVAN AND FOLSTERS LAKES
NETLEY - LIBAU MARSH, Red River at Lake Winnipeg
Manitoba, Canada

All Elevations are shown in meters above Mean Sea Level

Ellipsoid: WGS 84 Grid: UTM North Zone 14

Background Satellite Image obtained from GeoSpace.ca
Date of Background Image: May 12, 2007. Panchromatic 10m res.

Survey	Survey Method:	Horizontal & Vertical Positioning:	Water Level
Oct. 2010	Single Beam Sonar	RTK, Temp. Base Stations	RTK
SCALE 1 = 10 000		April 2011	Sheet 1 OF 1

Hardsmans Lake

Meters 0   500   1000   2000   3000 Meters

N

>= 217.30
217.20 - 217.29
217.10 - 217.19
217.00 - 217.09
216.90 - 216.99
216.80 - 216.89
216.70 - 216.79
216.60 - 216.69
216.50 - 216.59
216.40 - 216.49
< 216.40

Aquatics Environmental Services Inc.   St. Andrews, Manitoba

U.S. ARMY ENGINEER DISTRICT
NETLEY - LIBAU MARSH, Red River at Lake Winnipeg
Manitoba, Canada

All elevations are shown in meters above Mean Sea Level

Ellipsoid: WGS 84   Grid: UTM North Zone 14

Background Satellite Image obtained from GeoSpace.ca

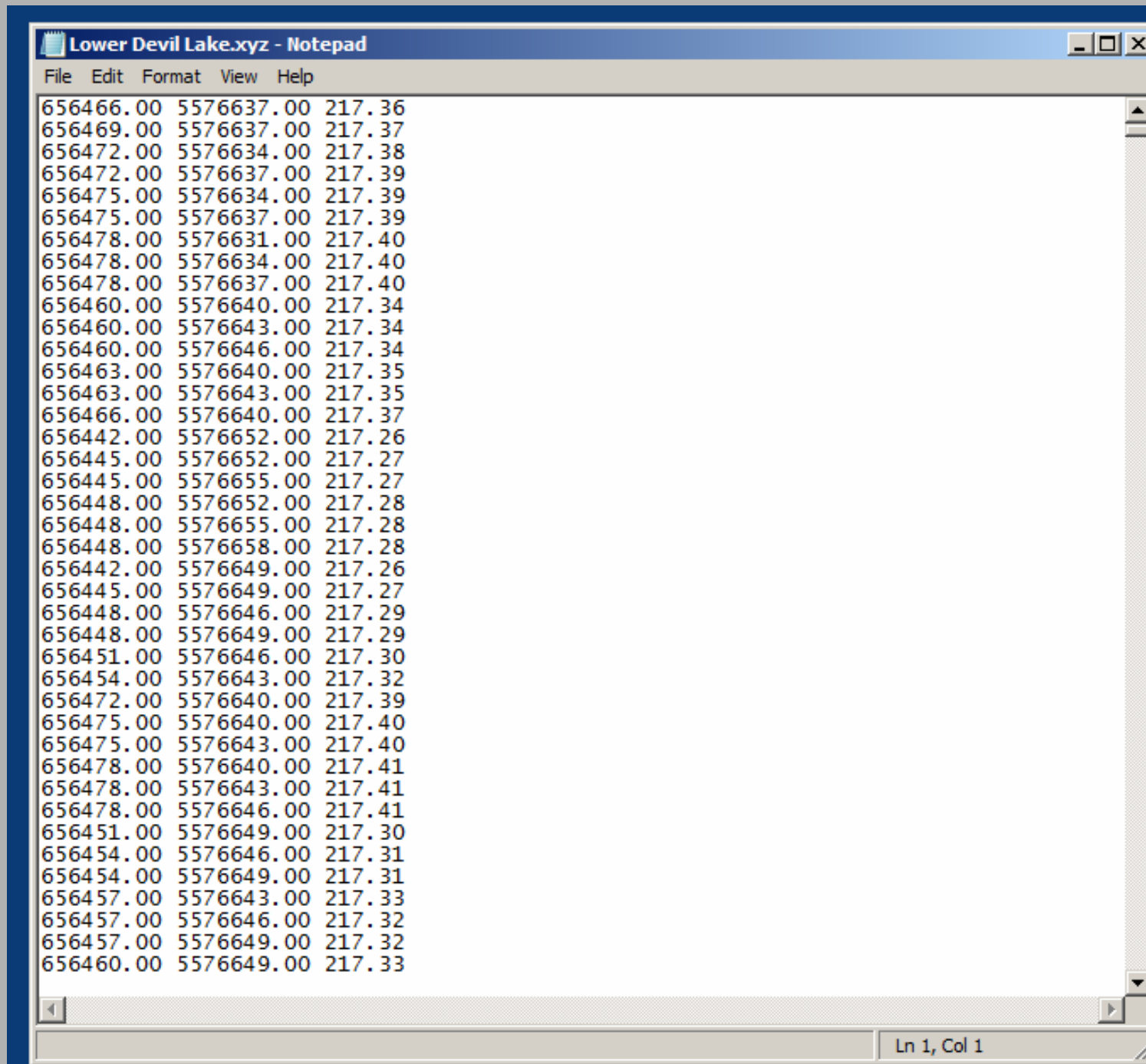Date of Background Image: May 12, 2007. Panchromatic 10m resolution

