

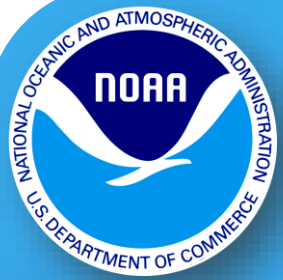


# Electronic Chart QC

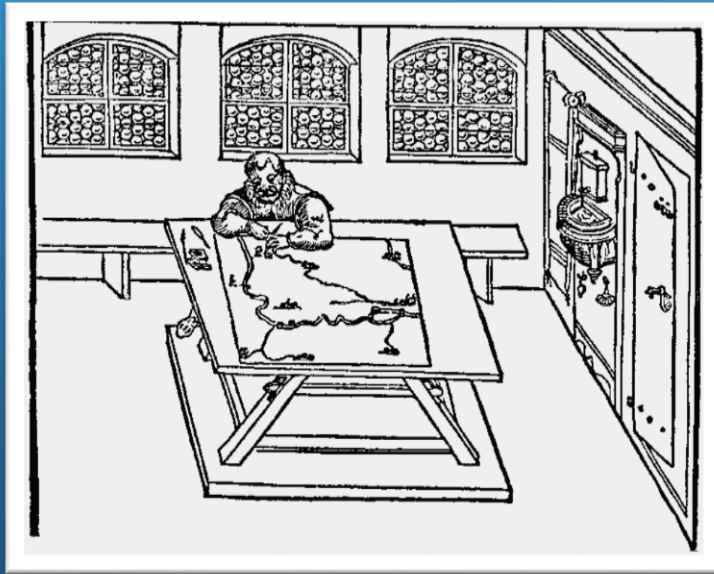
Christie Ence and Shachak Pe'eri

Office of Coast Survey  
NOAA's Open House 2017

Contact info:      [Christie.ence@noaa.gov](mailto:Christie.ence@noaa.gov)  
                                 [Shachak.peeri@noaa.gov](mailto:Shachak.peeri@noaa.gov)



# Cartography through the centuries

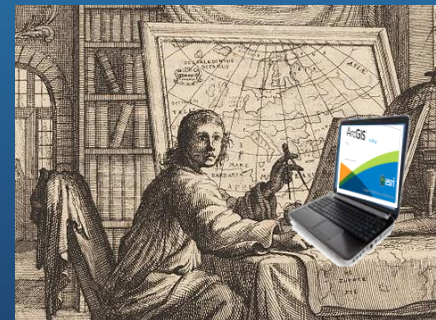


1300 AD

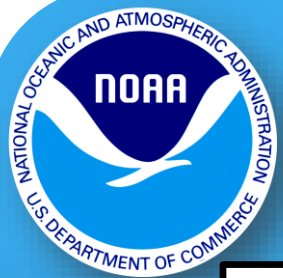
(<http://www.henry-davis.com/>)



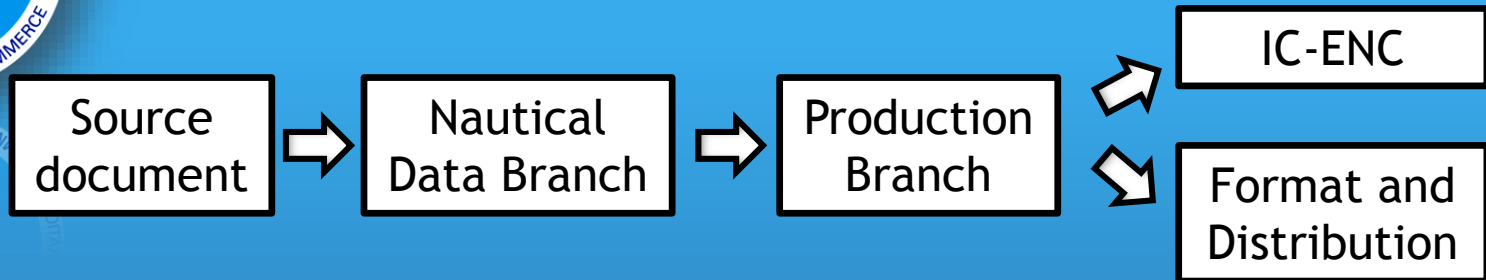
1714 AD



2017 AD



# Existing Quality Checks



## dKart / SevenCs

- S-58 validation performed within production branch before ENC export

## IC-ENC

- S-58 validation with additional checks (INFORM, SCAMIN, EXPSOU, etc.)
- Verifies .000 package meets international standards
- Reviews .txt file contents for spelling and relevance with charted features
- Checks for gaps or overlaps in cell coverage
- Examines charted features through multiple scale bands for consistency
- Reports back errors and discrepancies that should be corrected



# Current QC Limitations

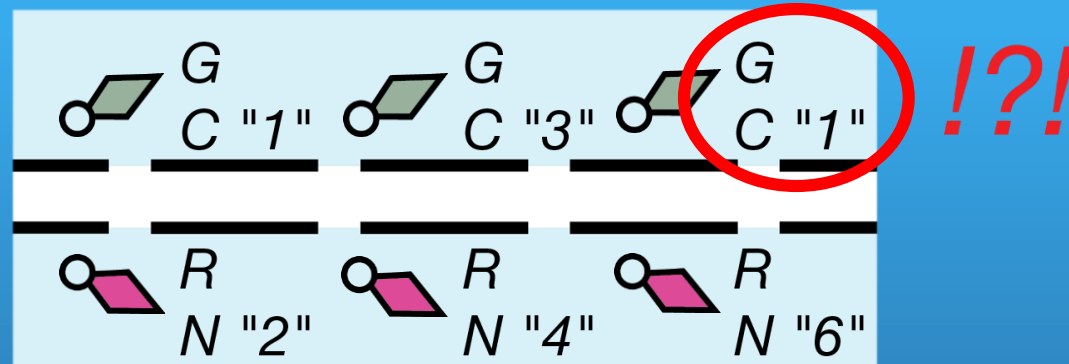
- Features must be examined independently
- Software display is “scaleless”
- Few features are labeled
- No convenient way to verify a feature is attributed correctly
  - S-57 / S-58

