

Criteria for Determining the Status of Individual Charts

Overview

One of the basic functions of the ChartManager program is to identify those charts in the user's library for which the chart source has released updated charts. This allows a selective downloading of updated charts rather than a mass update to the library each month, and helps insure that the chart library residing on the PC contains the most up-to-date content.

The purpose of this document is to define the criteria used by ChartManager to determine the update status of each chart, and how those criteria can be manipulated by the users to meet their requirements.

There are currently three types of charts managed by ChartManager

1. NOAA Raster Navigation Charts (RNC)
2. NOAA Electronic Navigation Charts (ENC)
3. USACE Inland Electronic Navigation Charts (IENC)

There are sources for the charts of other countries and regions available on the Internet, and support for these chart sources is under development in ChartManager, but for now the three chart types listed above are the only ones fully implemented in the program.

Each of these chart types provide different data for determining the update status of the charts and require different processing by ChartManager. The rest of this document describes how ChartManager handles each of the chart types.

NOAA RNC Chart Status Determination

NOAA provides a catalog of all RNC charts in an xml fileⁱ that can be downloaded from the NOAA Office of Coast Survey (OCS). This catalog is updated weekly to identify the current status and the URL for the download of each chart. The contents of the catalog can be displayed using the XML Notepad software provided by Microsoft with most Windows systems, as shown below.

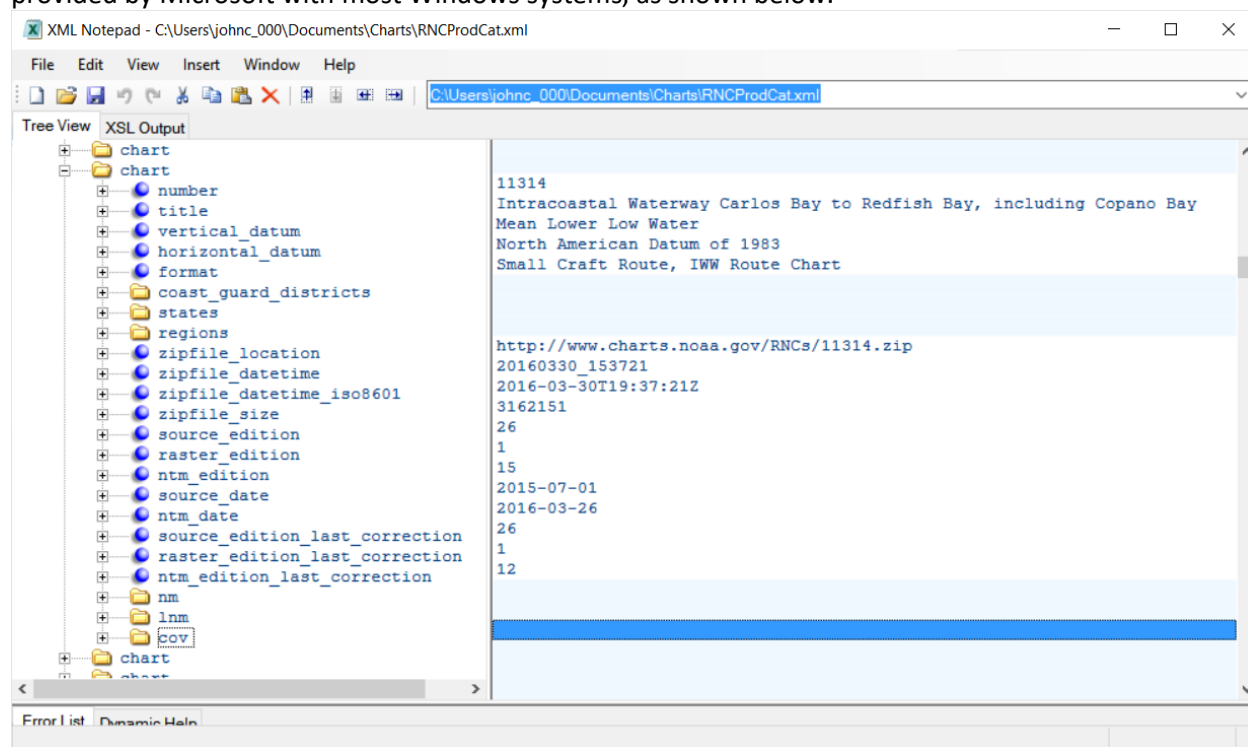


Figure 1, XML Notepad display of the RNC Product Catalog xml file.

Criteria for Determining the Status of Individual Charts

Figure 1 shows the basic contents of the NOAA RNC Product Catalog for one chart (11314, "Intracoastal Waterway Carlos Bay to Redfish Bay, including Copano Bay"). The following elements of this chart record are used by ChartManager to determine the update status of this chart.

- **zipfile_datetime_iso8601** – This is the date time that the compressed zipfile containing the chart files was posted to the OCS server. This is the most basic of the values used by ChartManager to determine if a newer version of the chart is available. This date is compared to the date of the *.BSB file (11314.BSB in this case) in the PC library. If the zipfile date is later than the file date then an update to the chart is potentially available. There are several reasons a newer zipfile might have been posted other than for a change to the chart image. There are administrative updates to the contents of the BSB file that require a new zipfile to be posted without any changes to the chart. However this is by far the safest criteria for determining if a new version of the chart has been made available. Using this criteria to download the associated zipfile will insure that the chart in the PC library is the latest available, but it may result in an update that is unnecessary for navigation. That is the only change to the chart files may have been metadata that is not used by any chart plotting software to display the chart image. This is a necessary, but not always sufficient criteria for determining if a chart has been updated.
- **source_edition** – This is the edition number of the paper chart from which the RNC chart was created. A change in this edition number means the paper chart has been modified in some manner and the new version of the RNC chart most likely should be downloaded into the PC library. However; there can be many changes to the chart image with the same source_edition value. Only when the paper chart is modified and rescanned as the content of this RNC does the source_edition number change. Therefore a change in the edition number is a normally sufficient, but not necessary criteria for downloading an updated chart. Other criteria must be checked as well. Although a change in this number almost always means the chart image has been modified, the program relies on the source_edition_last_correction value described below.
- **ntm_edition** – The ntm_edition value is used to identify the level of the Notice-To-Mariners and Local_Notice-To-Mariners issued by the NGA and USCG, respectively, to which the chart has been verified. A change in this number does not necessarily mean the chart has been modified. It may mean that the NTMs included in the edition have been checked against the chart and no changes were required. The ntm_edition number is a sequence number for the current source edition and includes all NMs and LNMs up to and including those posted in the catalog. When a new source edition is issued, the ntm_edition value is reset to zero. The ntm_edition_last_correction value is a sufficient criteria for determining that the chart has been corrected.
- **source_date** – This is date the chart was modified for the posted source_edition. It can be used interchangeably with the source edition to determine the status of the chart, but as with the edition number it is sufficient, but not necessary for determining that the chart image has been modified.
- **ntm_date** – Like the source_date, this date can be used interchangeably with the ntm_edition number to determine the NTM status of the chart. However, like the ntm_edition number it is neither sufficient nor necessary criteria for the download of the chart zipfile. The ntm_edition_last_correction is used by the program for this purpose.
- **source_edition_last_correction** – A change in this edition number is sufficient to determine that the latest zipfile should be downloaded and used to update the chart library.
- **ntm_edition_last_correction** – A change in this edition number is sufficient to determine that the latest zipfile should be downloaded and used to update the chart library.

