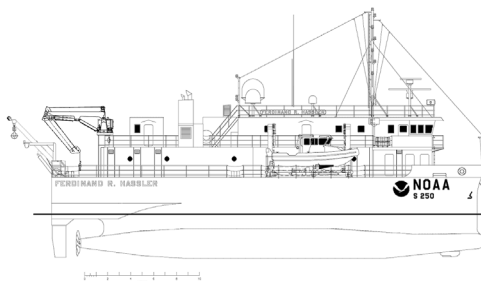




Practical Polygon Planning/Putting your Polygons in Perspicuous Places



Standard Operating Procedure

REVISION HISTORY

REV	Description of Change	Editor	Effective Date
0	Compilation of existing polygon SOPs	Eli Smith	05/18/2015
1	Reworked for HIPS and SIPS	Chris Palmer	09/15/2015
2	Reworked for CARIS 10.4 & Update w/ exporting to Hypack	Michelle Levano	05/03/2018
4	Reworked for CARIS 11.3 and General Updates	Charles Corea	05/03/2021
5	Reviewed	LT Debrousse	11/19/2023

Scope

This document covers methods and means of producing polygons for the purpose of conducting efficient and safe hydrographic survey. The end product will be a polygon plan for the division of survey work amongst the launch and Hassler. It serves to outline both the method by which polygons are produced, as well as guide the user in creating appropriately sized and shaped polygons in safe working areas.

This SOP covers polygon planning theory, creating polygons, and exporting.

Introduction

Why Polygons?

The polygon plan serves to divide the survey into smaller sections, around which operations can be planned and coordinated. Boat sheets with the polygons are made to communicate and track the daily acquisition plan to the launch crew, OPS, the bridge, and the CO. The polygons are also displayed in Hypack with the real time acquired bathymetry so the launch crew can be assured that they are collecting their assigned data.

Safety in Polygon Planning

Launches should not operate in exceptionally shallow or completely uncharted areas, nor should they operate over significant **DTON** features identified in the project Composite Source File. ***This exposes them to significant danger.*** Nearshore polygons are generally planned for survey operations inside the blue shaded part of the chart, usually the 10-fathom contour inward.



Efficiency and Other Considerations for Polygon Planning

Depth Ranges:

Different parts of a survey require different approaches to operations. Polygons should be designed around the depth of water and the shape of the area of operations.

For example, a deep area in open water can have a relatively large polygon set up for it, as the width of the swath will be wider. Conversely, a shallow (<20 meters) near-shore area should have smaller polygons created in it, since the launch will likely be operating more cautiously, both for safety and coverage.

The resolution depth ranges make useful criteria for splitting up polygons. Crews will need to make a matrix that is roughly the same as the resolution for the depth range being acquired, so they can identify holidays during collection.

When planning your polygons remember to create them with depth resolutions in mind. For example, plan your inshore "red" polygons to cover areas that are less than 20 meters.. Keep your next set of polygons between approximately 20 and 50 meters. This will allow us to acquire at the proper resolution and find holidays as they occur in the field. Offshore polygons should be "blue" polygons. The following table should be used as a guide:

Depth Range (m)	Resolution (m)
0-20	1
18-40	2
36-80	4
72-160	8
144-320	16

Shape:

There is no hard and fast rule for size limits, or the polygon shape – they do NOT need to be boxes. In fact, avoid a cube shape. Make your polygon longer in the dimension you want the boat to run (if running N to S will be most efficient with the contours, make your polygon longer in the N to S dimension).

Polygons should follow the contours. The launch will acquire better data running parallel to contours so that constant range changes can be avoided.

Try to plan your polygons such that the boat will be running offshore to nearshore.

As a starting point, keep any dimension to approximately 3,000 meters long. There should be multiple polygons for one boat to run in a day – not just one or two big ones.

Draw your polygons with a little bit of overlap, about 20-30 meters.

In a channel that you could fill in with one polygon (shore to shore), consider breaking it down into two polygons such that you have a straight edge in the middle of the channel. This provides the launch with a straight baseline, and encourages them to run offshore to nearshore.