Acronym	Name	Value
SCAMIN	Scale minimum	119999
CATLIT	Category of light	Value is unknown
COLOUR	Colour	white
DATEND	Date end	
DATSTA	Date start	
EXCLIT	Exhibition condition of light	night light
HEIGHT	Height	
LITCHR	Light characteristic	flashing
LITVIS	Light visibility	
MARSYS	Marks navigational - system of	
MLTYLT	Multiplicity of lights	
NOBJNM	Object name in national language	
OBJNAM	Object name	
ORIENT	Orientation	
PEREND	Periodic date end	
PERSTA	Periodic date start	
SECTR1	Sector limit one	
SECTR2	Sector limit two	
SIGGRP	Signal group	(1)
SIGPER	Signal period	4.00
SIGSEQ	Signal sequence	00.4+(03.6)
STATUS	Status	
VALNMR	Value of nominal range	
VERDAT	Vertical datum	
NTXTDS	Textual description in national language	
TXTDSC	Textual description	
INFORM	Information	
NINFOM	Information in national language	
SORDAT	Source date	20060822
SORIND	Source indication	US,US,reprt,1thCGD,LN

S-52 Symbology



# What does this mean?



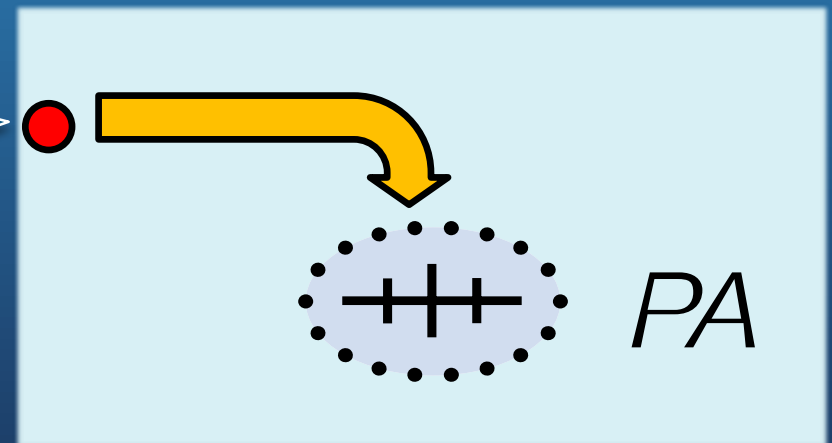
- Difficult to see the “big picture”
- Feature may be encoded correctly according to S-57 / S-58 standards, but can fail to represent the real-world feature accurately
- Missing features do not cause validation errors (most of the time!)
- In an “ENC-First” environment, it’s important the primary product is correct

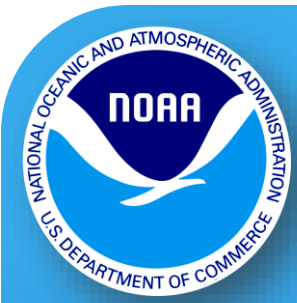


# NCSII Chart Configuration Files

- Represents the data in a way the mariner would interpret it (not the way we *think* they would interpret it)
  - Applies symbology *and labels* to S-57 data
  - Applies chart scale and projection
  - Soundings and heights can be displayed in chart units
- Allows users to review multiple features in context with each other
- Can be used on independent .000 files

Field	Value
FCSubtype	45 (WRECKS)
CATWRK	2 (dangerous wreck)
QUAPOS	4 (approximate)
VALSOU	-32767 (unknown)
WATLEV	3 (always under water/submerged)

