USER'S NOTES FOR THE GIS FOR THE ST. CLAIR RIVER AOC

A COMPONENT OF THE APPLICATION OF COMPUTER MODELING AND BIOMONITORING TOOLS TO ASSIST IN DECISION MAKING FOR THE ST. CLAIR RIVER AREA OF CONCERN

DRAFT

John Alexander McCorquodale
Department of Civil and Environmental Engineering
University of New Orleans
Lakefront, New Orleans
LA 70148-0001

Maciej Tomczak
Great Lakes Institute for Environmental Research
University of Windsor
304 Sunset Ave., Windsor, Ontario
N9B 3P4

Great Lakes Institute for Environmental Research
November, 1997

INTRODUCTION

The GIS files on the attached CD-ROM are in MapInfo format. Although several other applications were used to create these outputs, only native MapInfo files are needed by the user. To manipulate the files, MapInfo Professional version 3.5 or higher is required. It is, however, possible to use less expensive MapInfo Desktop for limited viewing and analysis of the data. MapInfo files are also compatible with any custom application created with MapInfo MapX OCX, MapInfo Runtime routines as well as Mapinfo ProServer network server application. For more information please contact MapInfo Corporation at *www.mapinfo.com*. The files can be translated to other GIS formats such as ArcView or ArcInfo with appropriate translators.

COMPONENTS

Each MapInfo table consists of several linked files. One needs to be concerned only with files with `.TAB` extension for they contain all the necessary references and links to other files. Files with `.TAB` extension are referred to as *tables*.

The table names consists of three parts separated by underscore:

1) The first part describes the category of data. There are 4 categories:
    - **3D** - 3D model outputs, inputs and derivatives
    - **IPX** - IPX model outputs, inputs and derivatives
    - **MEASURED** - cores, interpolations, Roxann survey, sediment score, etc.
    - **MISC** - air photos, satellite-derived imagery, shorelines, outfalls etc.
2) The second part of the table name describes the content of the file
3) The third part is based on types of objects that the file consists of. The possible objects include, but are not limited to: POINT, REGION, LINE, CONTOUR, LEGEND, VECTOR and BITMAP.

For example: table named `3D_BATHYMETRY_CONTOURS.TAB` is in 3D model category, describes bathymetry of the river and shows it as interpolated contours i.e. covers the river with regions of specified depth limits.

A set of related tables can be combined and saved as a WORKSPACE. The following workspaces are included on the CD-ROM for convenience. Other workspaces can be created by the user as required. The following eight workspaces can be used as a quick overview of the entire project.

`SLIDE01.WOR`	Satelite imagery, air photo, shoreline
`SLIDE02.WOR`	Total Sediment Quality Score (TSQS), AOC #1 boundary, sediment quality regions (IDW)
`SLIDE03.WOR`	Roxann corrections to TSQS
`SLIDE04.WOR`	Sediement thickness, volumes, HCB distribution, mass (with and without Roxann corrections)
`SLIDE05.WOR`	GLIER biomonitoring stations, HCB in clams and water
`SLIDE06.WOR`	Models spatial extent comparison

SLIDE07.WOR 3D model output example
SLIDE08.WOR Synthetic IPX output example

Other workspaces include:

OVERVIEW_BASEMAPS.WOR
3DMODEL_BATHYMETRY.WOR
3DMODEL_COLEDRAIN.WOR
3DMODEL_SHEAR.WOR
IPX_LONG-AND-SHORT_A1999THEME.WOR
MEASURED_CORES_CONTOURS.WOR
MEASURED_HCB_DEPTHAVERAGE.WOR
MEASURED_HCB-AND-SEDTHICKNESS.WOR
MEASURED_HCB-MASS-VOLUME.WOR
MEASURED_ROXANN-CORRECTED_SEDIMENT.WOR

Note: It is usually a good idea to close all the tables (FILE>CLOSE ALL) before opening a new workspace.

Each MapInfo table may consists of several objects (records) and fields (columns). The following is a short description of main GIS components included on the CD-ROM. The data are described under three (3) heading levels. Heading level one describes the category; heading level two describes the table (file); headings number three consists of the columns (fields) names within each table. Comments and usage notes are included under headings as appropriate.

1. CATEGORY: 3D

1.1 TABLE: 3D_ALL-OUTPUTS_POINTS

All original inputs and outputs of University of Windsor 3D hydrodynamic model. The data pertain to the controids of model's cells. The model consists of 1,958 cells (boundary half-cells are excluded).