Survey:	Survey Method:	Horizontal & Verticle Positioning:	Water Level:
Oct. 2010	Single Beam Sonar	RTK, Temporary Base Stations	RTK
SCALE 1 : 20 000		April 2011	Sheet 1 of 1

Legend (elevation in meters above Mean Sea Level):
- >= 217.30
- 217.20 - 217.30
- 217.10 - 217.19
- 217.00 - 217.09
- 216.90 - 216.99
- 216.80 - 216.89
- 216.70 - 216.79
- 216.60 - 216.69
- 216.50 - 216.59
- 216.40 - 216.49
- < 216.40

Netley Lake

Aquatics Environmental Services Inc.   St. Andrews, Manitoba

NETLEY LAKE
NETLEY - LIBAU MARSH, Red River at Lake Winnipeg
Manitoba, Canada

All elevations are shown in meters above Mean Sea Level

Ellipsoid: WGS 84   Grid: UTM North Zone 14

Background Satellite Image obtained from GeoSpace.ca

Date of Background Image: May 12, 2007. Panchromatic 10m resolution

Survey:	Survey Method:	Horizontal & Vertical Positioning:	Water Level:
Nov. 2010	Single Beam Sonar	RTK, Temporary Base Stations	RTK
SCALE 1 : 50 000		April 2011	Sheet 1 of 1

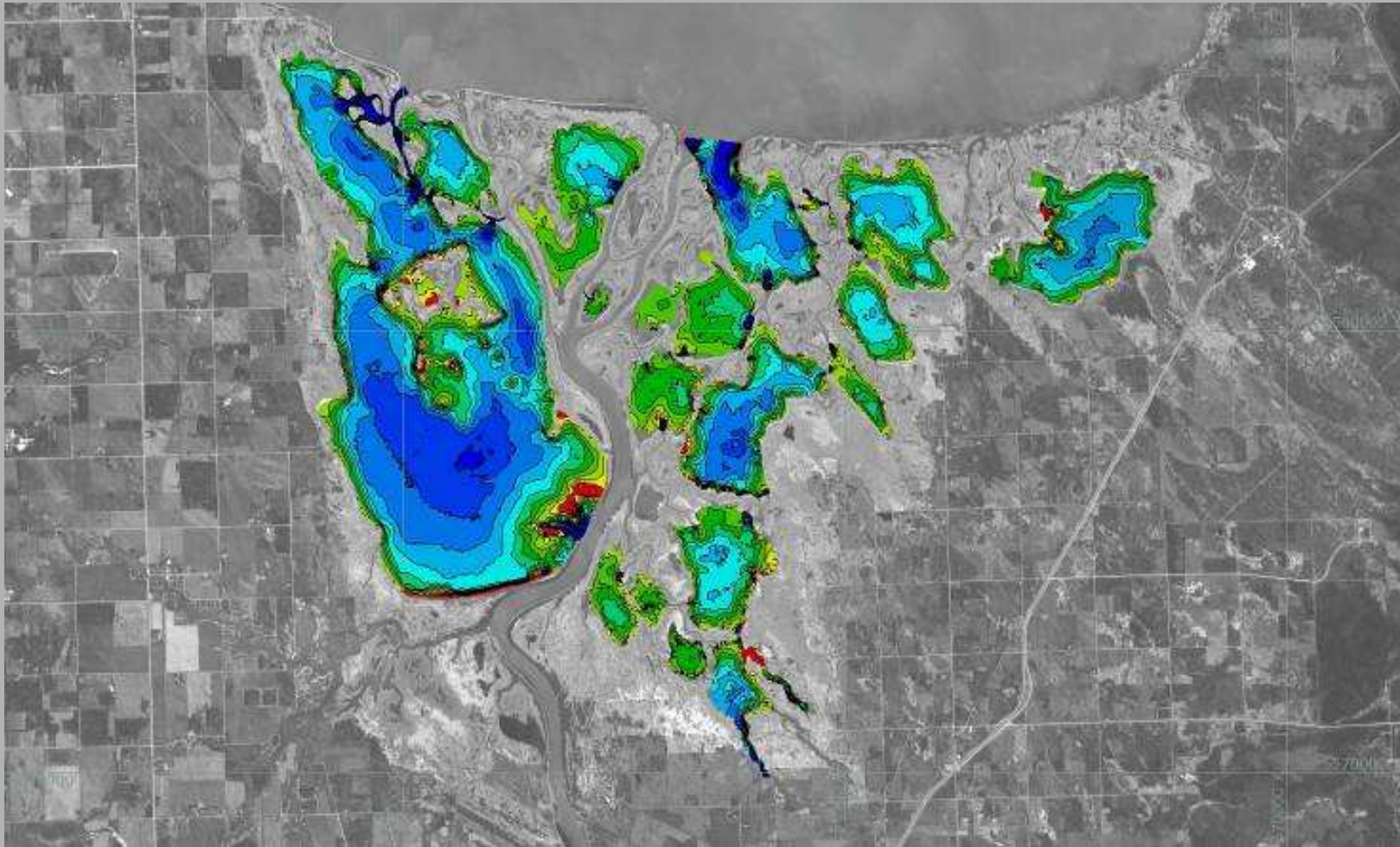# XYZ Files for each lake are generated and saved for future work