Criteria for Determining the Status of Individual Charts

When a NOAA RNC chart zipfile is downloaded and unzipped into a chart directory on the PC, the chart consists of a minimum of three files in a sub-folder of the chart directory with same name as the chart number.

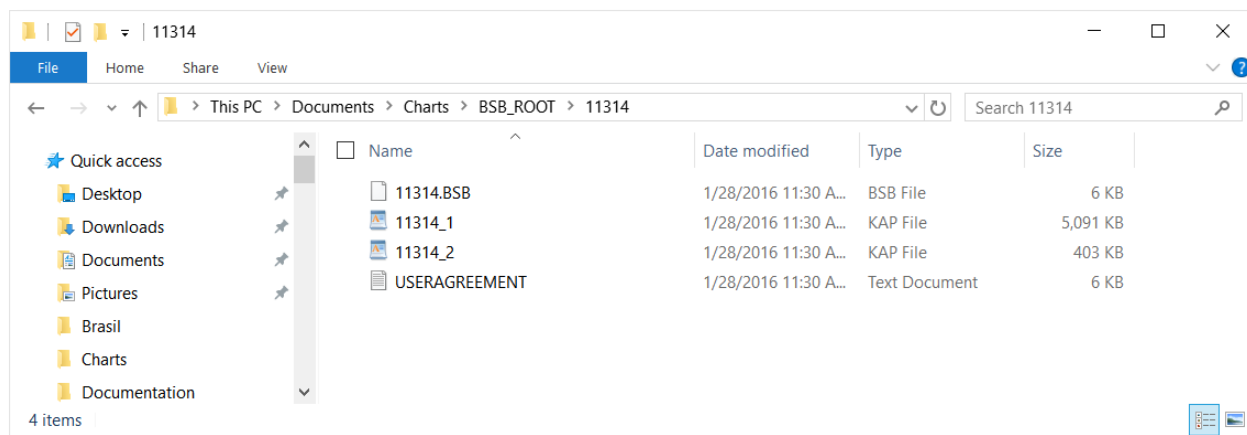


Figure 2, Chart Sub-Folder 11314

In the screen capture above the files associated with chart 11314 are displayed. In this case there are four files that make up the chart. The 11314.BSB file is a text file that contains most of the data from the RNC Catalog for this chart. The program compares the date and contents of this file to the dates and content of the catalog record for chart 11314 to determine if a new version of the chart is available. For each chart in the library there is also at least one KAP file, which contains the chart image and some additional data on the chart. The paper version of chart 11314 contains two panels and each panel has a separate KAP file in the chart sub-folder (11314_1.KAP and 11314_2.KAP). These are the files used by the chart plotting software to display the chart panels on the PC screen. The fourth file is the USERAGREEMENT text file that specifies the terms and conditions for the use of this NOAA chart.

In order to make a determination of the update status for a given chart, ChartManager will display selective contents of the product catalog for the chart and the same parameters for the chart files installed on the PC, as shown below.

Criteria for Determining the Status of Individual Charts

The screenshot displays the NOAA RNC Chart Library interface. At the top, the title bar reads "NOAA RNC Chart Library". Below it, the "RNC" section contains a "RNC Download Selection List" with a dropdown menu showing "11314" and "Intracoastal Waterway Carlos Bay to Redfish Bay, inc". To the right, a "Nr of Charts" field shows "1024". Navigation buttons include "First", "Prev", "Next", "Last", "Download Selection List", "View Selected Chart Online", and "Download Selected Chart".

The "Chart Catalog Selection Filters" section on the right includes checkboxes for "Edition Check", "Missing Check", "Date Check", "Zip Date", "Source Date", and "NTM Date". It also has dropdowns for "Coast Guard Dist", "State", "Chart Regions", and "Chart Formats", along with a "Clear Filters" button.

The "RNC Chart Catalog Data for Chart: 11314" section on the left provides detailed information:

- Chart Download URL:** <http://www.charts.noaa.gov/RNCs/11314.zip>
- Zip File Date/Time:** 3/30/2016 3:37:21 PM
- Zip File Size:** 3162151
- Chart Format:** Small Craft Route, IWW Route Chart
- Edition:** 26, **Source Edition Date:** 7/1/2015, **NTM:** 12, **NTM Date:** 3/26/2016
- NM:** 1516, **NM Date:** 4/9/2016, **NM Agency:** NGA
- LNM Count:** 1, **LNM Doc Nr:** 1516, **LNM Date:** 4/12/2016, **LNM USCG Dist:** USCG08

The "RNC Chart Library Data for Chart: 11314" section on the right shows:

- Date/Time of the 11314.BSB File:** 1/28/2016 11:30:16 AM
- RNC Chart Status:** A later chart is available
- Edition:** 26, **Source Edition Date:** 07/01/2015, **NTM:** 13, **NTM Date:** 01/30/2016
- KAP File:** 11314_1.KAP, **KAP File Title:** CARLOS BAY TO REDFISH BAY SIDE A
- 21 Updates to Chart Edition 26 listed in this KAP file:** Ransom Point Danger Breakwater Light
- Latitude:** 27.846450, **Longitude:** -97.139120
- ADD:** R 2.5s Priv
- Export as Wots** button

Figure 3, ChartManager Display of Chart 11314

In the lower half of this form the program displays selective contents of the RNC Product Catalog (left panel) and chart files on the PC (right panel) for the selected chart. The catalog panel contains the number and date for both the source and NTM chart editions. The edition numbers displayed are the `source_edition_last_correction` and the `ntm_edition_last_correction` values from the catalog; however the dates for these editions are the dates for the latest editions that have been applied to the chart. Therefore the dates displayed for these edition numbers may be for later editions that did not require a correction to the chart.