1.1.1 ROWIDX
Internal table index

1.1.2 CELL_ID
Scalar index - unique for each cell

1.1.3 I
Transect index

1.1.4 J
Cell index within a transect

1.1.5 LAT_N_DEG
Latitude in decimal degrees

1.1.6 LONG_W_DEG
Longitude in decimal degrees

1.1.7 UTM_ZONE_NAD83
UTM zone

1.1.8 UTM_EASTING_M
UTM-NAD83 easting in meters

1.1.9 UTM_NORTHING_M
UTM-NAD83 northing in meters

1.1.10 BED_ELEVATION_M
River bed elevation in meters with respect to the International Great Lakes Datum

1.1.11 DEPTH_M
Depth in meters with respect to the low water datum

1.1.12 POROSITY_0_5
Porosity of sediments 0 to 5 cm

1.1.13 POROSITY_5_25
Porosity of sediments 5 to 25 cm

1.1.14 DENSITY_0_5
Density of sediments 0 to 5 cm

1.1.15 DENSITY_5_25
Density of sediments 5 to 25 cm

1.1.16 PERCENT_FINES_O_5
Percent fines (<63 μm), 0 to 5 cm

1.1.17 PERCENT_FINES_5_25
Percent fines (<63 μm), 5 to 25 cm

1.1.18 SHEAR_Q10
Shear stress at river bed in N/m^2 at lower decile flow (4750 m^3/s)

1.1.19 SHEAR_Q50
Shear stress at river bed in N/m^2 at median flow (5520 m^3/s)

1.1.20 SHEAR_Q90
Shear stress at river bed in N/m^2 at upper decile flow (6240 m^3/s)

1.1.21 RMAX_Q10
Potential sediment flux in $g/m^2/s$ at lower decile flow if sediments are unconsolidated

1.1.22 RMIN_Q10

Potential sediment flux in g/m^2/s at lower decile flow if sediments are consolidated or armored

1.1.23 RMAX_Q50
Potential sediment flux in g/m^2/s at median flow if sediments are unconsolidated

1.1.24 RMIN_Q50
Potential sediment flux in g/m^2/s at median flow if sediments are consolidated or armored

1.1.25 RMAX_Q90
Potential sediment flux in g/m^2/s at upper decile flow if sediments are unconsolidated

1.1.26 RMIN_Q90
Potential sediment flux in g/m^2/s at lower decile flow if sediments are consolidated or armored

1.1.27 V_Q10_M_S
Magnitude of surface velocity vector at lower decile flow in m/s

1.1.28 V_Q10_DEG
Azimuth of surface velocity vector at lower decile flow in decimal degrees

1.1.29 V_Q50_M_S
Magnitude of surface velocity vector at median flow in m/s

1.1.30 V_Q50_DEG
Azimuth of surface velocity vector at median flow in decimal degrees

1.1.31 V_Q90_M_S
Magnitude of surface velocity vector at upper decile flow in m/s

1.1.32 V_Q90_DEG
Azimuth of surface velocity vector at upper decile flow in decimal degrees

1.1.33 HCB_CD2ONLY_PPB
Depth average HCB concentration in water; contours in ppb due to 2g/d load from Cole Drain

1.1.34 HCB_CD2ONLY_PLUSMDL_PPB
Depth average HCB concentration in water; contours in ppb due to 2g/d load from Cole Drain plus assumed background concentration of 0.00004 ppb

1.1.35 HCB_CDONLY_UNITLOAD_PPB
Depth average HCB concentration in water contours in ppb due to “unit load” (1g/d) from Cole Drain (no background)

1.2 TABLE: 3D_BATHYMETRY_CONTOURS

Interpolated (contoured every 1m) depth from 3D model cells. Depths are in meters and are measured relative to low water datum.

1.2.1 DEPTH_LOWER_M
Lower bound for a contour in meters

1.2.2 DEPTH_UPPER_M
Upper bound for a contour in meters

1.2.3 DEPTH_AVERAGE_M
Average water depth for a contour

1.3 TABLE: 3D_BATHYMETRY_LEGEND

Legend for the table above. It has to be opened in a separate mapper window.