Time:

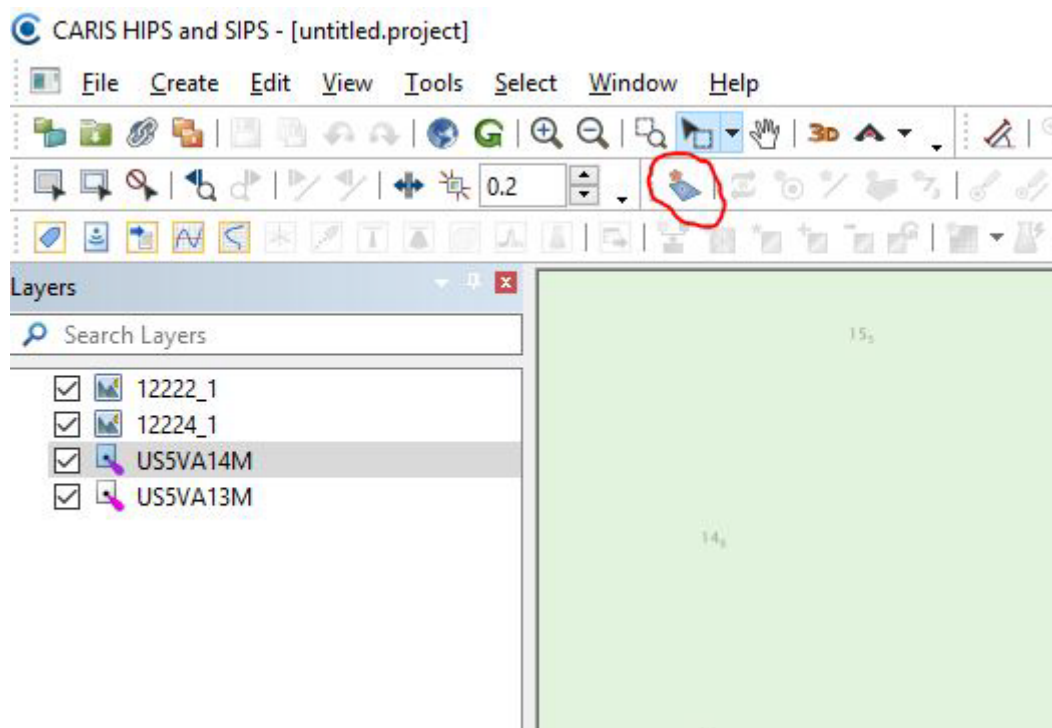
Making polygons that are able to be completed within *2-4 hours* is a good rule of thumb; too many polygons can be tedious to manage. Knowing how long your polygons will take to complete will give you a good way to track how much acquisition is left on the sheet.

Procedure

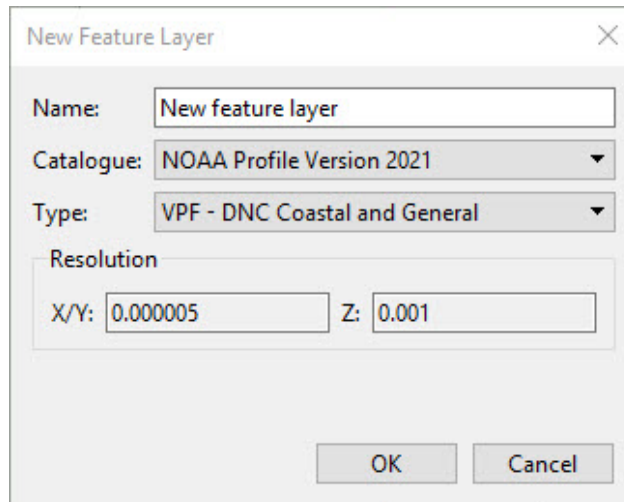
CARIS HIPS and SIPS is the primary means by which polygons are produced. Prior to doing so, ensure that the following items are available in a known location:

- A) Open HIPS, and select File → Open...
 - a. Most recent largest-scale chart containing the survey area.
 - b. Sheet limits
 - c. Final Feature File

Select the icon labeled **New Feature Layer**.



Make the following selections and name your feature layer.



The 'New Feature Layer' dialog box is shown. It has the following fields and options:

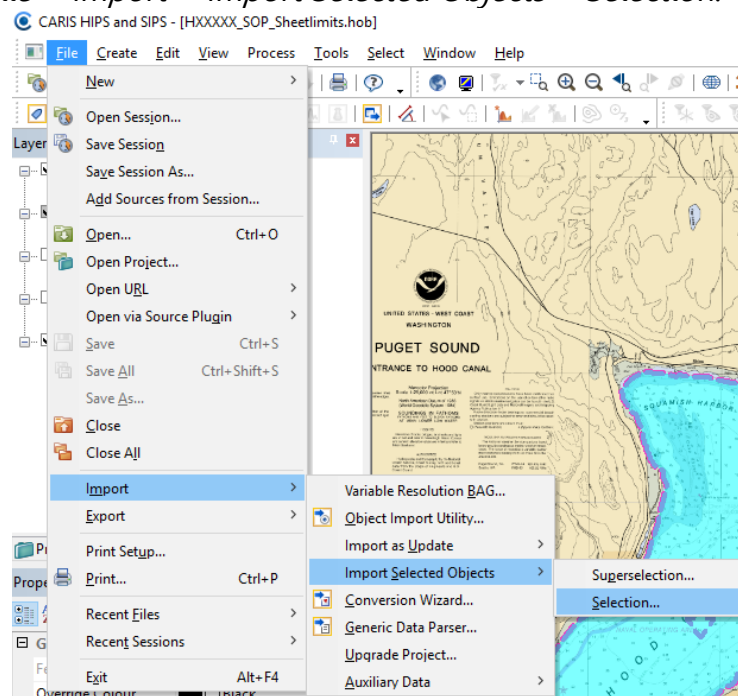
- Name:** New feature layer
- Catalogue:** NOAA Profile Version 2021
- Type:** VPF - DNC Coastal and General
- Resolution:**
 - X/Y: 0.000005
 - Z: 0.001
- Buttons:** OK, Cancel