Looking closely at the data for this chart we can see the following differences.

- The zipfile date from the catalog is 3/30/2016 and the date of the BSB file on the PC is 1/28/2016. Therefore the zipfile contains a later version of the chart files. This is not sufficient information to determine that the chart has been modified, but the user may wish to download the chart in any case to insure the latest chart information is available on the PC. The program displays the chart status as, "A later chart is available" because a new zipfile is available and it may contain an updated chart.
- The source edition from the catalog displayed (actually the `source_edition_last_correction` value) is 26, which is the same as the value extracted from the BSB file. So the source paper chart has not been modified since the chart was last downloaded. The Source Edition Dates from the catalog and the BSB file also match.
- The NTM edition value from the catalog (actually the `ntm_edition_last_correction`) is "12" while that from the BSB file is "13", which means the chart was downloaded since the last NTM chart correction was posted. Therefore the chart on the PC contains the latest NTM chart corrections available. However, the NTM date from the catalog (3/26/2016) is later than the NTM date

Criteria for Determining the Status of Individual Charts

from the BSB file (1/30/2016). The catalog NTM date reflects the date of the latest NTM that has been applied to the chart, while the catalog NTM number identifies that latest NTM that required a correction to the chart. Hence, NOAA has updated the chart files on the server to reflect the latest NTMs, but those NTMs after edition 12 did not require a change to the chart.

Therefore an update to the chart files is available on the NOAA server for download, but since the chart on the PC is up-to-date with the `source_edition_last_correction` and the `ntm_edition_last_correction` the download has not been performed by the user. For this user it is sufficient to have the latest corrections to the chart rather than the latest files released by NOAA.

The next step for a user to maintain the latest versions of the chart in the user's library to use the filter checks in the upper right corner of the form to identify the charts that meet the user's needs for keeping the charts up-to-date.

RNC Chart Status Criteria

For RNC charts there are 5 types of filter checks that can be performed by the program.

1. Edition Check.
2. Missing Check
3. Zip Date
4. Source Date
5. NTM Date

The screenshot shows a form titled 'Filter Checkboxes'. It contains five checkboxes on the left: 'Edition Check', 'Missing Check', 'Date Check', 'Zip Date', and 'Source Date'. To the right of these checkboxes are three dropdown menus: 'Coast Guard Dist', 'State', and 'Chart Regions'. Below these are two more dropdown menus: 'Chart Formats' and 'NTM Date'. A 'Clear Filters' button is located to the right of the 'State' dropdown.

Figure 4, Filter Checkboxes

Selecting any one or a combination of these checkboxes will cause the program to rebuild the chart list in the upper left section of the form with all charts that meet the filter criteria. These checks are described in more detail below.

Edition Check

This filter compares the latest correction source and NTM editions for each chart in the catalog against the corresponding chart files on the PC. If the chart file exists (chart is not missing), and either edition number (source or NTM) in the BSB file is less than the last correction values from the catalog, the file is added to the list. The resulting chart list identifies all charts in the library for which NOAA has issued a correction.

Criteria for Determining the Status of Individual Charts

The screenshot displays the NOAA RNC Chart Library interface. The main window is titled "NOAA RNC Chart Library". On the left, there is a list of chart numbers (1116A, 11308, 11309, 11315, 11316, 11317, 11319, 11322, 11324, 11326, 11329, 11330, 11331, 11339, 11340, 11341, 11342, 11343, 11344, 11347, 11348, 11351, 11352, 11353, 11354, 11355, 11356, 11357, 11358, 11361). The "Edition Check" checkbox is checked. The "Missing Check" checkbox is unchecked. The "Date Check" checkbox is unchecked. The "Source Date" checkbox is unchecked. The "NTM Date" checkbox is unchecked. The "Coast Guard Dist" dropdown is set to "State". The "Chart Regions" dropdown is set to "Chart Regions". The "Chart Formats" dropdown is set to "Chart Formats". The "RNC Chart Library Data for Chart: 1116A" section shows the "Date/Time of the 1116A.BSB File" as 4/4/2016 9:48:32 AM and the "RNC Chart Status" as "A later chart is available". The "Edition" is 79, "Source Edition Date" is 02/01/2016, "NTM" is 05, and "NTM Date" is 03/26/2016. The "KAP File" is 1116A_1.KAP and the "KAP File Title" is LEASE BLOCK FOR MISSISSIPPI RIVER TO GALVES. The "17 Updates to Chart Edition 79 listed in this KAP file" section shows a table with columns for "Obstruction in Fathoms", "Latitude", "Longitude", "ADD", "4 Obstr", and "Chart No. 1: K41". The "Export as Wots" button is visible.

Figure 5, Edition Check

In the screen capture above, the Edition Check box has been checked and the RNC Download Selection List has been updated to include only those charts for which a later source or NTM correction has been published. Notice in the drop-down list of chart numbers, chart 11314 is not included even though the chart status in Figure 1 indicates that a later chart is available. This is because that later chart represents a change to some of the metadata (e.g., NTMs that did not require a chart correction), but not to the chart itself.

Therefore a download of all of the charts in this selection list would bring all charts in the library (but not any missing charts) up-to-date with the latest corrections available.

Missing Check

This check identifies any charts in the catalog that do not exist in the PC chart library.