1.4 TABLE: 3D_COLE-DRAIN_CONTOURS

Depth averaged water concentration of HCB due to Cole Drain load only. Assumed background concentration at lower Lake Huron (also MDL) is

0.00004ppb. Provincial Water Quality Objective is 0.0065ppb. RAP yardstick is 0.001ppb. RAP desired yardstick is 0.0001ppb.

1.4.1 HCB_CD2_LOWER_PPB
Lower bound for a contour due to 2g/d load from Cole Drain in ppb. Includes background.

1.4.2 HCB_CD2_UPPER_PPB
Upper bound for a contour due to 2g/d load from Cole Drain in ppb. Includes background.

1.4.3 HCB_CD2_AVG_PPB
The average concentration for a contour due to 2g/d load from Cole Drain in ppb. Includes background.

1.4.4 HCB_CD_UNITLOAD_PPB
HCB concentration for a contour due to unit load from Cole Drain (1g/d). No background included.

1.4.5 HCB_CD_UNITLOAD_PLUSMDL_PPB
HCB concentration for a contour due to unit load from Cole Drain (1g/d). With background of 0.00004ppb superimposed.

1.5 TABLE: 3D_COLE-DRAIN_LEGEND

Legend for the table above. It has to be opened in a separate mapper window.

1.6 TABLE: 3D_SHEAR-Q50_CONTOURS

Interpolated shear stress at the bottom and corresponding potential sediment flux for consolidated (τ_{cr}=0.6N/m^2) and unconsolidated (τ_{cr}=0.12N/m^2) sediments. Median flow (Q50) only. (Q10=4,750m^3/s, Q50=5,520m^3/s,Q90=6,240m^3/s).

1.6.1 SHEAR_STRESS_LOWER_N_M2
Lower bound of the river bed shear stress for a contour at Q50 in N/m^2.

1.6.2 SHEAR_STRESS_UPPER_N_M2
Upper bound of the river bed shear stress for a contour at Q50 in N/m^2. No navigation effect.

1.6.3 SHEAR_STRESS_AVG_N_M2
Average river bed sheer stress for a contour at Q50 in N/m^2. No navigation effect.

1.6.4 RMAX_AVG_G_M2_S
Average potential sediment flux for a contour in g/m^2/s at median flow if sediments are unconsolidated. No navigation effect.

1.6.5 RMIN_AVG_G_M2_S
Average potential sediment flux in g/m^2/s at median flow if sediments are consolidated or armored. No navigation effect.

1.6.6 AREA_M2
Area of each contour region in m^2.

1.6.7 SHEAR_STRESS_LOWER_SHIPS_N_M2
Lower bound of the river bed shear stress for a contour at Q50 in N/m^2. Increased due to ship traffic.

1.6.8 SHEAR_STRESS_UPPER_SHIPS_N_M2
Upper bound of the river bed shear stress for a contour at Q50 in N/m^2. Increased due to ship traffic.

1.6.9 RMAX_AVG_G_M2_S
Average potential sediment flux for a contour in g/m^2/s at median flow if sediments are unconsolidated. Navigation effects included.

1.6.10 RMIN_AVG_G_M2_S

Average potential sediment flux in $g/m^2/s$ at median flow if sediments are consolidated or armored. Navigation effects included.

1.7 TABLE: 3D_SHEAR-Q50_LEGEND

Legend for the table above. It has to be opened in a separate mapper window.

1.8 TABLE: 3D_VELOCITY-SURF-Q50_VECTOR

Surface velocity for median flow in form of vectors for the centroid of each cell of 3-D model

1.8.1 AZIMUTH_Q50_DEG

Azimuth in decimal degrees; clockwise from true north.

1.8.2 MAGNITUDE_Q50_M_S

Magnitude of the velocity vector in m/s.

2. CATEGORY: IPX-MODEL

2.1 TABLE: IPX_ALL-OUTPUTS_REGIONS

All outputs attached to the IPX segments. Four vertical layers (three sediment layers, one water column). The long model consists of 363 cells and covers the entire river. The short model consists of 163 cells and covers the section of the river from Lake Huron to about 3.5 km past Stag Island.

The original outputs were coded according to the following key: Each output (record in the table) consist of five parts separated by a hyphen:
`XX-XXX-XXX-XXXX-X`

The five parts signify the following:

1. MEDIUM (WC=water column, S1=top sediment, S2=deep sediment, S3=deepest sediment)
2. TIME (T00=now, T05=5 years from now, T10=10 years from now)
3. ACTION (NOA=all sediments available including “400ppm cell”, MIN=two worst cells blanked off, MAX=six cells blanked off
4. COLE DRAIN LOAD (CD00=no load, CD02=2g/day, CD20=20g/day
5. SHIPS (S=with ships, N=no ships)

The following datasets are all original IPX outputs and pertain to the “short” model except for two records (`WC-T00-NOA-CD02-S` and `WC-T10-NOA-CD02-S`) that cover the entire “long” model. The records in the table are listed below.