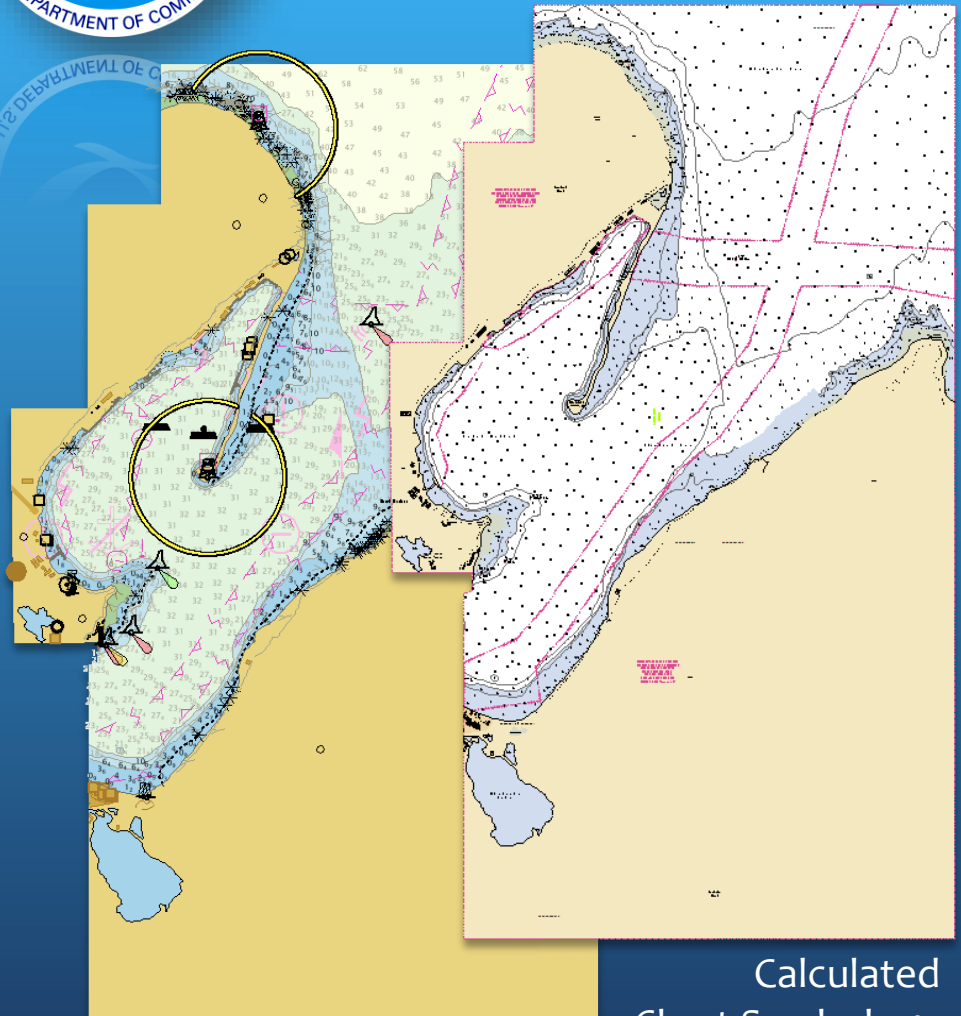




# Dutch Harbor, AK

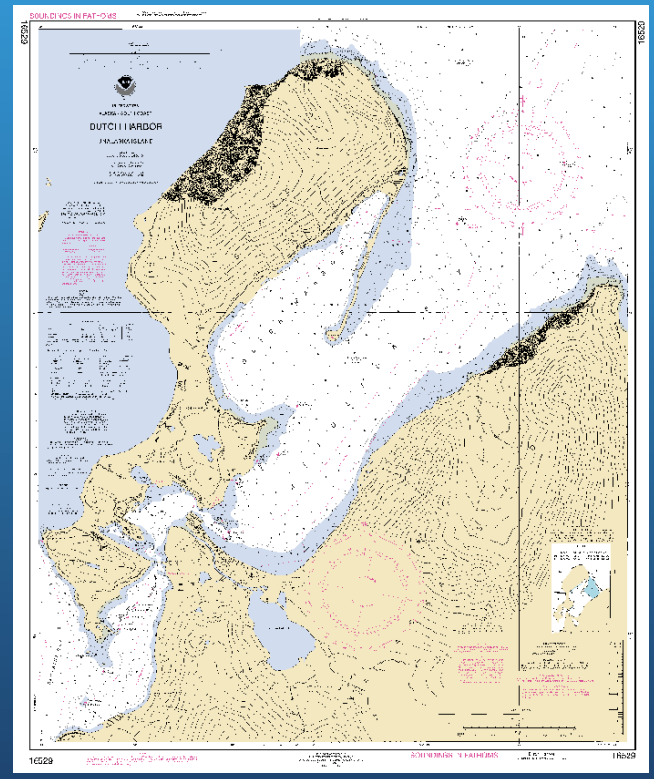
## Chart 16529 / US5AK6DM

### 1:10,000

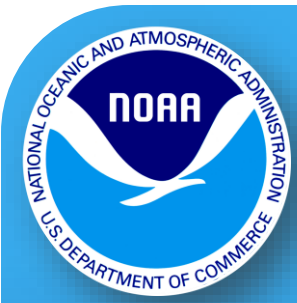


S-52 Symbolry

Calculated Chart Symbolry

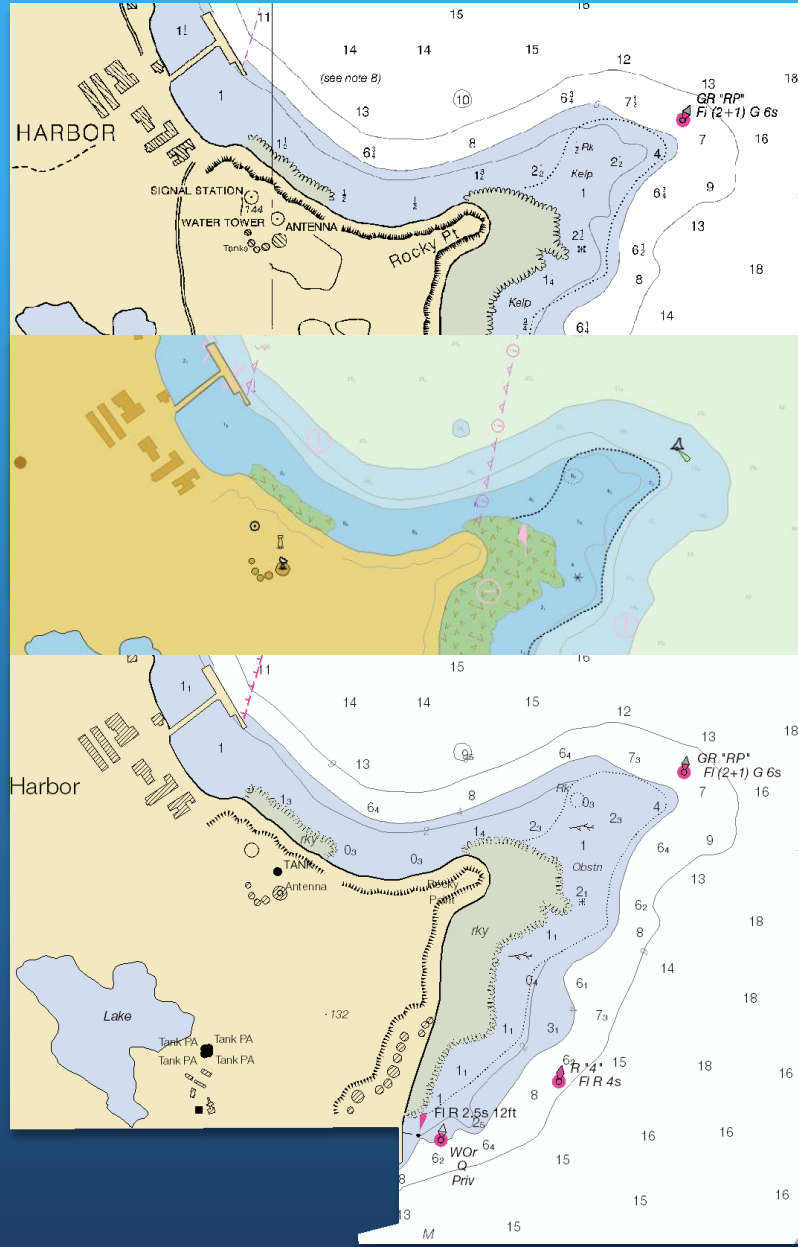






**Average processing time:**  
~30 minutes