Criteria for Determining the Status of Individual Charts

The screenshot displays the NOAA RNC Chart Library application window. The title bar reads "NOAA RNC Chart Library". The main interface is divided into several sections:

- RNC Download Selection List:** Includes a dropdown menu, a text input field, and a "Nr of Charts" field showing "0". Navigation buttons (First, Prev, Next, Last) and action buttons (Download Selection List, View Selected Chart Online, Download Selected Chart) are present.
- Chart Catalog Selection Filters:** A panel on the right containing checkboxes for "Edition Check", "Missing Check" (which is checked), and "Date Check". It also includes dropdowns for "Coast Guard Dist", "State", "Chart Regions", and "Chart Formats", along with a "Clear Filters" button.
- RNC Chart Catalog Data for Chart: 50:** A section on the left with various input fields for chart details, including "Chart Download URL", "Zip File Date/Time", "Zip File Size", "Chart Format", "Edition", "Source Edition Date", "NTM", "NTM Date", "NM", "NM Date", "NM Agency", "LNM Count", "LNM Doc Nr", "LNM Date", and "LNM USCG Dist".
- RNC Chart Library Data for Chart: 50:** A section on the right containing fields for "Date/Time of the 50.BSB File", "RNC Chart Status", "Edition", "Source Edition Date", "NTM", "NTM Date", "KAP File", and "KAP File Title". It also includes a message "No Updates to Chart Edition listed in this KAP file" and a section for "Latitude" and "Longitude" with an "Export as Wots" button.

Figure 6, Missing Check

In the screen capture above, the missing checkbox has been checked, and as can be seen there are no charts in the catalog that are missing from the PC library. This would often not be the case for other users, as most navigators would only download the charts for their normal area of sailing and not be concerned with charts for areas they do not plan visit. So an East Coast sailor would likely not want to maintain a library of charts for the West Coast. Therefore only the Missing Check checkbox will select charts that have not been downloaded to the PC. If the user wants to see both charts existing in and missing from the PC library in the selection list, the user can select the Missing Check checkbox in addition to one or more of the other checkboxes.

Date Checks

Below the Edition and Missing checkboxes (see Figure 3, above) are three additional checks that can be performed against the PC chart library to identify charts for which a potential update is available. The Date Check checkbox selects the default date filter check, currently the Zip Date. Each of the date checks can be selected individually or in conjunction with the other filters.

Zip Date

The Zip Date check box will filter the RNC chart list to those for which a zipfile is available on the OCS server that has a later date than that of the corresponding BSB file in the PC library.

Criteria for Determining the Status of Individual Charts

The screenshot shows the NOAA RNC Chart Library interface. The 'RNC Download Selection List' shows 11314 charts selected, with the 'Nr of Charts' field displaying 559. The 'Chart Catalog Selection Filters' section has the 'Zip Date' checkbox checked. The 'RNC Chart Catalog Data for Chart: 11314' section shows the chart's metadata, including the download URL, zip file date/time (3/30/2016 3:37:21 PM), zip file size (3162151), chart format (Small Craft Route, IWW Route Chart), edition (26), source edition date (7/1/2015), NTM (12), NTM date (3/26/2016), NM (1516), NM date (4/9/2016), NM agency (NGA), LNM count (1), LNM doc nr (1516), LNM date (4/12/2016), and LNM USCG dist (USCG08). The 'RNC Chart Library Data for Chart: 11314' section shows the date/time of the 11314.BSB file (1/28/2016 11:30:16 AM), RNC chart status (A later chart is available), edition (26), source edition date (07/01/2015), NTM (13), NTM date (01/30/2016), KAP file (11314_1.KAP), KAP file title (CARLOS BAY TO REDFISH BAY SIDE A), and 21 updates to chart edition 26 listed in this KAP file. The updates list includes 'Ransom Point Danger Breakwater Light' with latitude 27.846450 and longitude -97.139120, and a note 'ADD R 2.5s Priv'. An 'Export as Wots' button is also visible.

Figure 7, Zip Date Filter Check

In the screen capture above, the Zip Date checkbox has been checked and the number of charts in the selection list has been reduced from 1024 to 559. More than half of the charts in the catalog have an updated zipfile. When the Edition Check box was checked the number of charts in the selection list was only 295, or a little more than half of those with an updated zipfile. Therefore using the zipfile date as the criteria for downloading charts will nearly double the number of charts. At the end of each month NOAA will clear all of the outstanding NTMs for each chart resulting almost every chart getting a new zipfile. Therefore, using the zipfile date as the criteria for updating the chart library will normally require downloading the entire chart library each month.

As can be seen, chart 11314 is included in this list as the zipfile has been updated with metadata, but the user has not downloaded the chart because the chart has not been corrected for source or NTM changes. If the user were interested in downloading the latest chart update, regardless of whether or not the chart has been modified, this filter would be the one to use

Source Date

The Source Date filter check identifies all charts in the PC library for which NOAA has released chart with a later source date.

NTM Date

The NTM Date filter check identifies all charts in the PC library for which NOAA has released a chart with a later NTM date.

Criteria for Determining the Status of Individual Charts

NOAA ENC Chart Status Determination

The NOAA ENC chart catalog is distributed as an xml fileⁱⁱ that is very similar to the RNC Product Catalog.