WC-T00-NOA-CD02-S	S1-T00-NOA-CD02-S
S2-T00-NOA-CD02-S	S3-T00-NOA-CD02-S
WC-T00-NOA-CD00-S	S1-T00-NOA-CD00-S
S2-T00-NOA-CD00-S	S3-T00-NOA-CD00-S
WC-T00-NOA-CD20-S	S1-T00-NOA-CD20-S
S2-T00-NOA-CD20-S	S3-T00-NOA-CD20-S
WC-T00-NOA-CD02-N	S1-T00-NOA-CD02-N
S2-T00-NOA-CD02-N	S3-T00-NOA-CD02-N
WC-T00-MIN-CD02-S	S1-T00-MIN-CD02-S
S2-T00-MIN-CD02-S	S3-T00-MIN-CD02-S
WC-TOO-MAX-CD02-S	S1-TOO-MAX-CD02-S
S2-TOO-MAX-CD02-S	S3-TOO-MAX-CD02-S
WC-T05-NOA-CD02-S	S1-T05-NOA-CD02-S
S2-T05-NOA-CD02-S	S3-T05-NOA-CD02-S
WC-T05-MIN-CD02-S	S1-T05-MIN-CD02-S
S2-T05-MIN-CD02-S	S3-T05-MIN-CD02-S
WC-T05-MAX-CD02-S	S1-T05-MAX-CD02-S
S2-T05-MAX-CD02-S	S3-T05-MAX-CD02-S
WC-T10-NOA-CD02-S	S1-T10-NOA-CD02-S
S2-T10-NOA-CD02-S	S3-T10-NOA-CD02-S
WC-T10-MIN-CD02-S	S1-T10-MIN-CD02-S
S2-T10-MIN-CD02-S	S3-T10-MIN-CD02-S
WC-T10-MAX-CD02-S	S1-T10-MAX-CD02-S
S2-T10-MAX-CD02-S	S3-T10-MAX-CD02-S

2.2 *TABLE:* ***IPX_SYNTHETIC_REGIONS***

It has been suggested that the original IPX model outputs overestimated the importance of ship traffic as well as the concentration of HCB in the most contaminated sediment segment (underestimating contributions from the Cole Drain at the same time). The model was also too complex to allow for evaluation of other, user defined scenarios in real time. In addition, the coverage of the short model (which is the coverage of most of the original scenarios) is too limited to make predictions for water quality as it enters the delta. The model has been therefore disassembled into parameters that can be recombined along with corrected source terms to refine scenarios as well as to produce new ones at user's convenience. All synthetic outputs have the coverage of the "long" model.

The model relies on superposition of concentrations due to three sources: the most contaminated cell (c^i_{400}), all other distributed sediments (c^i_{REST}) and Cole Drain (c^i_{CD}). Each cell of the LONG IPX model (363 cells) has a unique and different set of five "k" controlling parameters attached to it. The superscript i=1,2,.....,363 signifies the cell location.

$$c^i_{all} = \underbrace{\frac{1}{\left[k^i_{noships} + \frac{L_{\%ships}}{100}\cdot\left(1-k^i_{noships}\right)\right]}\cdot\left[k^i_{400unit}\cdot L_{400}\left(1-0.0285\cdot t\right)\right]}_{c^i_{400}} +$$

$$+\underbrace{\frac{1}{\left[k^i_{noships} + \frac{L_{\%ships}}{100}\cdot\left(1-k^i_{noships}\right)\right]}\cdot\left[k^i_{rest0} - \left(\frac{k^i_{rest0}-k^i_{rest10}}{\ln(11)}\right)\cdot\ln(t+1)\right]}_{c^i_{REST}} +$$

$$+\underbrace{\left[k^i_{CDunit}\cdot L_{CD}\right]}_{c^i_{CD}}$$

Note: This equation is saved in ASCII form as `IPX_EQUATION.TXT` and can be pasted to GIS EXPRESSION dialog box to produce desired outputs.