**Product format:**  
ArcGIS or PDF

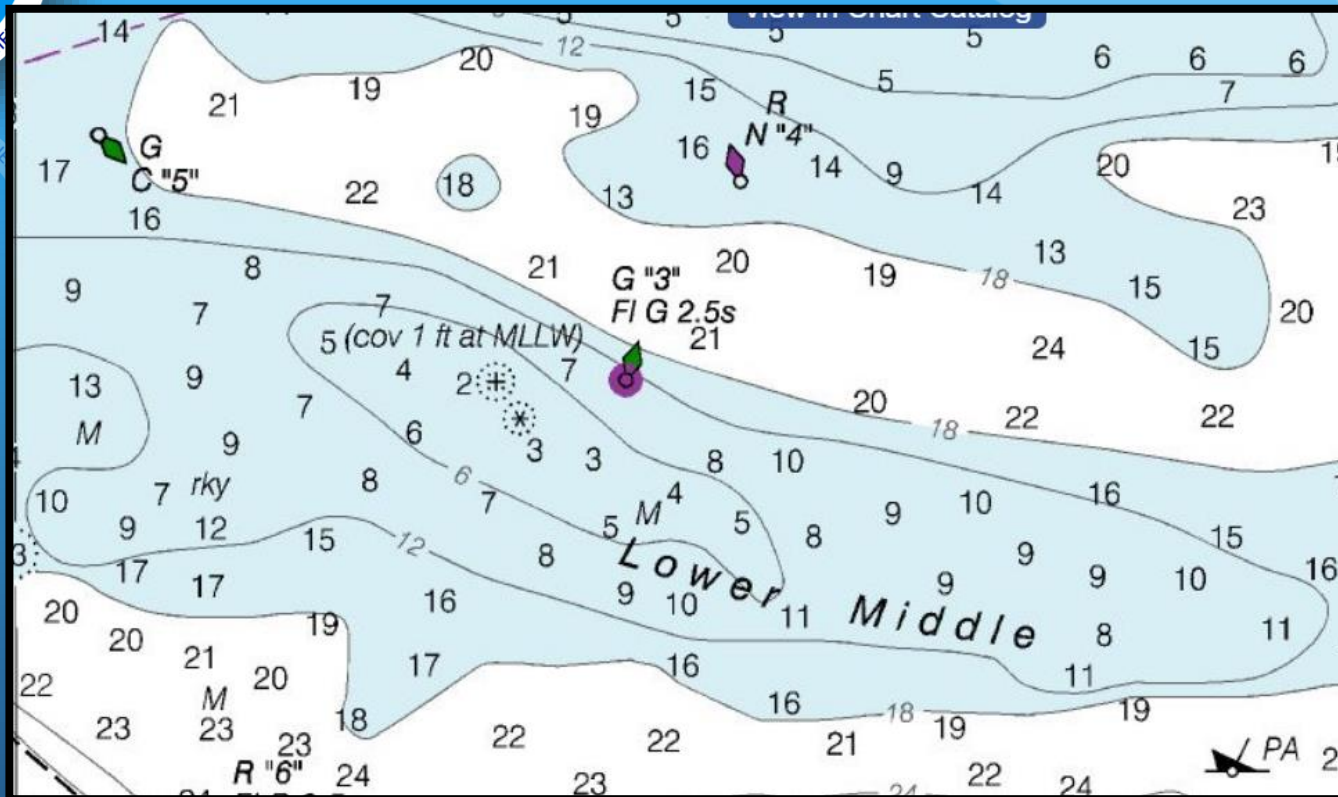
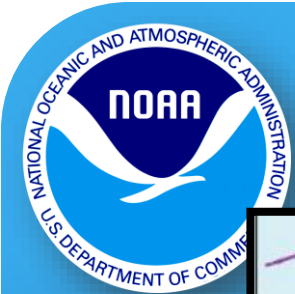


Online Chart Viewer

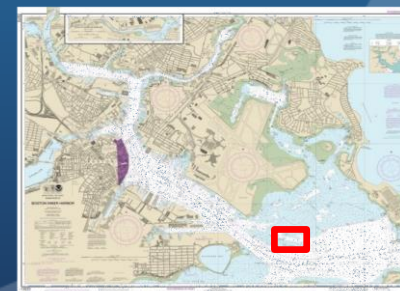
S-52 Symbology

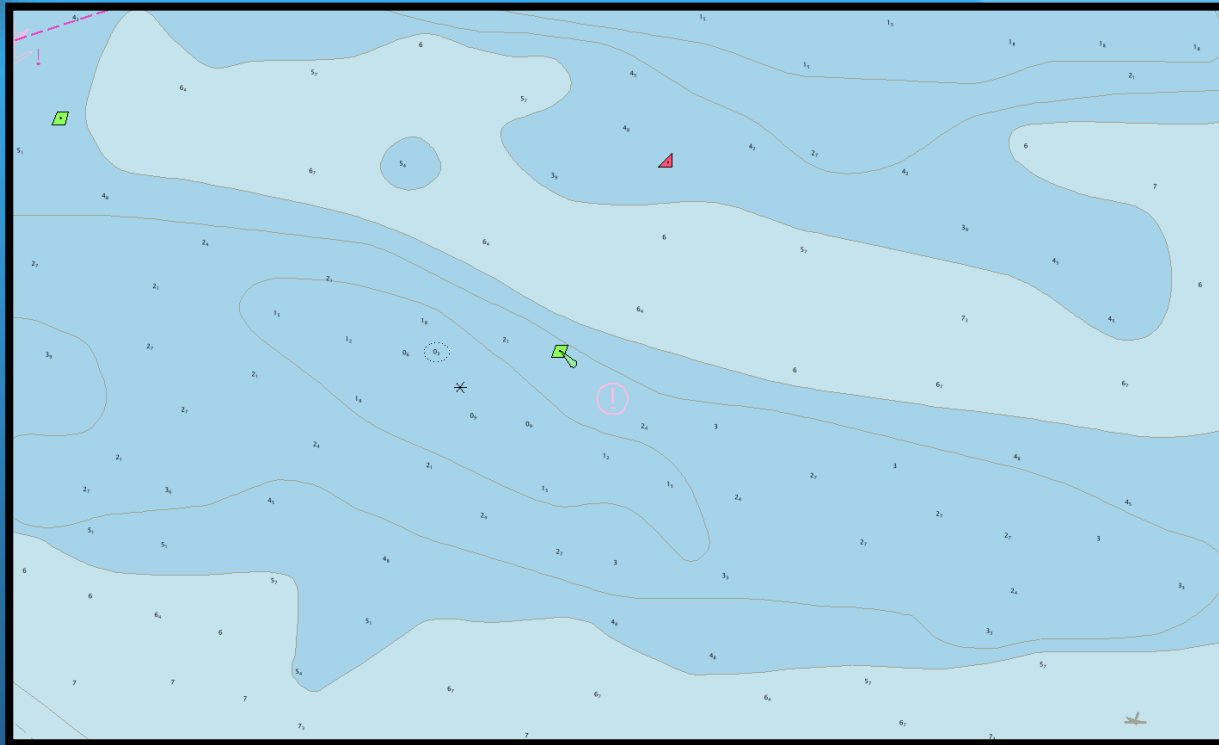
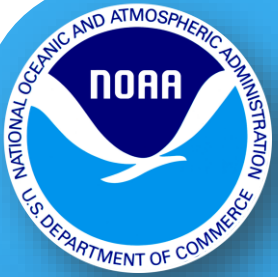
Calculated Chart Symbology