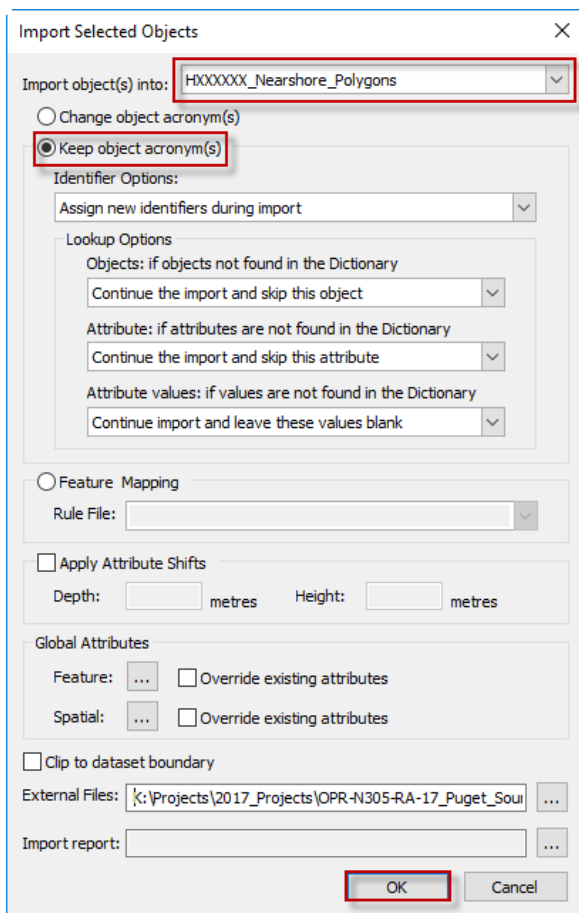
This will create a **HOB** file. You'll be making one HOB file for **nearshore polygons** and another for **offshore polygons**, so repeat these steps for creating an Edit Layer **twice**.

Place this file in your Polygons folder:

P:\Survey_Storage\00_PROJECTS\YYYY\OPR-A###-FH-
YY\Surveys\HXXXXX\Working_Survey_Files\Survey_Planning\Polygons

- F) Open your sheet limits.
- G) Select the child layer of your sheet limits in the *Layers* pane and click within your sheet limits. This allows you to import your sheet limits into your polygon feature layer by clicking *File > Import > Import Selected Objects > Selection*.





Select your polygon layer for the "Import object(s) into:" option. Then, select "Keep object acronym(s); the default settings for this are fine.

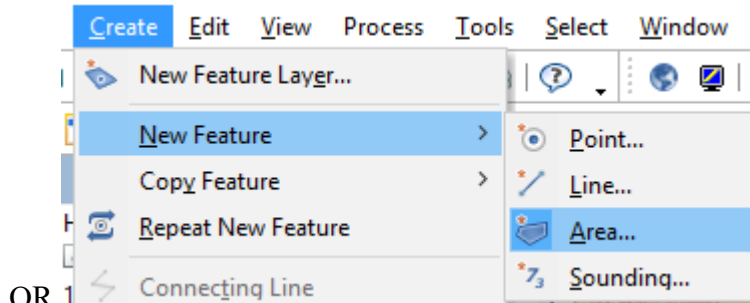
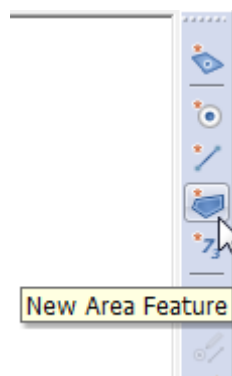
Making Polygons

Now that you have a basic understanding of how polygons should be laid out, and you have a file created with its spatial extents defined, you are ready to actually start drawing polygons.

- Select the child layer of the polygon file in the *Layers* window then select **New Area Feature**. This will bring up the **Select Object Acronym** window.

As a rule, to make polygons visible and more easily selected en masse use SLCON (Shoreline Construction) when creating polygons. Select this and click OK.