Please note that all "k" parameters are NOT user adjustable and are functions of the locations of model segments. The "k" parameters can be described as follows:

- $k_{noships}$ is a reduction factor due to no navigation.
- $k_{400unit}$ is a factor describing contribution of the most contaminated cell ("400 cell") to each water cell concentration due to unit (1ppm) concentration in top sediments in the "400 cell" location at time zero.
- k_{rest0} is a concentration factor due to all sediments other than "400 cell" at time 0

k_{rest10} is a concentration factor due to all sediments other than “400 cell” at time 10 years later.

k_{CDunit} is a factor for each WC cell “i” due to Cole Drain unit load (1g/day)

The model consists of four (4) user adjustable parameters which can be modified by the user to produce scenarios other than those already considered. The user adjustable parameters are:

$L_{\%ships}$ is the percent of shipping in %. (100% corresponds to 12 ships per day, 80s passage time and constant traffic at all seasons).

L_{CD} is the actual load from Cole Drain in g/day.

L_{400} is the actual concentration in the most contaminated cell in ppm; my best estimate is about 50ppm.

t is time in years (limit: 0-10 years).

The output from the model (c_{all}^{i}) is in ppb in water column.

The following scenarios are already included in the table as records. Scenarios assume the potential remediation occurring in the year 1999.

2.2.1 A-1999
No Action.

2.2.2 A-2010
No Action, 10 years later.

2.2.3 B-1999
Virtual elimination of Cole Drain loads.

2.2.4 B-2010
Virtual elimination of Cole Drain loads, 10 years later.

2.2.5 C-1999
Removal by environmental dredging the RED area of AOC No. 1.

2.2.6 C-2010
Removal by environmental dredging the RED area of AOC No. 1, 10 years later.

2.2.7 D-1999
Removal by environmental dredging the entire AOC No. 1.

2.2.8 D-2010
Removal by environmental dredging the entire AOC No. 1, 10 years later.

2.2.9 E-1999
Removal by environmental dredging the RED area of AOC No. 1 and virtual elimination of Cole Drain loads.

2.2.10 E-2010
Removal by environmental dredging the RED area of AOC No. 1 and virtual elimination of Cole Drain loads, 10 years later.

2.2.11 F-1999
No action with no ship traffic.

2.2.12 F-2010
No action with no ship traffic, 10 years later.

2.2.13 G-1999
Reduction of Cole Drain by 50%.

2.2.14 G-2010
Reduction of Cole Drain by 50 %, 10 years later.

2.2.15 H-1999

Reduction of Cole Drain by 50% and removal by environmental dredging the RED area of AOC No. 1.

2.2.16 H-2010

Reduction of Cole Drain by 50% and removal by environmental dredging the RED area of AOC No. 1, 10 years later

Other fields of importance in this table include:

2.2.17 PIPE

IPX model transects are 4 to 5 segments wide across the river. They were divided into 5 “pipes” depending on their proximity to Canadian or US shoreline.

2.2.18 DISTANCE_FROM_LHURON_KM

This is the straight line distance from the centroid of the upstream-most cell of the model (first NW cell at US shore) to the centroid of each cell of the model. It roughly represents the location of each cell of the model in downstream direction along the river.

2.2.19 IF_SHORT_1

This is a variable that can be used in a conditional statement to differentiate between “short” and “long” versions of IPX model. Cells of short model are assigned a value of 1, long model cells have value of zero.

3. CATEGORY: MEASURED

"Measured" is a loosely coined term. Files included in this category do not necessarily have to be field collected. They can also be derived or interpolated such as Sediment Quality Score.

3.1 TABLE: MEASURED_ALL-CHEMICALS-TOP_POINT

This is the table used in BEAK report. It consists of all chemical and physical parameters for top 5 cm of sediment. Includes LELs and SELs if applicable. Note: some reported values are geometric averages of replicates. Please refer to BEAK report for the description of fields.

3.2 TABLE: MEASURED_GLI-BIOMONITORING_POINT

Locations for sampling and biomonitoring sites as described in biomonitoring component of the report.

3.2.1 STATION#

3.2.2 DESCRIPTION

3.2.3 LONGITUDE

3.2.4 LATITUDE

3.2.5 HCB_TISSUE_PPB

Measured HCB concentration in clam tissue, in ppb, wet basis

3.2.6 HCB_WATER-PPB

Clam-derived HCB concentration in water column, in ppb. It is assumed that the equilibrium is reached in less than a week, that HCB is accumulated in lipid and that HCB K_{ow}=5.5.