Water Volumes Calculated for Each Lake, for a few different Water levels

Sullivan & Folsters Lakes

Lake Volume

Water Level (Meters above Mean Sea Level)
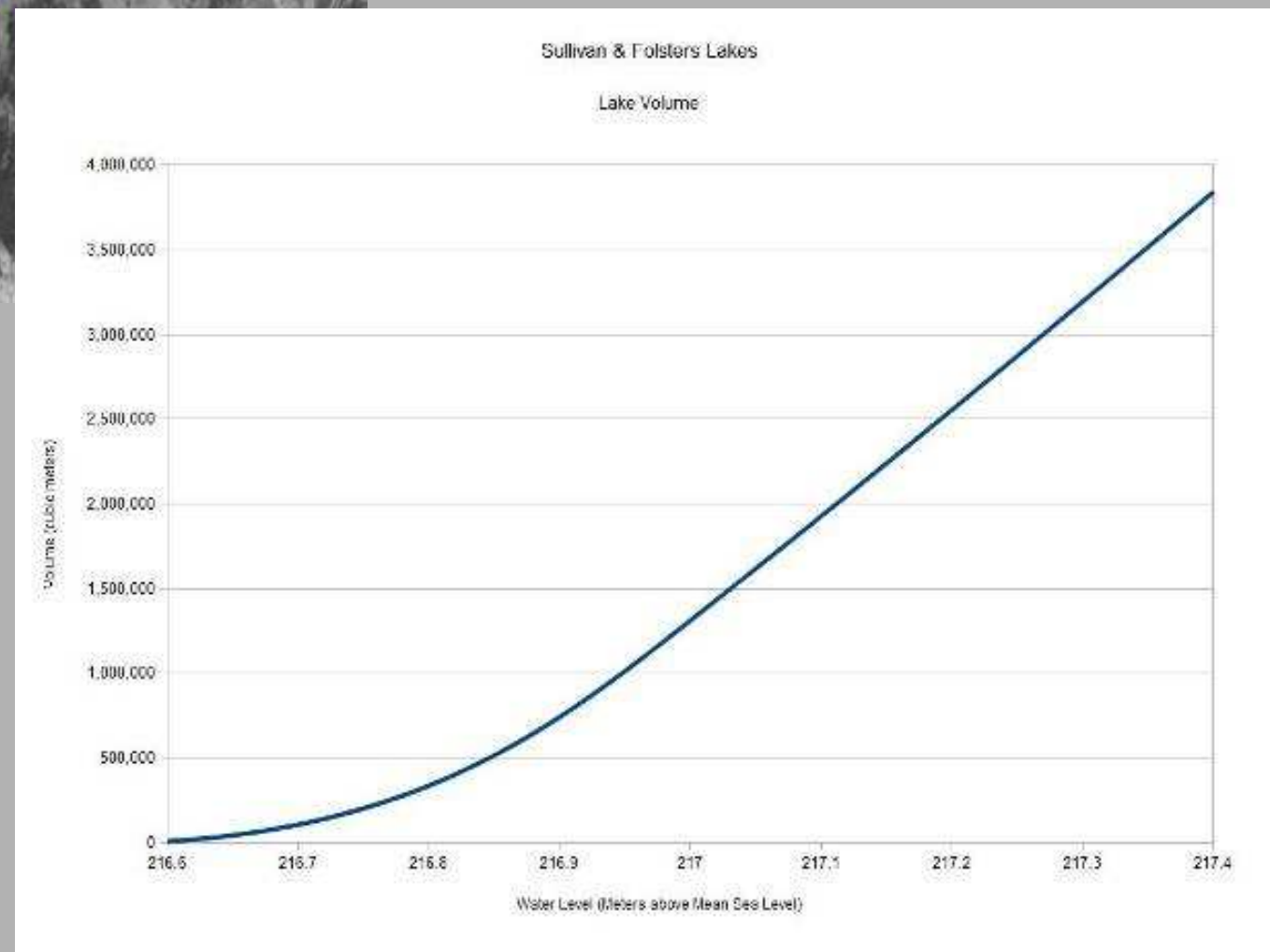
Results shown for a water elevation of 217.4 m

Total Water Volume, All Lakes:	58,360,826 m^3
All Lakes with Exception of Netley Lake:	24,768,477 m^3
Netley Lake Only:	33,592,349 m^3
Netley Lake as a percentage of Total:	57.6 %
All Lakes Except Netley as a percentage of Total:	42.4 %