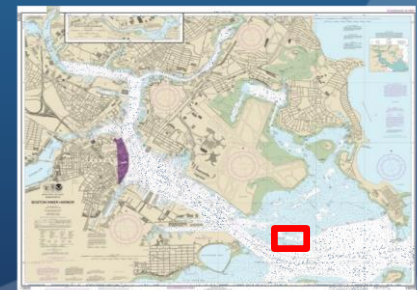


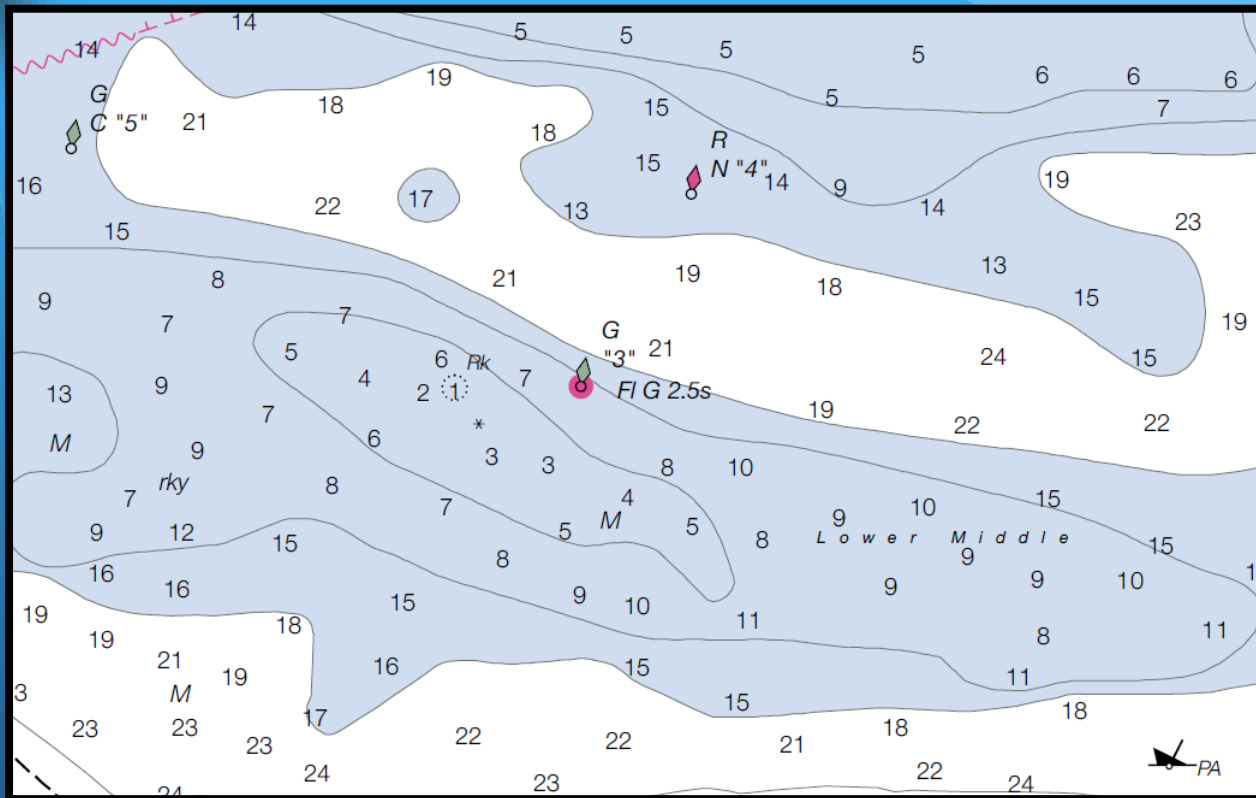
# Display Comparison (Online Chart Viewer)



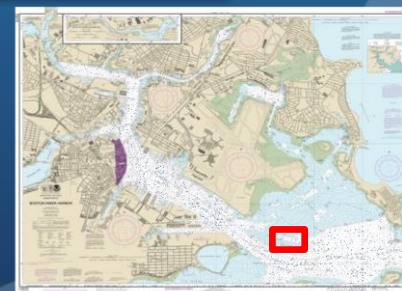


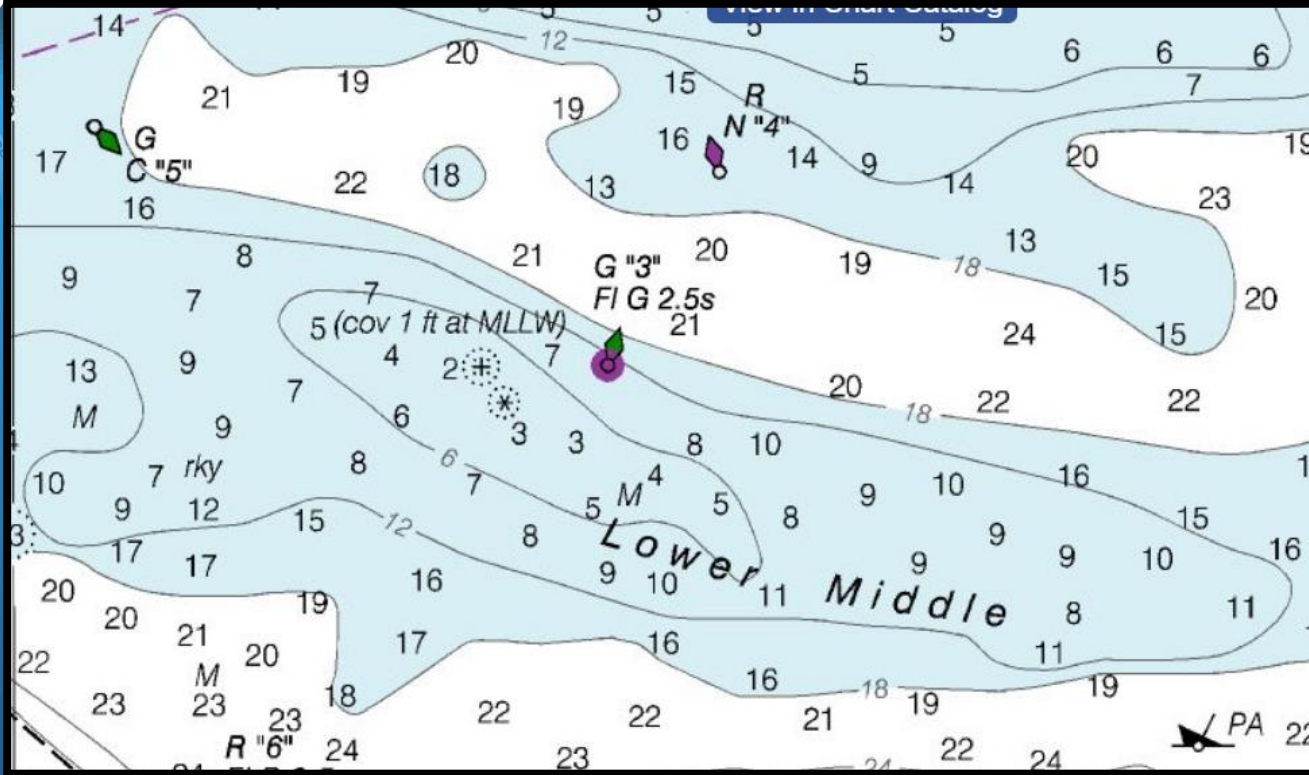
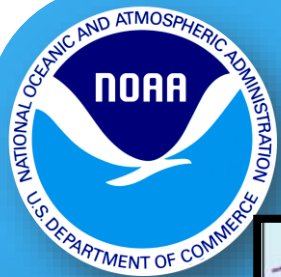
# Display Comparison (S-52 Symbology)