3.3 TABLE: MEASURED_HCB-ALLDEPRHS_POINT

This table contains all the core samples collected in 1994 with minimum, maximum and geometric averages of replicates for each layer. It also includes depth weighted average for each core.

3.4 TABLE: MEASURED_HCB-ALL_VORONOI

This table is a derivative of the previous table. It extends the core depth weighted average concentration for HCB to the natural polygons (Voronoi diagrams) around each core. Since the shape and location of each polygon are functions of the cores' locations only, same polygons can be used for other core-derived parameters to represent their spatial distribution.

3.5 TABLE: MEASURED_IDW2-55_CONTOURS

The Inverse Distance Weighing (optimal) interpolated Sediment Quality Score with exponent of 2 and anisotropy ratio of 5.5 as described in the Designation of Sediment Quality Zones component report.

3.5.1 LOWER_SCORE

Lower Total Quality Score for the contour

3.5.2 UPPER_SCORE

Upper Total Quality Score for the contour

3.5.3 AREA_M2

Area of the contour region in m^2

3.5.4 SEDIMENT_THICKNESS_CM

Weighted sediment thickness “under” each contour region based on MEASURED_SEDIMENT-THICKNESS-AVG_CONTOUR table in centimeters.

3.5.5 SEDIMENT_VOLUME_M3

Weighted sediment thickness “under” each contour region based on MEASURED_SEDIMENT-THICKNESS-AVG_CONTOUR table and area of each contour in m^2.

3.5.6 HCB_GAVERAGE_KG

Weighted mass of HCB “under” each contour polygon in kg.

3.5.7 SEDIMENT_THICKNESS_ROXANN_CM

As above except the sediment thickness at the acoustically “hard” areas is set to zero.

3.5.8 SEDIMENT_VOLUME_ROXANN_M3

As above with acoustically “hard” areas set to zero.

3.5.9 HCB_GAVERAGE_ROXANN_KG

Weighted mass of HCB “under” each contour polygon corrected for Roxann-derived “hard” areas.

3.6 TABLE: MEASURED_IDW2-55-ROXANN_CONTOURS

As above with acoustically hard sediments upgraded to higher score. For discussion see Designation of Sediment Quality Zones component report.

3.6.1 LOWER_SCORE
3.6.2 UPPER_SCORE
3.6.3 AREA_M2
3.6.4 WEIGHTED_SEDIMENT_THICKNESS_CM
3.6.5 WEGHTED_SEDIMENT_VOUME_M3

3.7 TABLE: MEASURED_IDW2-55_LEGEND

Legend for both IDW2-55 tables above.

3.8 TABLE: MEASURED_ROXANN94_POINTS

The Roxann survey for upper St. Clair River from 1994. Includes actual classification (8 classes) as well as binary derivative (hard or soft). Over 26,000 points. Note: the map, as all other maps, is in UTM-NAD83 projection. The original UTM coordinates reported by Rukavina are in NAD27 datum.

3.8.1 EASTING_NAD27
3.8.2 NORTHING_NAD27
3.8.3 EASTING_NAD83_DERRIVED
3.8.4 NORTHING_NAD83_DERRIVED
3.8.5 CLASS
3.8.6 BINARY_CLASS
3.8.7 DEPTH_M
3.8.8 TIME
3.8.9 DATE

3.9 TABLE: MEASURED_ROXANN-BINARY_CONTOUR

Interpolated binary sediment file for the study area based on binary sediment classes from the table above.

3.9.1 LOWER_SOFTNESS
3.9.2 UPPER_SOFTNESS
3.9.3 AREA_M2
3.9.4 BINARY_SEDIMENT_TYPE
3.9.5 WEIGHTED_SEDIMENT_THICKNESS
3.9.6 SEDIMENT_VOLUME

3.10 TABLE: MEASURED_ROXANN-BINARY_LEGEND

Legend for the above.

3.11 TABLE: MEASURED_SCORE_POINT

Point Sediment Quality Score for each of 39 stations from 1994 survey. Includes component scores.

3.11.1 STATION
3.11.2 OLD_STATION_TRANSECT
3.11.3 DESCRIPTIVE_LOCATION
3.11.4 CHEMISTRY_SCORE
3.11.5 TOXICITY_SCORE
3.11.6 BENTHIC_SCORE
3.11.7 TOTAL_SCORE
3.11.8 EASTING
3.11.9 NORTHING

3.12 TABLE: MEASURED_SCORE_LEGEND

Legend for the table above. It has to be opened in a separate mapper window.