Netley-Libau Marsh Lake Bathymetry

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5. **Netley Cut**

6. Channels

7. Closing

Netley Cut Area
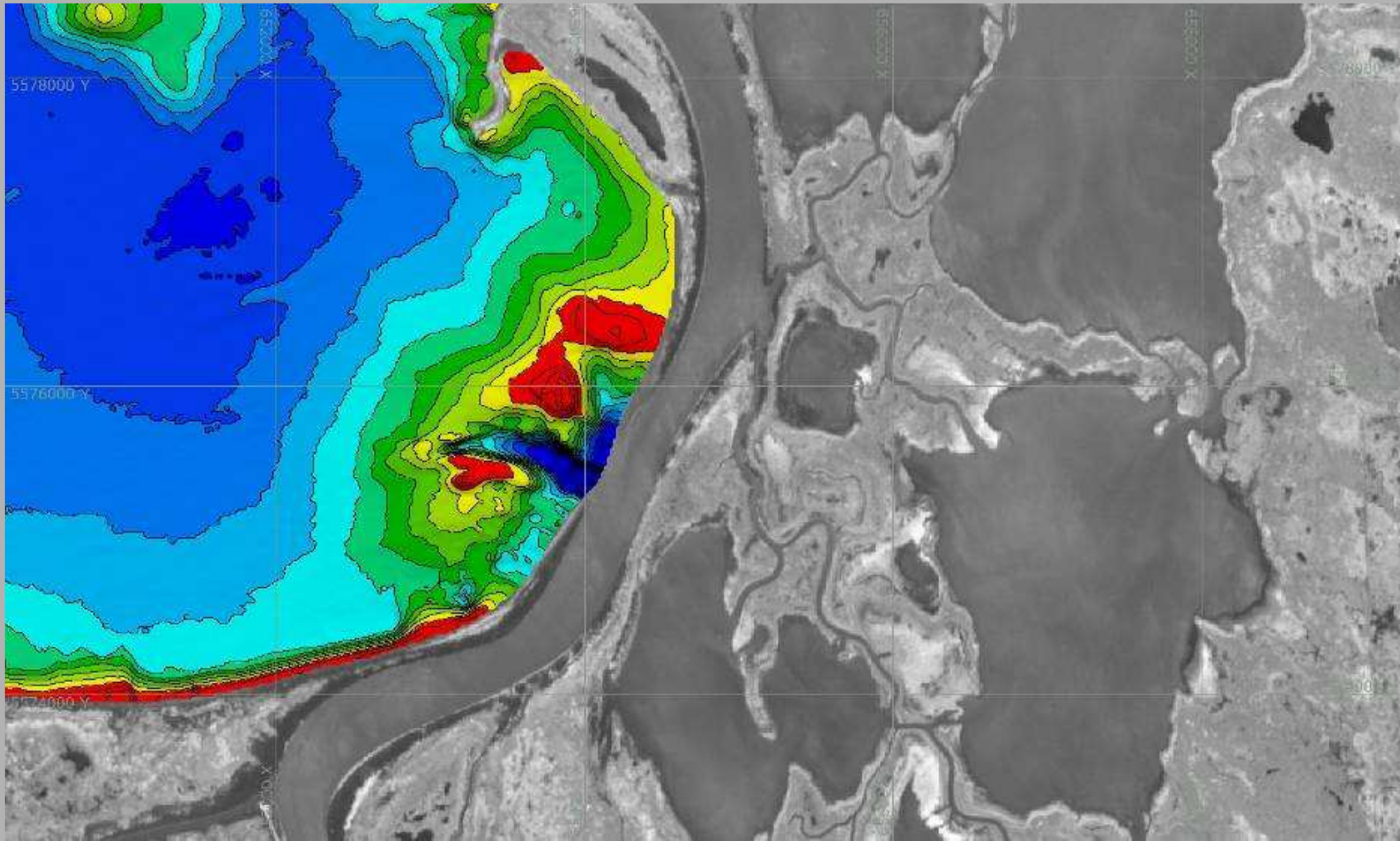
River Bathymetry Near Netley Cut