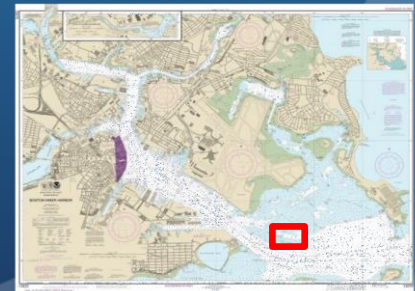


# Display Comparison (Calculated Chart Symbolology)

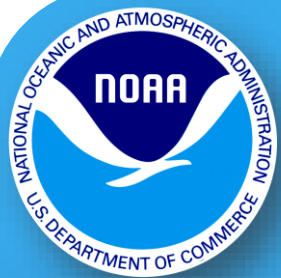




# Display Comparison (Online Chart Viewer)



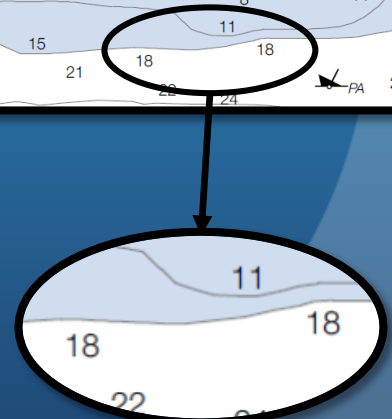
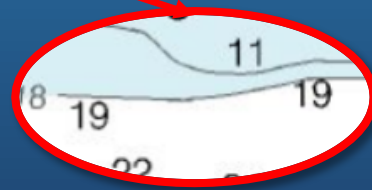
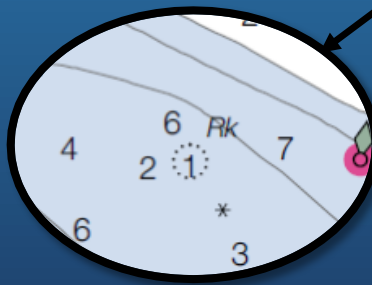
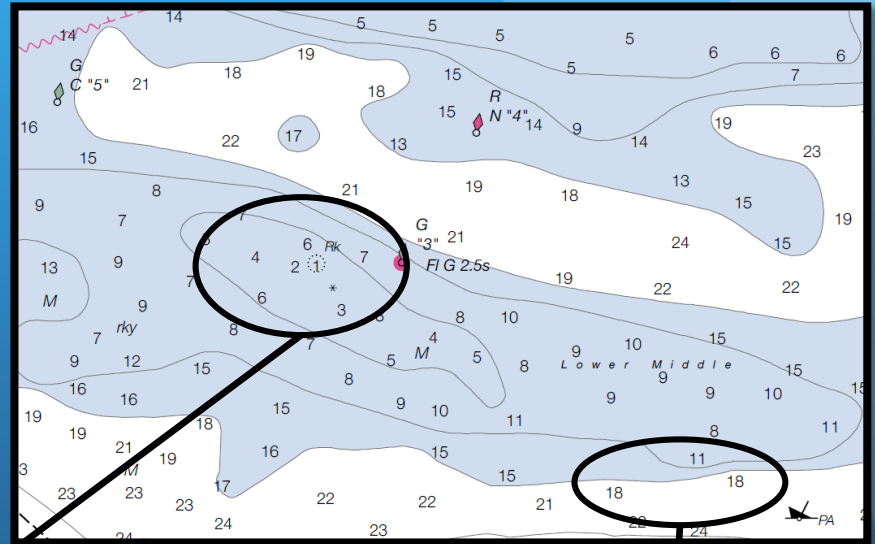
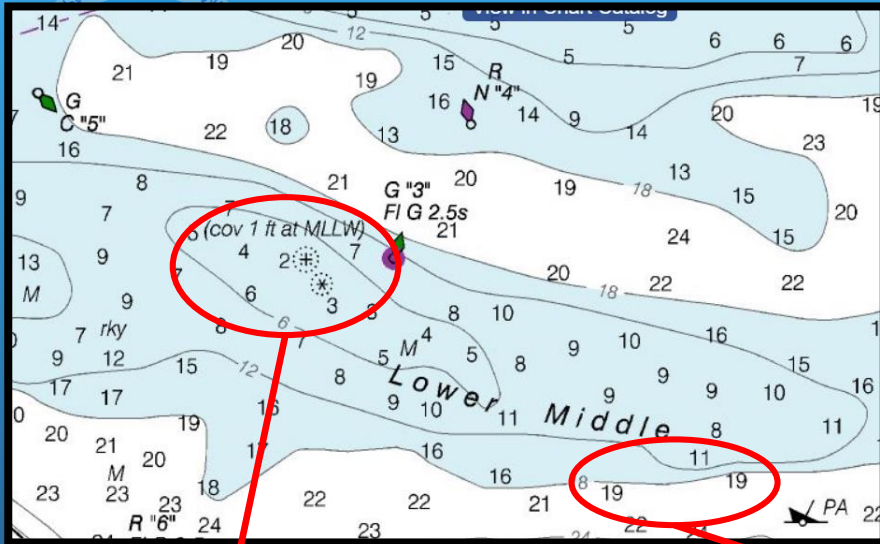




# Find the difference (2 seconds)!

Online Chart Viewer  
(Traditional Raster)

Calculated Chart Symbology  
(Rasterized RNC)