Complete the Shoreline Construction Attributes as shown below. Source Date=1, Source Indication=1, Remarks=1, Description=New



OR

Select Object Acronym

Object Acronym Filter:

SLCONS

Class Type Filter:

Geographic

Spatial Type Filter:

Area

Keyword Filter:

☐ Case

Object Acronym:

RUNWAY, Runway

SBDARE, Seabed area

SEADARE, Sea area/named water area

SILTANK, Silo/tank

SLCONS, Shoreline Construction

SLOGRD, Sloping ground

SMCFAC, Small craft facility

SNDWAV, Sand waves

SPLARE, Sea-plane landing area

SQIARE, Square

Dictionary Info:

Description: A fixed (not afloat) artificial structure attached to the land. Shoreline constructions are normally used for berthing and protection.

Remarks: Distinction: canal bank; coastline; lake shore; land area; pontoon; river bank;

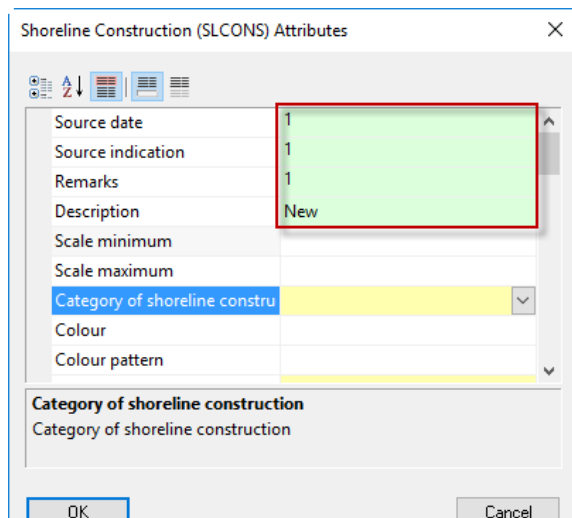
References: INT 1: IF 2, 4, 5, 6, 12-15, 18, 23, 33; M-4: 313.2,4; 321.1-4; 322.1-2; 324.1;

Spatial Types: Area; Line; Point

Attributes: SCAMIN SCAMAX CATSLC COLOUR COLPAT CONDTN

OK

Cancel



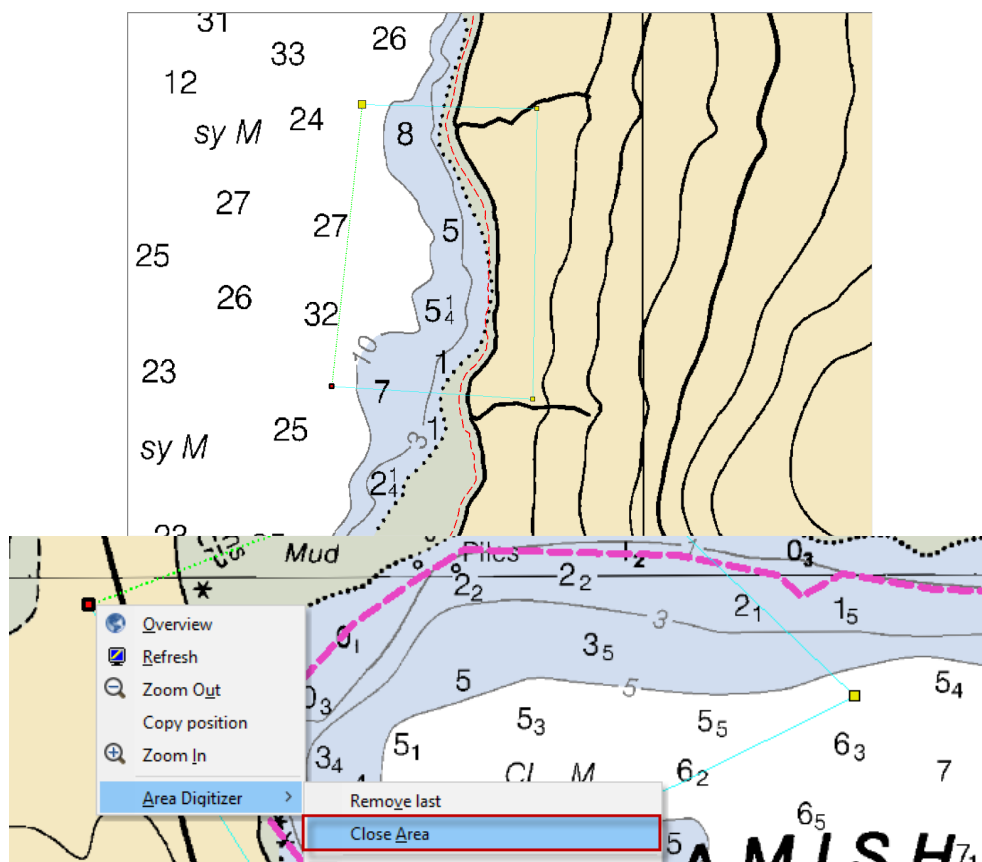
Attribute	Value
Source date	1
Source indication	1
Remarks	1
Description	New
Scale minimum	
Scale maximum	
Category of shoreline construction	New
Colour	
Colour pattern	

Category of shoreline construction
Category of shoreline construction


OK Cancel

The ensuing S-57 attribute window will have certain mandatory attributes highlighted in red (SORDAT, SORIND, descrp, and remrks). These can be filled in with 1's. None of these values are necessary for polygon creation.