Same Colour Scheme

Depth of Rivers is well below that of the Surrounding Lakes in the Marsh

Lakes

Deep channels

Netley-Libau Marsh Lake Bathymetry
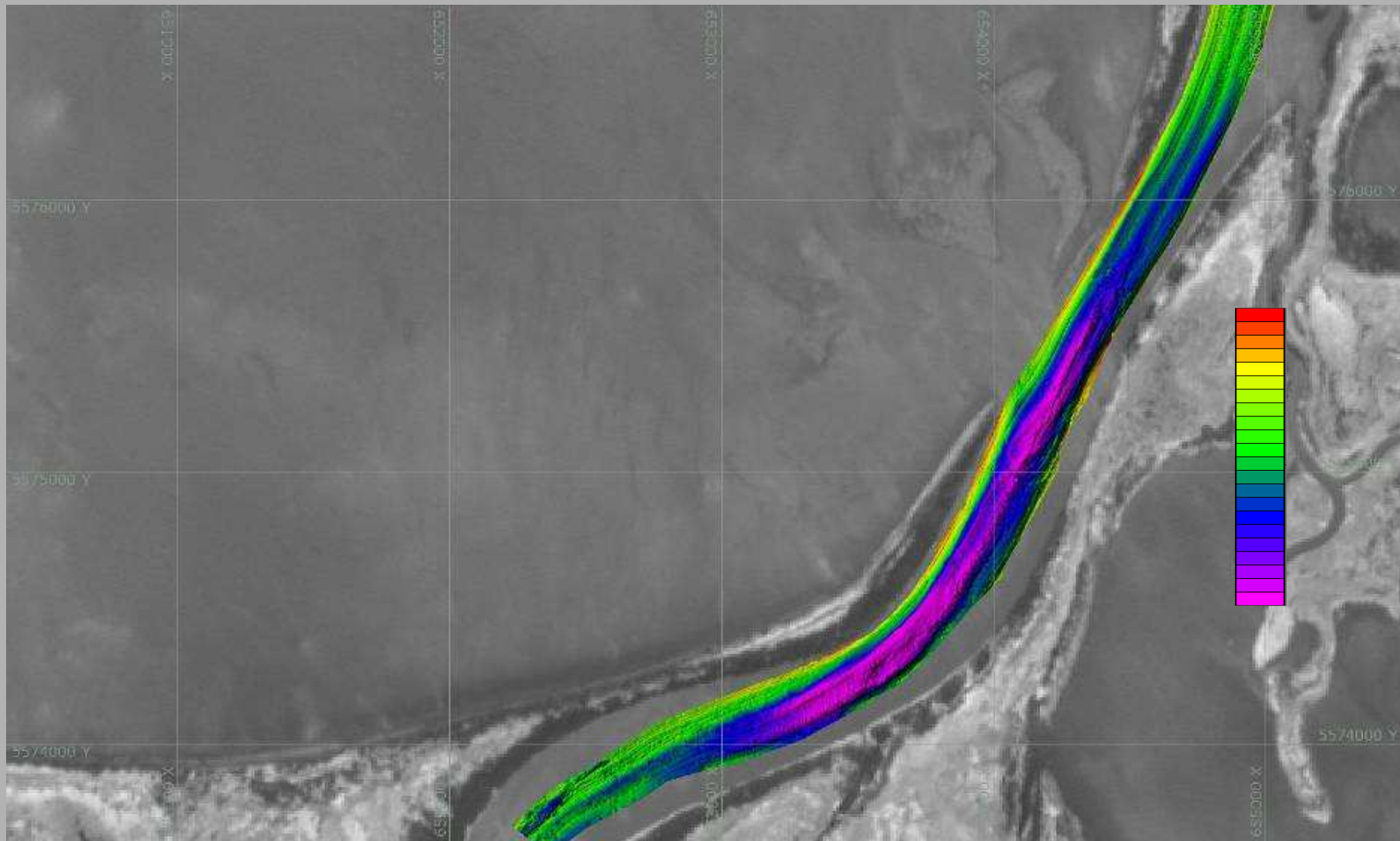
1. Lake Names