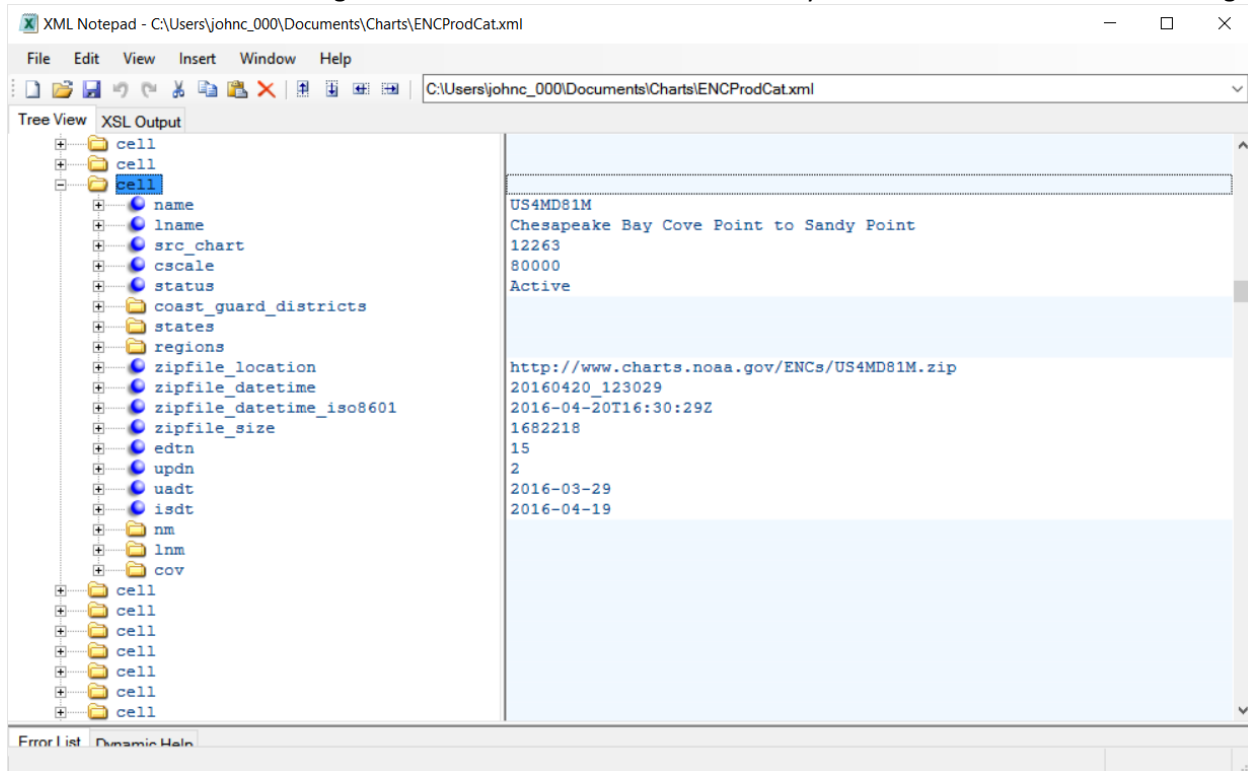


Figure 8, NOAA ENC Product Catalog Displayed in XML Notepad

Shown above is the XML Notepad display of the contents of the NOAA ENC Product Catalog xml file. The information displayed is for chart US4MD81M, “Chesapeake Bay Cove Point to Sandy Point”. The following elements from this xml record are used and/or displayed by ChartManager.

- **zipfile_location** – As for the RNC charts this is the URL of the zipfile that contains the files that make up the ENC chart. This is one of the parameters used by ChartManager to determine if a chart has been updated.
- **zipfile_datetime_iso_8601** – The date and time the chart zipfile was created.
- **edtn** – This is the edition number of the chart.
- **updn** – This the update number for the chart.
- **uadt** – This is the Update Application Date for the chart. It is the date a new version of the base file (e.g., US4MD81M.000) was released and corresponds to a new Edition for the chart. It is one of the parameters used ChartManager to determine if a chart has been updated.
- **isdt** – This is the Issue Date for the chart. It is the date the most recent patch file (e.g., US4MD81M.002) for the chart was released. This is one of the parameters used by ChartManager to determine if a chart has been updated.

Similar as for the RNC charts, ChartManager displays selective parameters from the ENC Product Catalog for a given chart alongside parameters extracted from the chart files that reside in the PC chart library.

Criteria for Determining the Status of Individual Charts

The screenshot displays the NOAA ENC Chart Library interface. The main window is titled "NOAA ENC Chart Library". It features a "Chart Catalog Selection Filters" section on the right with checkboxes for "Update Available", "Zip Date", "Update Date", "Issue Date", and "Chart Missing". Below these are dropdown menus for "USCG District", "State", and "NOAA Chart Region". A "Clear Filters" button is also present. The "ENC Chart Download Selection List" on the left shows a search for "US4MD81M" and "Chesapeake Bay Cove Point to Sandy Point". It includes buttons for "First", "Prev", "Next", "Last", "Download Chart Selection List", "View Chart Online (RNC Source)", and "Download Selected Chart". The "ENC Chart Catalog Data" section on the left provides detailed metadata for the selected chart, including "Chart Download URL", "ZIP File Date/Time", "ZIP File Size", "Source Chart", "Edition", "Update Date", "Issue Date", "NM", "NM Date", "NM Agency", "LNM Count", "LNM Doc Nr", "LNM Date", and "LNM USCG Dist". The "ENC Chart Library Data for Chart: US4MD81M" section on the right shows the "Date/Time of the US4MD81M.000 File" and the "ENC Chart Status".

Chart Download URL	ZIP File Date/Time	ZIP File Size	Source Chart	Edition	Update Date	Issue Date	NM	NM Date	NM Agency	LNM Count	LNM Doc Nr	LNM Date	LNM USCG Dist
http://www.charts.noaa.gov/ENCs/US4MD81M.zip	4/20/2016 12:30:29 PM	1682218	12263	15	3/29/2016	4/19/2016	1716	4/23/2016 12:00:00 AM	NGA	1	1516	4/12/2016	USCG05

Date/Time of the US4MD81M.000 File	ENC Chart Status
4/20/2016 12:30:26 PM	Chart is latest available

Figure 9, ChartManager Display of Chart Data for US4MD81M

Shown above is the ChartManager display of the data for chart US4MD81M. On the left are the parameters from catalog and on the right is the single parameter from the PC library – the date time of the US4MD81M.000 file. Unlike the RNC charts, NOAA does not distribute a text file with the chart that contains the same metadata as the catalog. The 000 base file and the 0nn update files are ISO 8211 formatted files, a parser for which I have started to develop, but it is not complete. According to the S-57 specification the file contains the edition number, Update and Issue dates for comparison to the catalog values. However, until the program can extract data from the ISO 8211 file that number cannot be accessed. So for now the only parameter from the chart file used by ChartManager to determine that a chart has been updated is the date time of the 000 file that resides in the PC library. That parameter can be compared to the three catalog dates (zipfile, uadt, and isdt).

In the instance shown above for US4MD81M the zipfile date is 4/20/2016, the uadt date is 3/29/2016, and the isdt date is 4/19/2016. The date of the 000 file that currently resides in the PC ENC chart library is 12/22/2015. So clearly all of the catalog dates are later than the date of the 000 file, and an updated chart is available for download.

ENC Chart Status Criteria

There are three date based criteria that can be used to select charts from the ENC Product Catalog for download.

Zipfile Date

This is the default criteria and is selected when the Update Available checkbox is checked. With this criteria the chart list will only include those charts in the catalog for which the associated 000 file in the PC library has a date prior to the catalog zipfile date.

Update Date

Checking the Update Date checkbox will cause the chart list to be re-built with only those charts for which the associated 000 file has a date prior to the uadt value in the catalog. This is the criteria option shown in the picture above. I am not sure if this is a correct comparison for determining that a chart has been updated, and the processing may require further research and programming. For now the zipfile date should be used to identify charts that have been updated.