B.) With those values filled in, the polygon creation cursor is now active. Draw an approximation of a box shape.

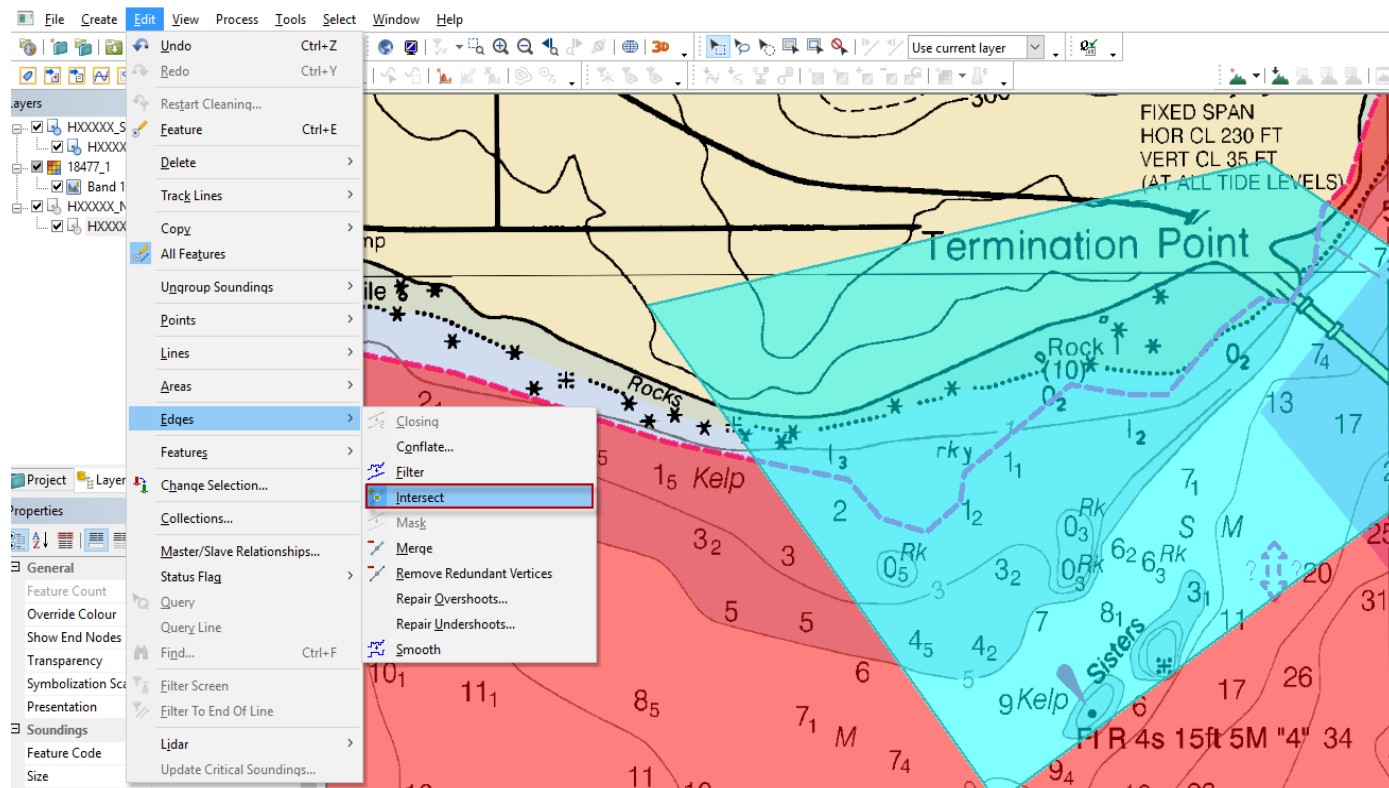



Right click, then Area Digitizer → Close Area, or simply hit the End button on your keyboard