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5. Netley Cut

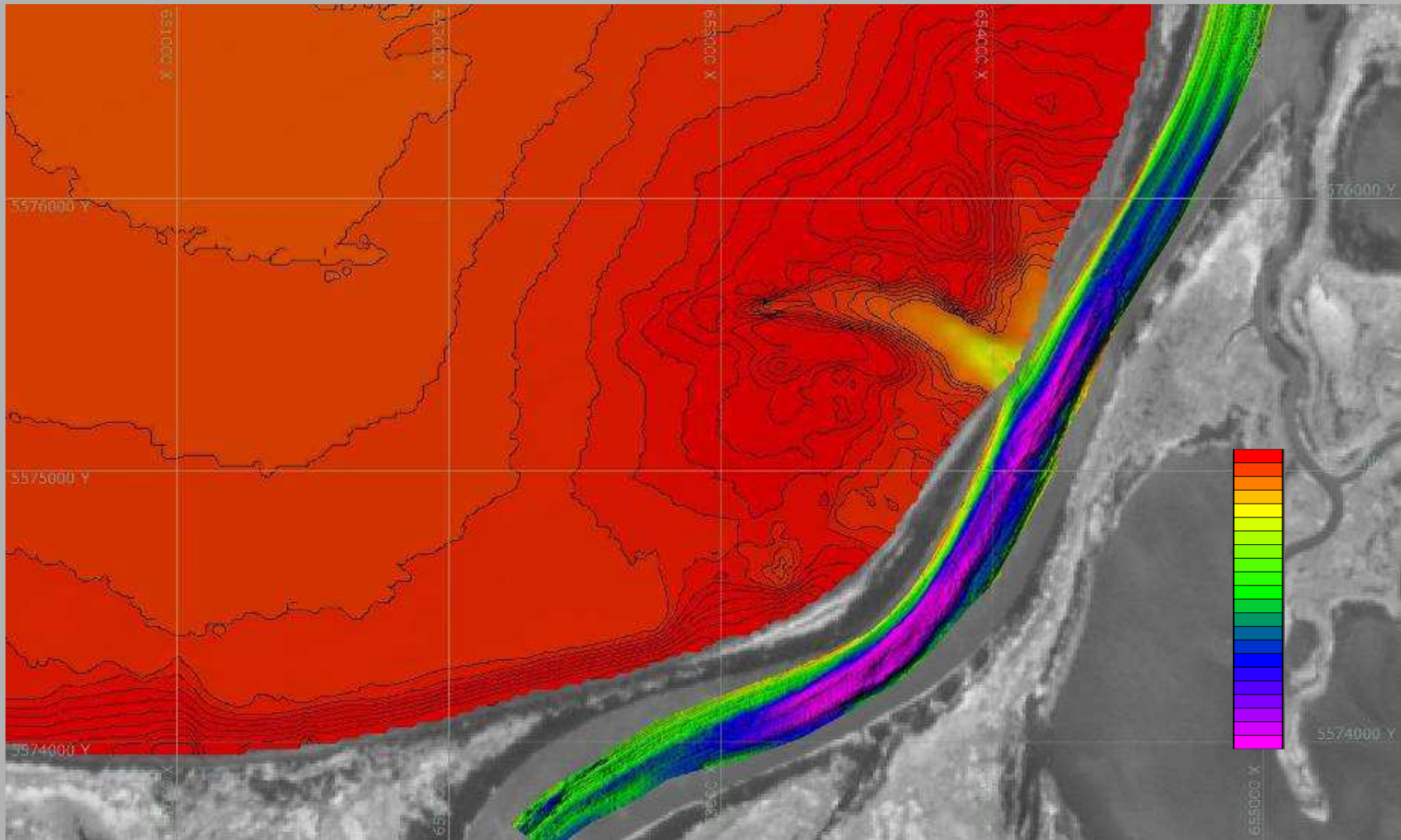6. **Channels**

7. Closing

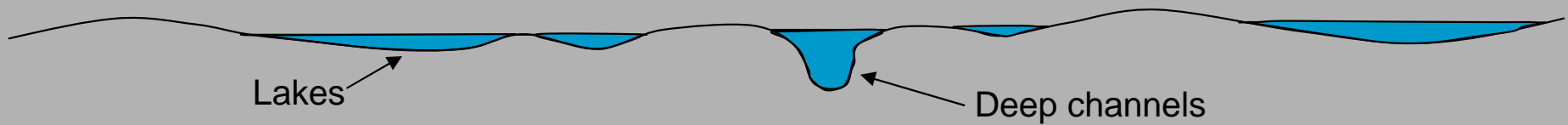Bi-Directional Water Flows

Hardmans Lake

Ramsay Lake

Pruden Bay

Lower Devil Lake

Poplar Point Lake

Devil's Creek

Oak Point Creek

Netley Lake

Little Devil Creek

Strait Creek

Lower Devil Lake

Morrison & Starr Lakes

MORRISON & STARR LAKES
NETLEY - LIBAU MARSH, Red River at Lake Winnipeg
Manitoba, Canada

All elevations are shown in meters above Mean Sea Level

Ellipsoid: WGS 84 Grid: UTM North Zone 14

Background Satellite Image obtained from: GeoSpace.ca

Date of Background Image: May 12, 2007 Panchromatic 10m resolution.
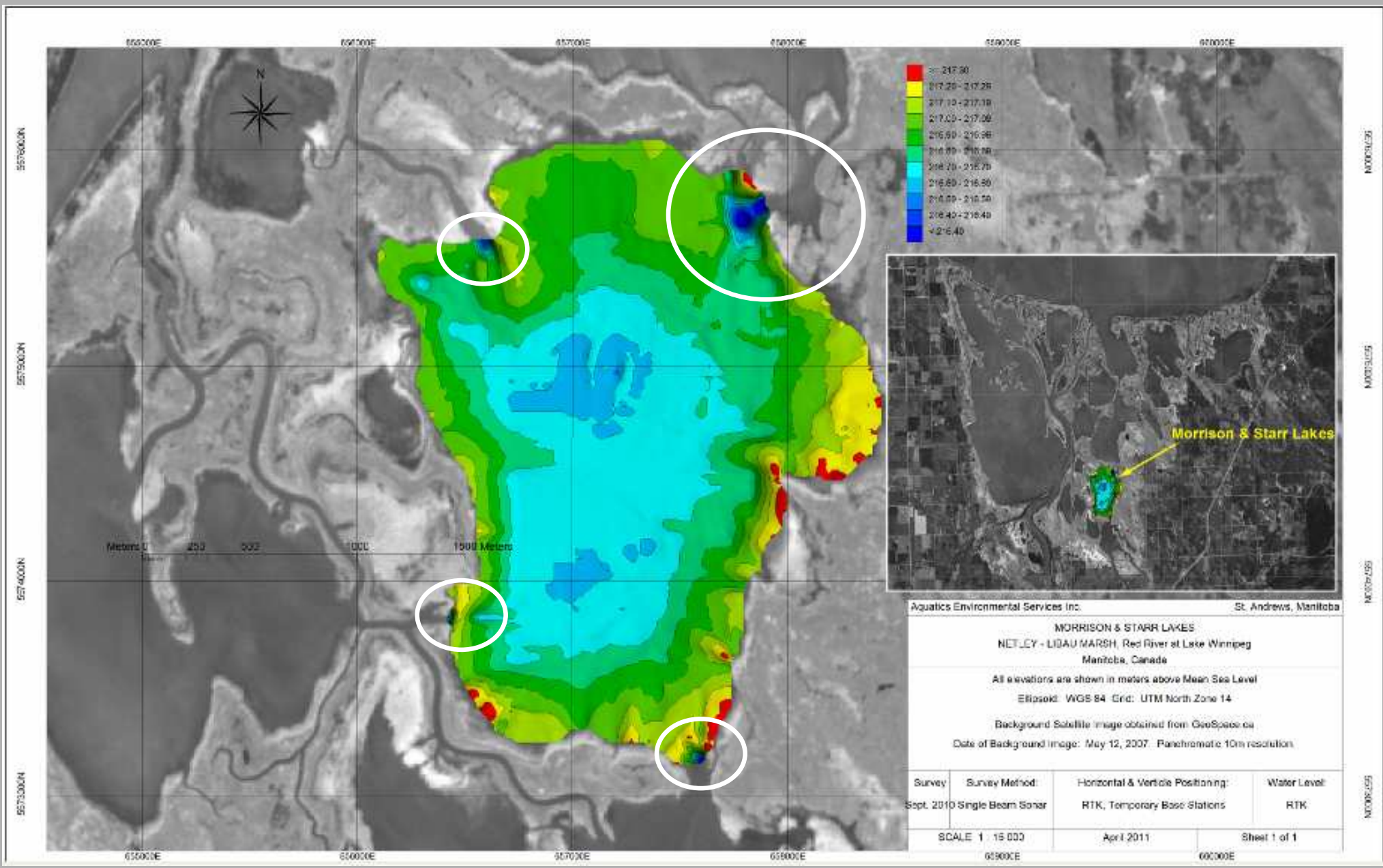
Aquatics Environmental Services Inc.   St. Andrews, Manitoba