3.13 TABLE: MEASURED_SEDIMENT-THICKNESS_POINTS

The original sediment thickness as measured by divers. 121 samples total.

3.13.1 TRANSECT
3.13.2 EASTING
3.13.3 NORTHING
3.13.4 DIST_FROM_SHORE
3.13.5 SED_THICKNESS_MIN
3.13.6 SED_THICKNESS_MAX
3.13.7 SED_THICKNESS_AVG
3.13.8 WATER_DEPTH

3.14 TABLE: MEASURED_SEDIMENT-THICKNESS-AVG_CONTOUR

Interpolated sediment thickness for the study area based on the table above.

3.14.1 LOWER_THICKNESS_CM

3.14.2 UPPER_THICKNESS_CM
3.14.3 AVERAGE_THICKNESS_CM
3.14.4 AREA_M2
3.14.5 VOLUME_M3
3.14.6 HCB_DRY_PPB

Weighted concentration of HCB in each of the contour regions in ppb - dry basis.

3.14.7 HCB_WET_MICROGRAM_M3

Converted HCB concentration in $\mu g/m^3$ of wet sediment.

3.14.8 HCB_MASS_KG

Mass of HCB in kg "under" each of the sediment thickness contours.

3.15 TABLE: MEASURED_SEDIMENT-THICKNESS-ROXANN_CONTOUR

As above, with acoustically "hard" areas removed.

3.16 TABLE: MEASURED_SEDIMENT-THICKNESS-AVG_LEGEND

Both sediment thickness contour files share the same legend.

4. CATEGORY: MISCALENEOUS

4.1 TABLE: MISC_AERIAL1_BITMAP

Geo-referenced air photo of upper St. Clair river, 1990. 2 m ground resolution.

4.2 TABLE: MISC_AOC-TRIMNEW_REGION

A region based on sediment thickness measurements, shoreline, uppermost and lowest transect in 1994 survey to which all the interpolations of study area were trimmed. Larger than in original draft component report.

4.3 TABLE: MISC_COLE-DRAIN_POINT

Approximate location of Cole Drain extended pipe discharge.

4.4 TABLE: MISC_DOW-CLEANUP96_REGION

Approximate area of DOW environmental dredging near Cole Drain. Likely inaccurate.

4.5 TABLE: MISC_DOW-CLEANUP96-MON_POINTS

The location of MOEE monitoring stations during the 1996 Cole Drain area contaminated sediment cleanup by DOW Chemical.

4.6 TABLE: MISC_LANDSAT_BROVEY

Landsat-5 satelite derived imagery acquired on June 13, 1993. "Natural" colour image created with Brovey Transform of bands 1,2,4 and 5 (two visible, two near infrared). This transformation allows for differentiating green vegetation from cultivated land, water features, infrastructure etc.

4.7 TABLE: MISC_LANDSAT_6-ALL

Thermal infrared band (band 6: 10.4-12.5 µm) for the entire scene. Higher radiant temperature is shown in red, lower in blue. Note that each thermal image uses different temperature scale.

4.8 TABLE: MISC_LANDSAT_6-LAND

Thermal infrared band (band 6: 10.4-12.5 µm) for the land portion of the image. Higher radiant temperature is shown in red, lower in blue. Note that each thermal image uses different temperature scale.

4.9 TABLE: MISC_LANDSAT_6-WATER

Thermal infrared band (band 6: 10.4-12.5 µm) for the water portion of the image. Higher radiant temperature is shown in red, lower in blue. Note that each thermal image uses different temperature scale.

4.10 TABLE: MISC_LIS-STATIONS_POINTS

Location of Pollutech/LIS sampling stations as obtained from Pollutech. No actual data attached.

4.11 TABLE: MISC_NPRI93_POINTS

National Pollutant Release Inventory database for all provinces, 1993.

4.12 TABLE: MISC_OUTFALLS-INTAKES_POINTS

Outfalls and intakes to St. Clair River with flows from Geomatics. Possibly outdated.

4.13 TABLE: MISC_SHORELINE_REGION

Combined shoreline of entire St. Clair River. Accurate to ~10m near AOC #1 study area. Less accurate elsewhere.