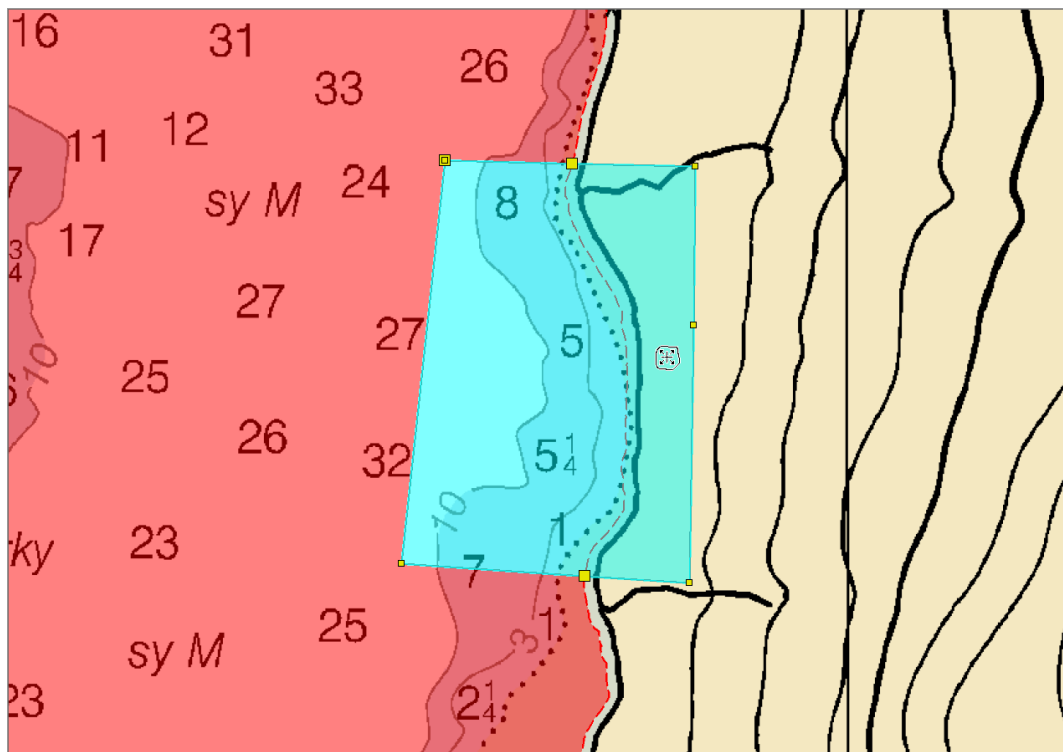
If you're not happy with the shape of your polygon, you can select Edit Feature. 

Additionally, you can add nodes by holding Ctrl and clicking where you'd like to insert the node. Nodes can also be deleted by selecting the one you don't like and pressing the delete key.

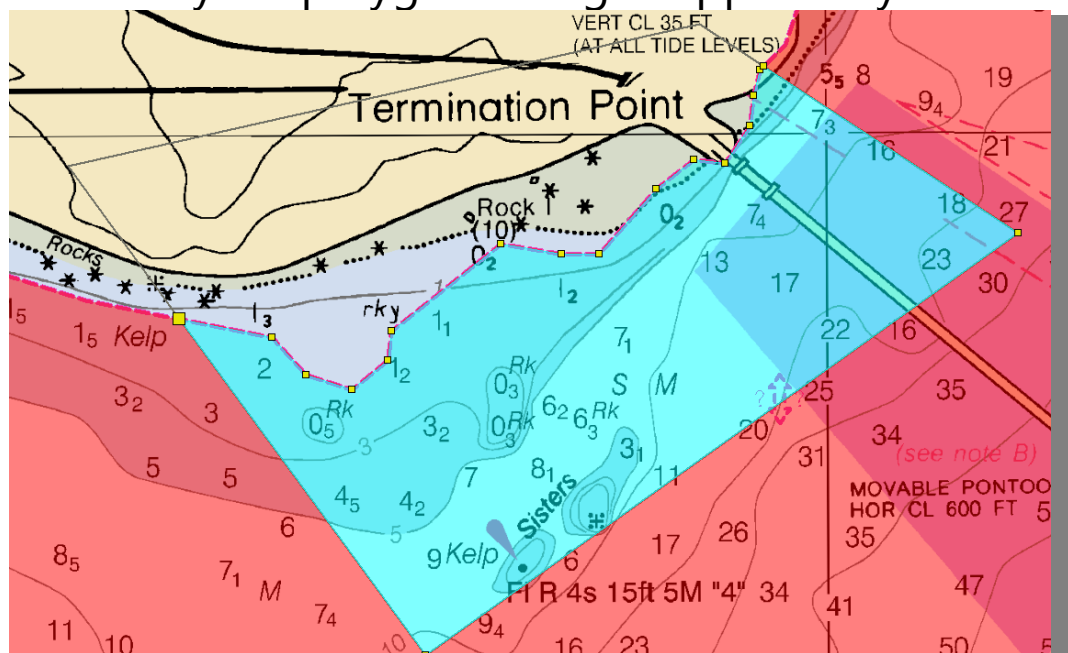
- C.) Now, holding Ctrl, select your new polygon (have polygon child layer selected in the *Layers* pane as well) and the sheet limits. Then navigate to Edit -> Edges and click Intersect (if this option is greyed out, ensure that you have Edit All Features  selected).