Attribution discrepancy

Rounding / truncation issues

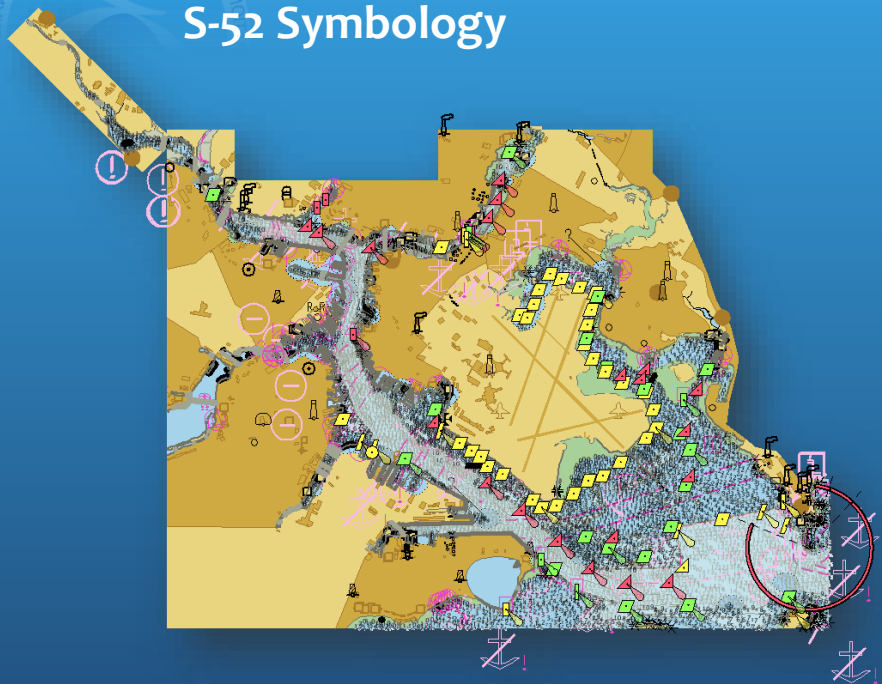


# Boston Inner Harbor, MA

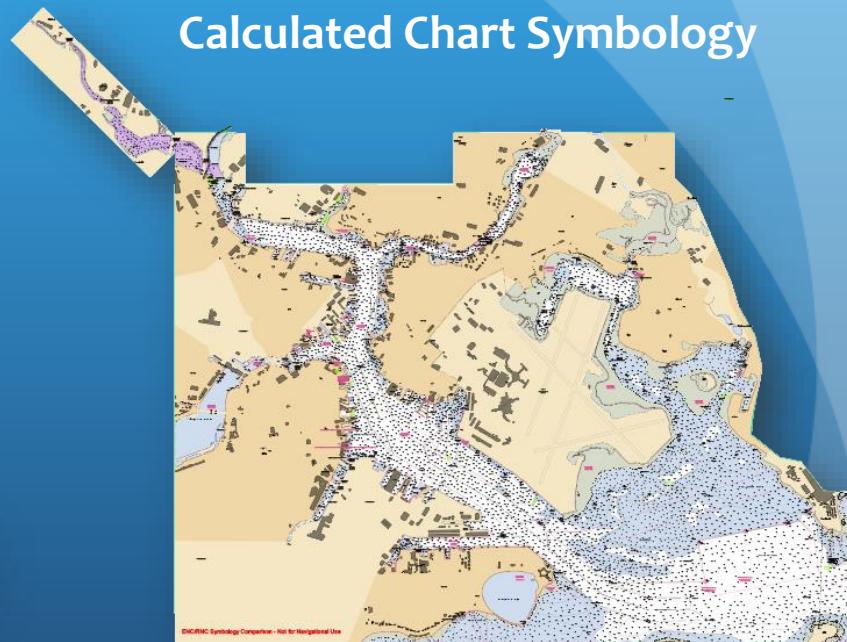
Chart 13272 / US5MA11M

1:10,000

S-52 Symbology



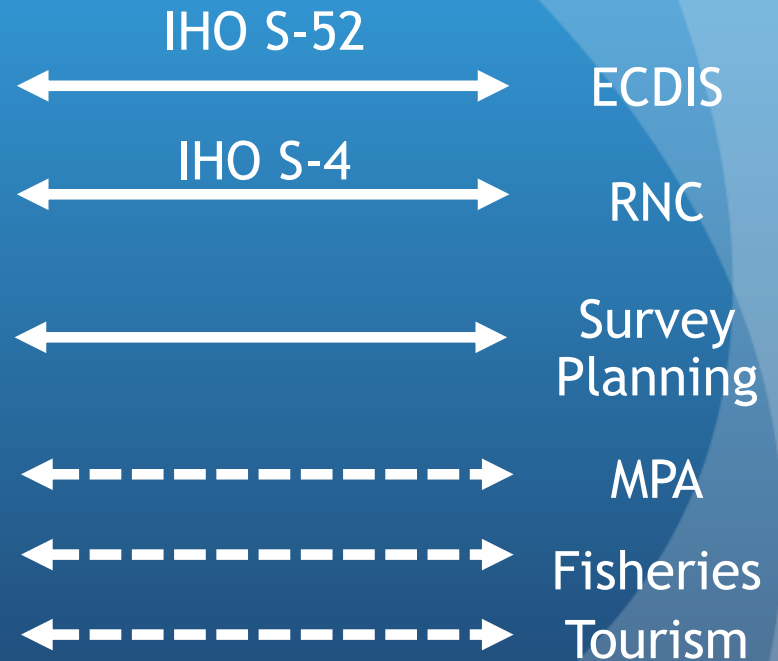
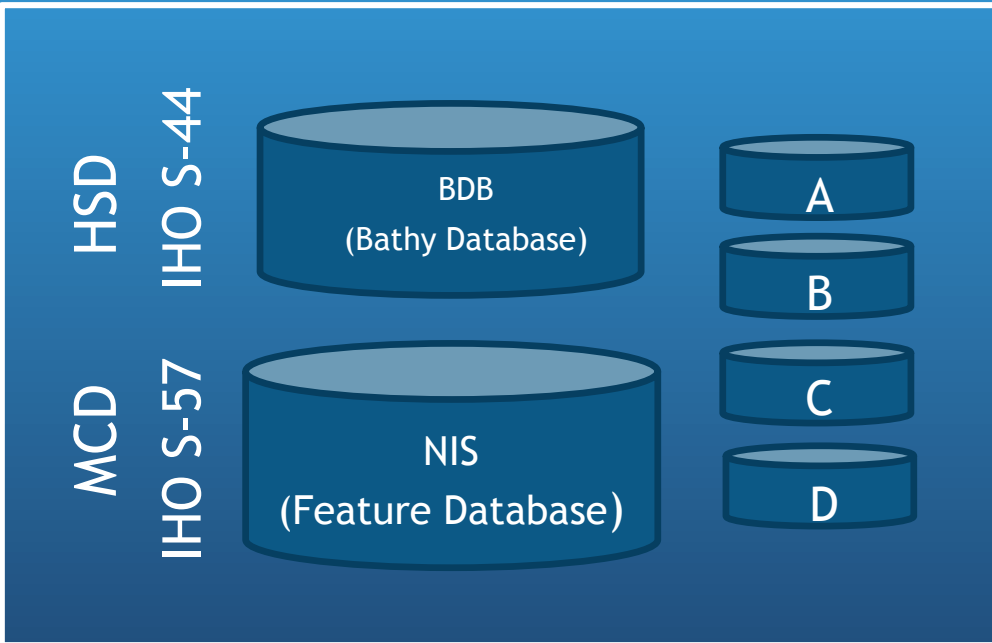
Calculated Chart Symbology