Criteria for Determining the Status of Individual Charts

Issue Date

Checking the Issue Date checkbox will cause the chart list to be rebuilt with only those charts for which the associated 000 file in the PC chart library has a date prior to the isdt value in the catalog. So far I have not been able to identify any chart for which the issue date is different than the zipfile date.

Chart Missing

As for the RNC charts, the Chart Missing checkbox is used to identify those charts from the catalog for which no 000 file exists in the PC chart library. It can be used in conjunction with one of the data checks to identify all charts (updated or missing) that need to be downloaded.

Criteria for Determining the Status of Individual Charts

USACE IENC Chart Status Determination

The IENC chart files are very similar to the NOAA ENC chart files, and offer only file date time and chart edition values to determine if an updated chart is available on the USACE server.

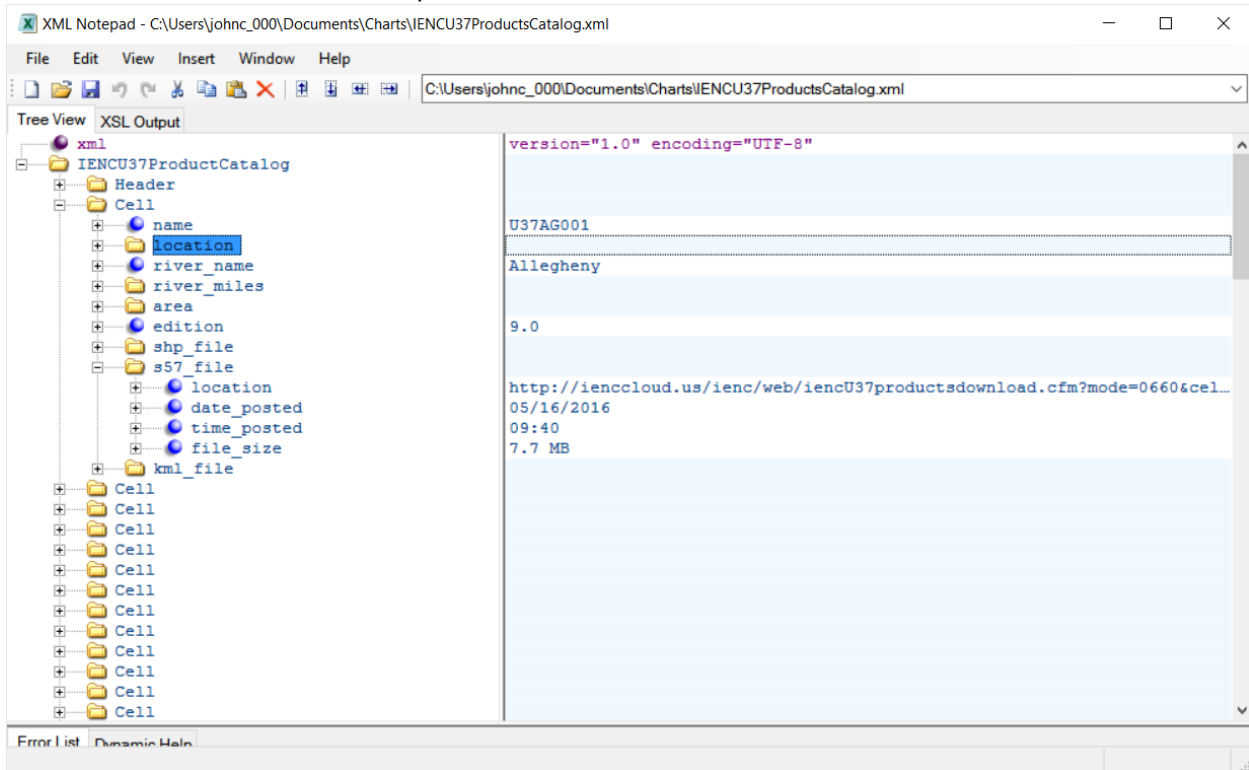


Figure 10, IENC Chart Catalog

The screen capture above is from the USACE chart catalog. For each chart there are 3 different representations that can be downloaded. There is a Shape file ("shp_file"), which is used by GIS software; a KML file ("kml_file") that is used with Google Earth; and the s57 file ("s57_file"), which is the chart file used by navigation software. ChartManager displays the catalog information on the shp and kml files, but only the s57 file information is used to download charts and manage the IENC library on a PC.

The catalog record shown above is for the Allegheny River. Under the "s57_file" node is the URL of the chart file ("location"), the date and time the file was posted on the server ("date_posted", "time_posted"), and the size of the file ("file_size"). Initially the program used the "date_posted" value to compare against the date of the *.000 file for the chart on the PC, just as done for the NOAA ENC charts. However the *.000 file contained in the downloaded compressed file often has an earlier date than the posted date. This caused the program to believe the chart files on the server were later than the files on the PC even when the chart had just been downloaded from the server. The program needed another way to compare the dates of the chart files.

To accomplish this comparison the ChartManager program creates an xml file in the folder for each downloaded chart, containing meta data on the chart.