- D.) Select Edit Feature , then . Click within your polygon, but outside the sheet limits.



This will result in your polygon being snapped to your sheet limits.





E.) To create your next polygon, click Repeat Feature Class .

F.) Rinse and repeat until you have all your polygons finished. It is important to include a slight overlap among your polygons.

a.) Additionally, it is good practice to have your polygons extend a bit past your sheet limits in areas that are not shoreline. I.E. A sheet limit that borders another sheet or an area that may be surveyed in the future.

Naming Polygons

Polygons can be labeled various different ways (*Snagit* and *Powerpoint* would work too), but since we're already in CARIS and you know how to make a **New Feature Layer** and **New Area Features**, let's try this method out.

- A) With your newly created polygon shape files and chart(s) open, you will begin by creating a new feature layer. **Create → New Feature Layer**
- B) Save your feature layer somewhere that makes sense with a name that makes sense.
- C) Now you can start creating **New Area Features** within each of your polygons. Use the feature type **SEAARE (Sea area/named water area)** and name it something clever.
- D) Continue this previous step until all your polygons have been named.

The downside to naming your polygons like this is that the text orientation cannot be modified. This might be a problem in smaller polygons where you don't have a lot of room for text.

Exporting Polygons

When the polygon plan has been completed, the polygon **HOB** files need to be converted to **Shape files** in order to be used with Hypack. Repeat the following steps but choose "S-57" in the place of "Shapefile."

- A.) Select one of your polygon layers
- B.) Go to **File → Export → To Shape file...**
- C.) Name your polygon shape file: HXXXXX_(Offshore or Nearshore)Polygons. Place the file in the project folder at the path:

**P:\Survey_Storage\00_PROJECTS\YYYY\OPR-A###-FH-
YY\Surveys\HXXXXX\Working_Survey_Files\Launch_Files\Polygons**

D.) Load the polygon shape files onto an appropriate flash drive and test the files in your Hypack project on the launch and/or ship to confirm it works when displayed with the chart and other layers.

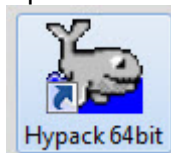
Exporting to Hypack and Downloading to Launch

There are some "gotcha's" with transferring your files from CARIS to Hypack out in the launches. Before doing so make sure you have on a transfer drive:

- Relevant .000 chart files
- .000 Final Feature and Bottom Sample Files
- .shp for **Sheet limits**, **Near Shore**, and **Offshore** files

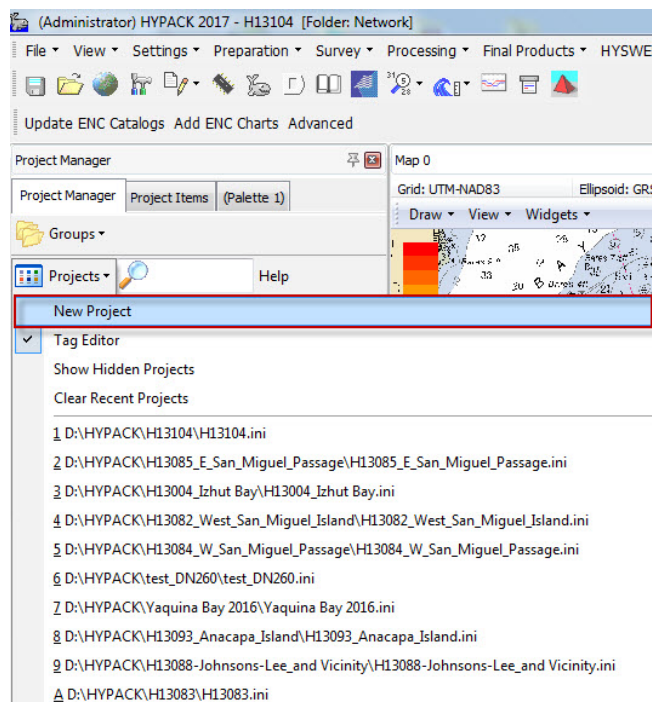
For some folks it might be helpful to print out this section of the SOP and bring it with you to the launch.