Morrison & Starr Lakes

Survey	Survey Method:	Horizontal & Vertical Positioning:	Water Level:
Sept. 2010	Single Beam Sonar	RTK, Temporary Base Stations	RTK
SCALE 1 : 15,000		April 2011	Sheet 1 of 1

Meters 0   250   500   1000   1500 Meters

217.30
217.20 - 217.20
217.10 - 217.10
217.00 - 217.00
216.90 - 216.90
216.80 - 216.80
216.70 - 216.70
216.60 - 216.60
216.50 - 216.50
216.40 - 216.40
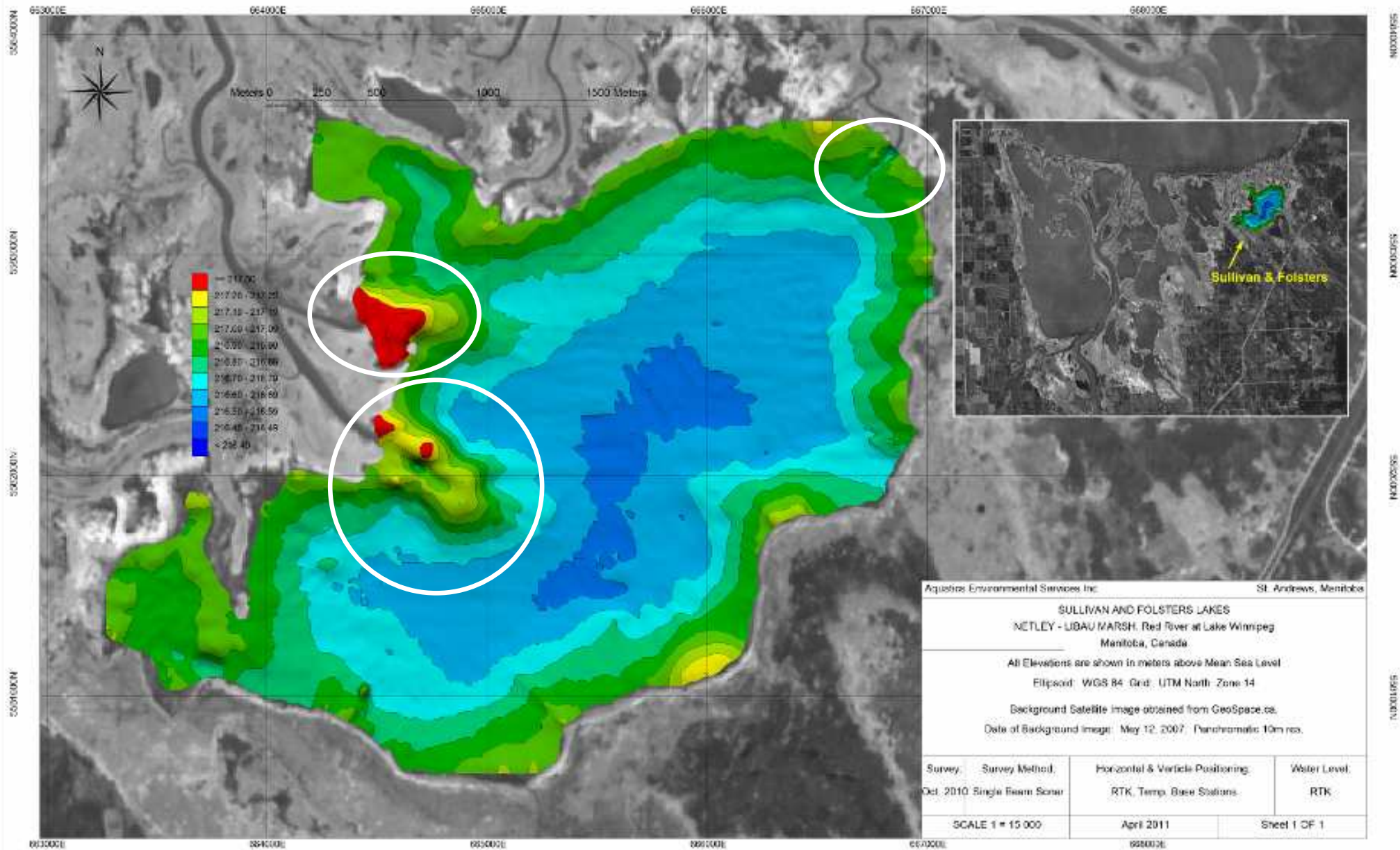216.40

Sullivan & Folsters

Aquatos Environmental Services Inc.   St. Andrews, Manitoba

SULLIVAN AND FOLSTERS LAKES
NETLEY - LIBAU MARSH, Red River at Lake Winnipeg
Manitoba, Canada

All Elevations are shown in meters above Mean Sea Level

Ellipsoid: WGS 84 Grid: UTM North Zone 14

Background Satellite Image obtained from GeoSpace.ca.