Criteria for Determining the Status of Individual Charts

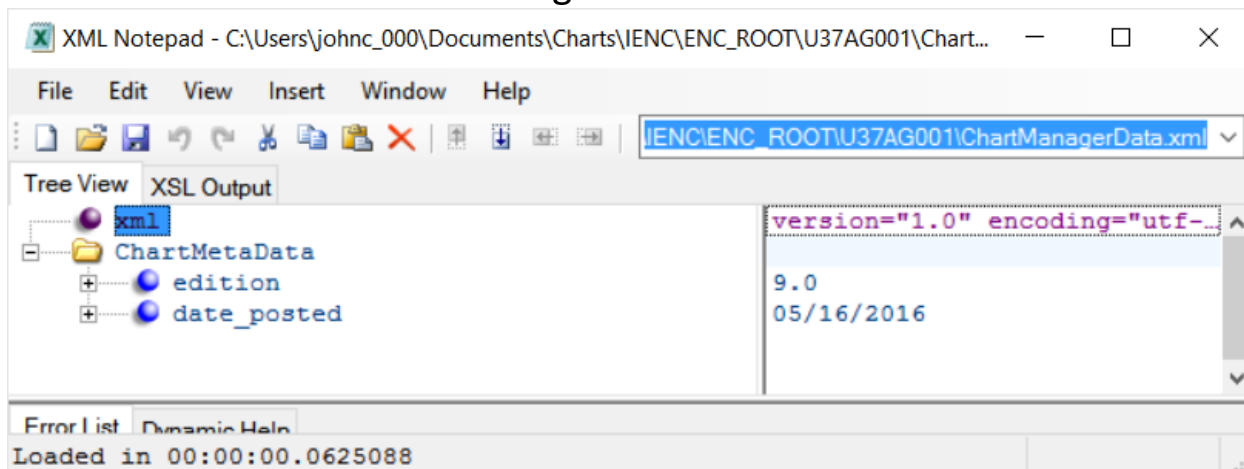


Figure 11, IENC Meta Data xml File Contents

The screen capture above shows the contents of the xml meta data file for the Allegheny River chart. The only data currently captured in this file are the edition and the date_posted values from the catalog at the time the chart files were downloaded. The program compares the date_posted value from this file, rather than the date of the *.000 file, to the value in the current catalog to determine if a later version of the chart is available for download.

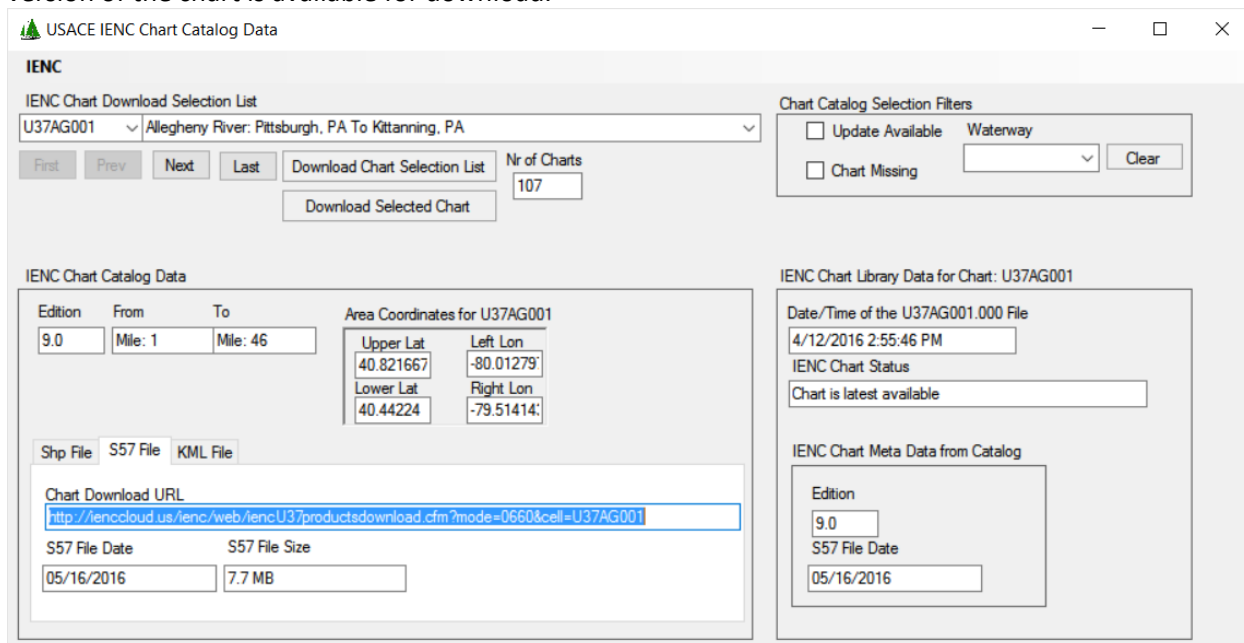


Figure 12, IENC Chart Library Form

Shown above is the IENC Chart Library form display of the Allegheny River chart. On left side of the form is the display of the catalog data on this chart, showing a posted date of 5/16/2016. On the right side is the data on this chart as it resides in the PC chart library. The date of the *.000 file displayed as 4/12/2016, which would tell the program that the chart in the catalog is later than the chart on the PC. However in the lower right portion of the form is the display of the meta data on this chart generated when the existing chart was downloaded, showing a date of 5/16/2016. Hence the program displays a status on this chart of "Chart is latest available".

Criteria for Determining the Status of Individual Charts

The IENC chart catalog contains only the edition number and date time posted values for each s-57 chart on the server. There are no Issue Date or Update Date values as in the NOAA ENC catalog. So the only criteria that can be used on the IENC form to identify charts that should be downloaded are the Update Available (a later chart is available) or the Chart Missing (chart does not exist in the IENC library) check boxes in the upper right portion of the form.

Criteria for Determining the Status of Individual Charts

Other Chart Sources

There are a number of other sources of navigation charts, both raster and vector, and a few of them offer free charts for download. The ChartManager development includes support for as many of these sources as possible and practical. This support is still under development, and partially implemented in version 1.6.5 of the program. However the final form of this support has not been determined and I recommend that user not use ChartManager to manage a library of these charts at this time. Once the development of this support has matured, this section of the document will be completed. Most likely it will involve criteria unique to each of the supported chart sources.

Chart Collections

There are two update checks performed on the charts in a collection.

Chart Download Check

When a chart collection is selected from the drop-down list on the Chart Collections form the program automatically performs a check on each chart in the collection to determine if a later chart is available for download. This is the same basic update check for each of the chart types/sources described above. For RNC charts the Edition Check is performed. For ENC and IENC charts the zipfile date check is performed. The zipfile date check for ENC charts can produce an erroneous result – identifying a chart as being out of date when it is actually up to date. The check should use the Update or Issue date contained in the ENC chart file and compare that to the value in the chart catalog. Extracting those dates from the chart file (*.000) requires parsing the ISO 8211 formatted data records in the file. That is under development, but has not been implemented.