ENCIRAC Symbology Comparison - Not for Navigational Use



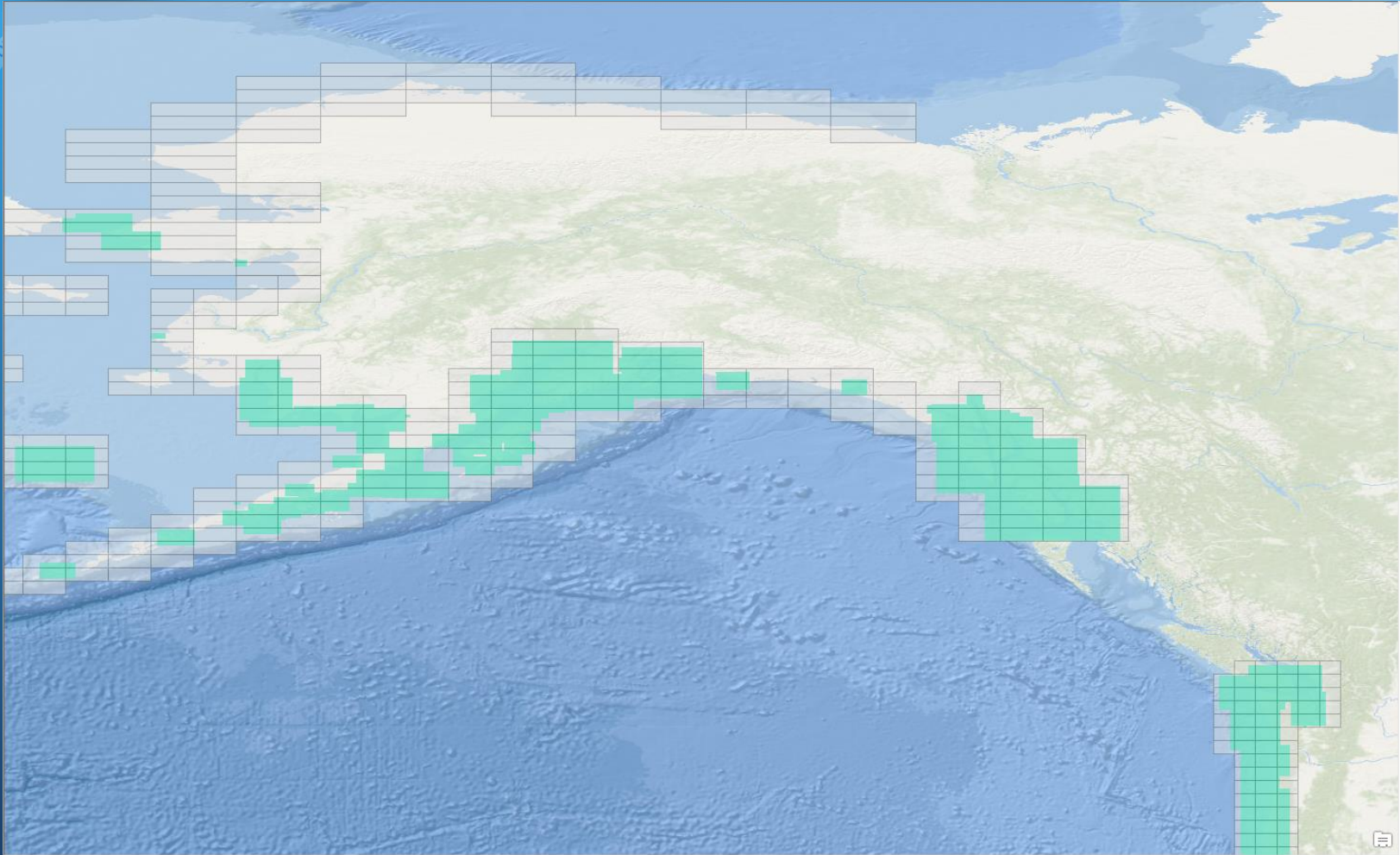
# Putting it all together







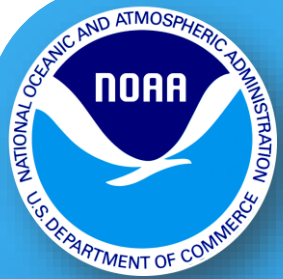
# Band 3 - Rescheming





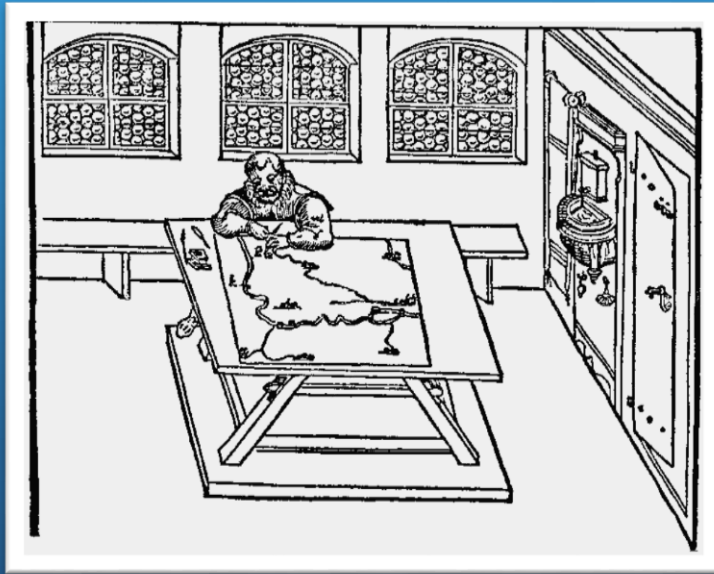
# Conclusions

- Standardized progressive scales
- IHO compliant (IHO specs)
- Complete coverage with an option for extension
- Intuitive
- Easy to create and implement
- Can be used as a management tool for project planning



# Questions?

## Cartography through the centuries

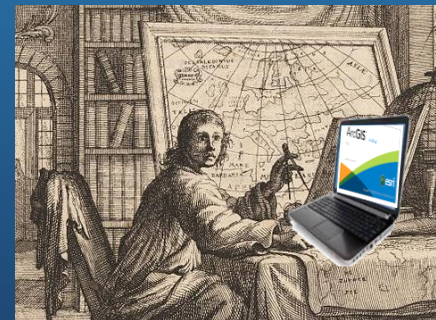


1300 AD

(<http://www.henry-davis.com/>)



1714 AD



2017 AD