A.) Turn on the Acquisition Machine

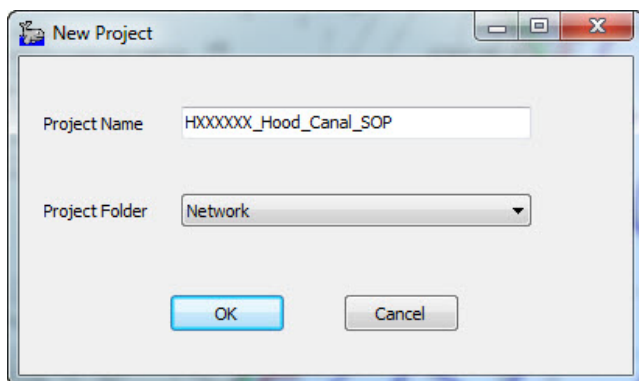


B.) Open Hypack

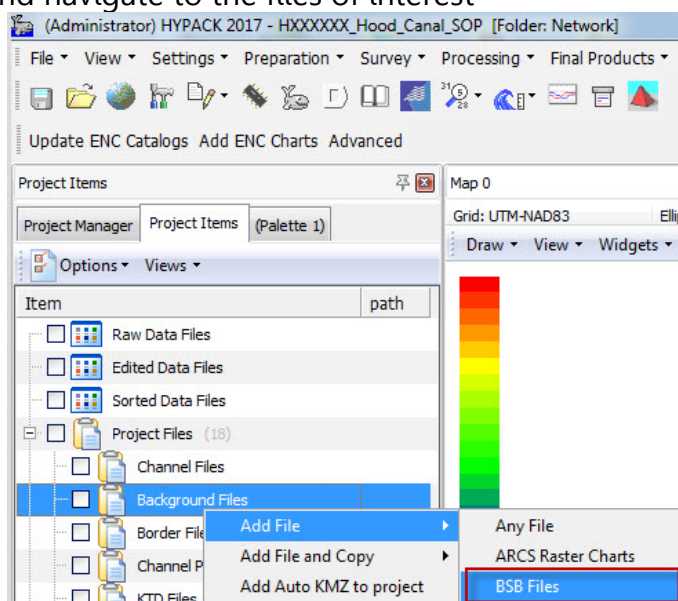
C.) In the **Project Manager** tab, select **Create New Project**



a. Add your project name **HXXXXX_Project_Vicinity**

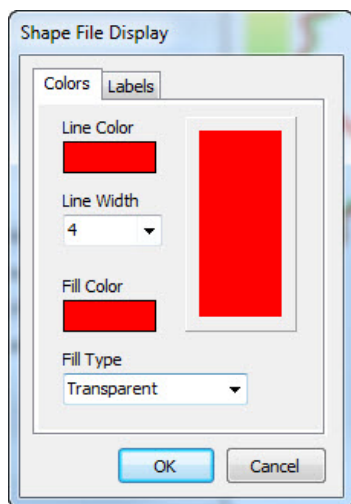
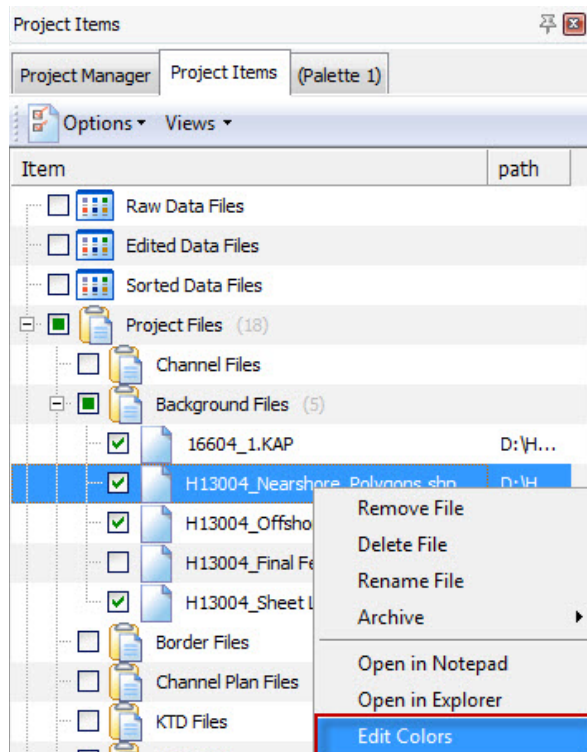



D.) Upload the files from **D:\HYPACK\HXXXXX** to Hypack *background* files in Project Items using **Add File and Copy** and navigate to the files of interest



- .000 (Chart) files
- .000 Final Features & Bottom Samples
- .shp files: **sheet limits**, **nearshore**, and **offshore**

E.) Once your files are uploaded, change the colors of your .shp files: **sheet limits**, **nearshore**, and **offshore**



- F.)  Save your work in Hypack, close out, eject the flash drive. Open Hypack up again and make sure that all the files work without the flashdrive in the computer.