Criteria for Determining the Status of Individual Charts

Create and Maintain Chart Collections

Chart Collection List: **FloridaRNC** [EDIT] [DELETE]

[Generate This Collection]

FloridaRNC Chart Collection Contents

Chart Collection Folder: C:\Users\johnc_000\Documents\Charts\ChartGroups\Florida\BSB_ROOT [Browse]

Chart Collection Members: 411 [v] Gulf of Mexico [v]

Up-To-Date	Update Avail	Missing	Total
66	22	0	88

[Download]

[Find the Collection Members]

Area Coordinates of Members

Upper Lat	Left Lon
35.33238	-98.11389
Lower Lat	Right Lon
17.77653	-67.16684

NOAA Criteria | **USACE Criteria** | Other Criteria

USCG District: [v]
 State: FL [v]
 Region: [v]

Chart Format: ☒ RNC ☐ ENC

Area Coordinates for Selection

Upper Lat	Left Lon
[v]	[v]
Lower Lat	Right Lon
[v]	[v]

Location of Chart Collections File: [Clear Criteria] [Change] C:\Users\johnc_000\Documents\Charts\ChartGroup.xml

Figure 13, Chart Collection Charts Have Been Updated

The form displays how many charts in the collection have been updated based on these checks (red ellipse) and offers a download button to perform the download of all charts in the collection that have been updated. The downloaded charts are stored in the master chart library such that those charts are updated for all collections in which they are included. However, the copies of the charts in the collection folder are not modified. That is the function of the Re-generation Check.

Collection Re-generation Check

The Re-generation Check is automatically performed to determine if one or more of the charts in a collection have been updated, and the program offers the user the option to re-generate the collection contents.

Criteria for Determining the Status of Individual Charts

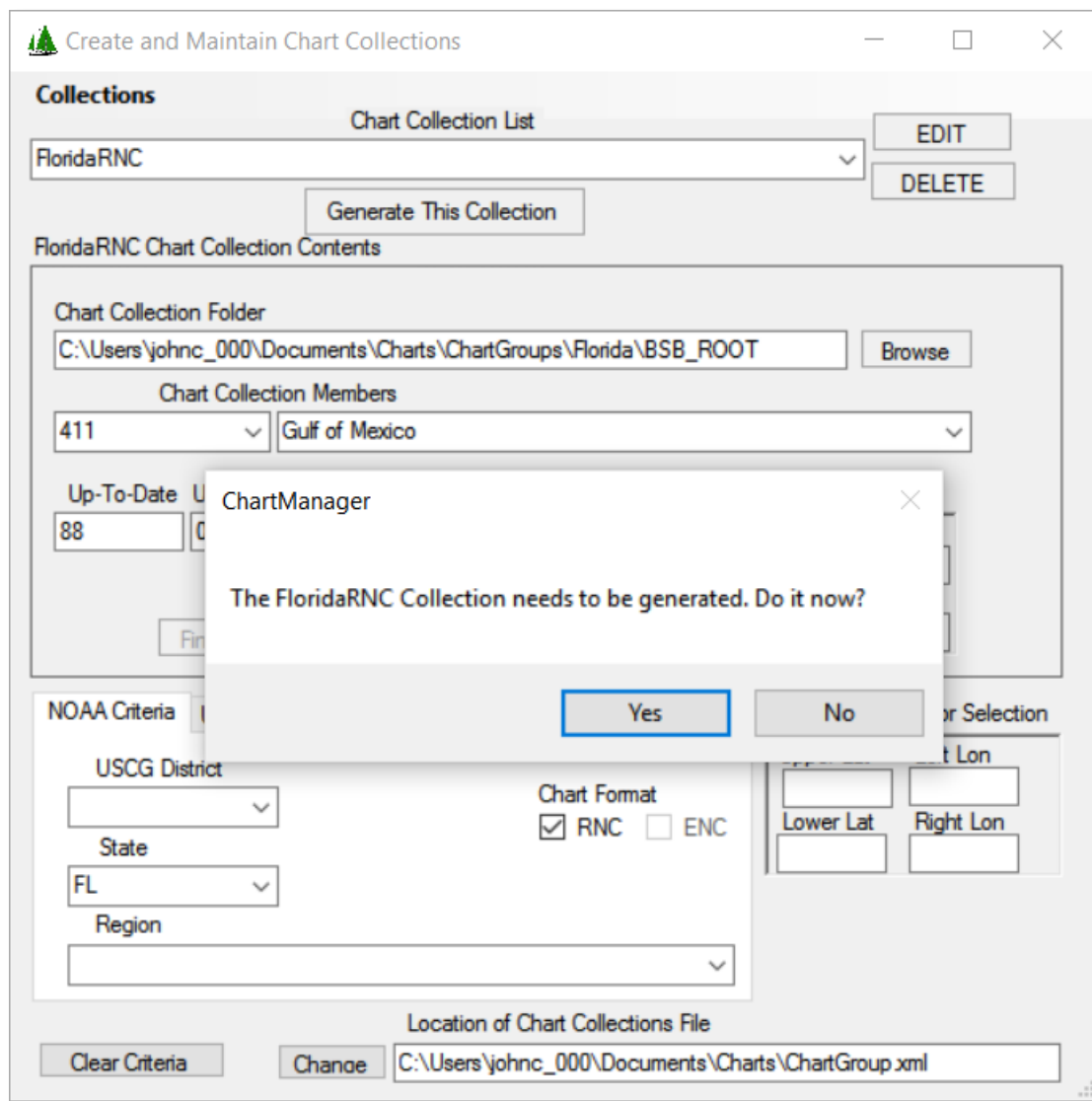


Figure 14, Chart Collection Needs to be Re-generated

The Re-generation Check is performed on the basis of the dates of the basic file type (*.BSB for RNC charts and *.000 for ENC and IENC charts). If the date/time of the chart file in the master library is later than the date/time of the file in the collection, the collection is flagged for re-generation. If the user selects the option to re-generate the collection, the entire contents of the collection is replaced by charts from the master library. If the user selects to not perform the re-generation, the collection form will provide a reminder of the need for this process every time the collection is selected from the drop down list.

The Re-generation Check is not performed on any selected collection if there is at least one chart in the collection for which an update is available for download. When the last updated chart is downloaded the program will then offer the user the option to re-generate the contents of the collection. The user can force a re-generation of a collection at any time by clicking the Generate This Collection button.

Criteria for Determining the Status of Individual Charts

ⁱ The NOAA RNC Product Catalog used by ChartManager may be supplanted or replaced by a catalog based on the ISO 19139 standard. An xml product catalog based on that specification is available for download. Sometime in the future ChartManager may have to be updated to process chart data from that catalog.

ⁱⁱ The NOAA ENC Product Catalog used by ChartManager may be supplanted or replaced by a catalog based on the ISO 19139 standard. An xml product catalog based on that specification is available for download. Sometime in the future ChartManager may have to be updated to process chart data from that catalog.