Date of Background Image: May 12, 2007. Panchromatic 10m res.

Survey:	Survey Method:	Horizontal & Vertical Positioning:	Water Level:
Oct. 2010	Single Beam Sonar	RTK, Temp. Base Stations.	RTK
SCALE 1 = 15 000		April 2011	Sheet 1 OF 1

Outlet of Netley Lake Into Lake Winnipeg

Aquatica Environmental Services Inc.   St. Andrews, Manitoba

NETLEY LAKE - NORTHERN PORTION

NETLEY - LIBAU MARSH, Red River at Lake Winnipeg

Manitoba, Canada

All elevations are shown in meters above Mean Sea Level
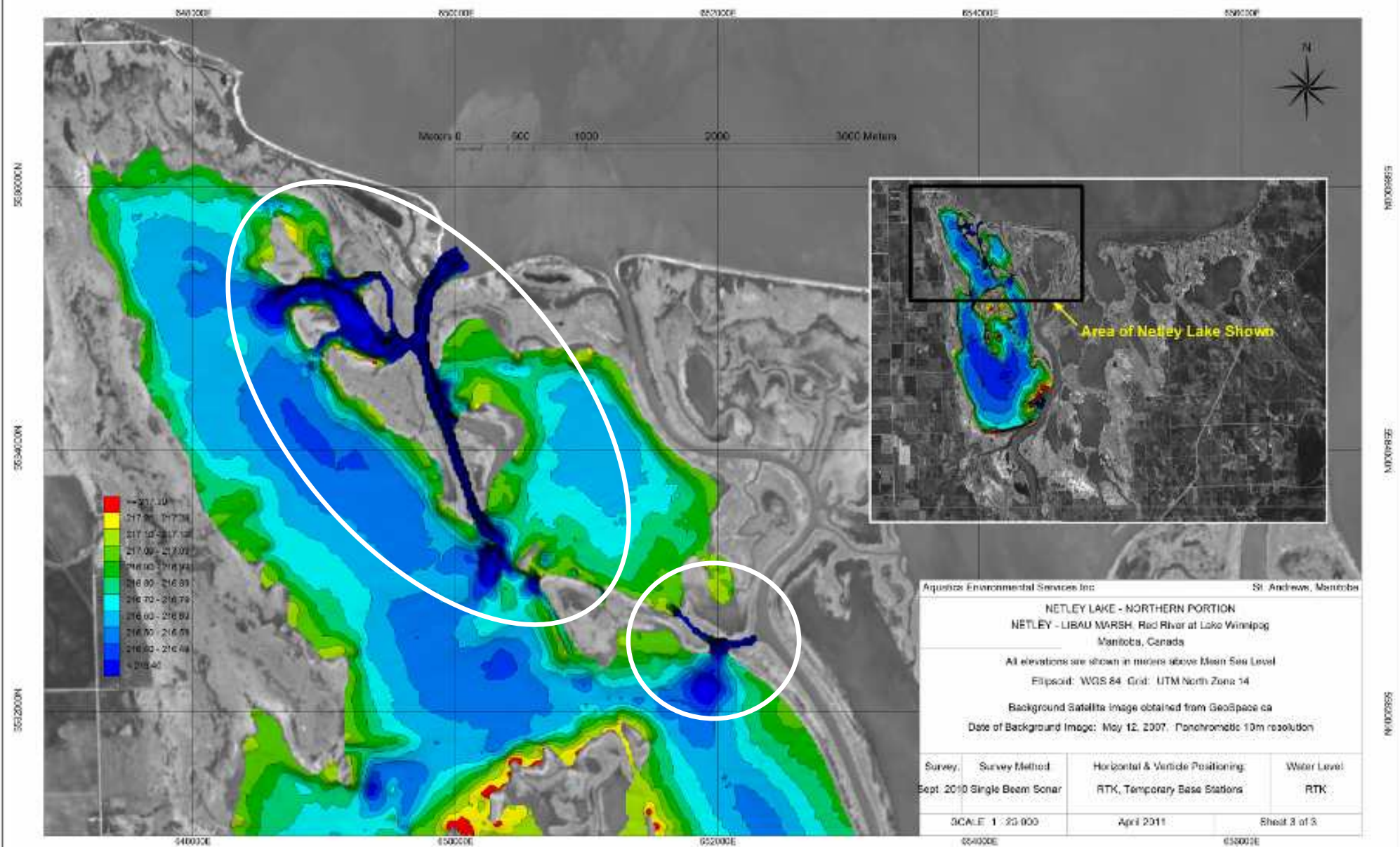
Ellipsoid: WGS 84 Grid: UTM North Zone 14

Background Satellite Image obtained from GeoSpace.ca

Date of Background Image: May 12, 2007. Panchromatic 10m resolution

Survey.	Survey Method	Horizontal & Verticle Positioning:	Water Level
Sept. 2010	Single Beam Sonar	RTK, Temporary Base Stations	RTK
SCALE 1 : 20 000		April 2011	Sheet 3 of 3.

Thank You

Aquatics Environmental Services Inc.
St. Andrews, Manitoba