

Standard Operating Procedures for the Tampa Bay Marine Channels Forecast (TBMCF)

Procedure Number: SOP # 6.5-X

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- **Title:** Standard Operating Procedures for the Tampa Bay Marine Channels Forecast (TBMCF)
- **Purpose:** The purpose of this document is to provide the Oceanographic Division's Modeling Team and the staff of the Continuous Operational Real-time Monitoring System (CORMS) with concise, easily accessible documentation for operations, quality control and troubleshooting of the Tampa Bay Marine Channels Forecast.
- **Background/History:** Effective August 1, 2017, the Tampa Bay Marine Channels Forecast (TBMCF) was implemented on CO-OPS servers and operated by the Oceanographic Division's Modeling Team. The newly implemented TBMCF integrates meteorological forecasts from the NWS/Weather Forecast Office in Tampa Bay with oceanographic forecasts from the CO-OPS Tampa Bay Operational Forecast System (TBOFS). TBMCF provides users with a suite of integrated forecast products that include water levels, currents, winds, wave height and period, swell, rain chance and probability of visibility of less than one statute mile and that extend out to 24 hours in the future. Additionally, TBMCF was constructed within the standardized Coastal Ocean Modeling Framework (COMF).
- **Scope/Applicability:** The target audience for this document is the Oceanographic Division's Modeling Team and CORMS, responsible for the 24 hours a day, 7 days a week monitoring of CO-OPS' operational observations, predictions, and forecast systems (models). This document provides the Standard Operating Procedure (SOP) for CORMS to monitor TBMCF and alert the CO-OPS modeling team and the personnel of the NWS/Weather Forecast Office in Tampa Bay.
- **Main Processes:** The NWS/Weather Forecast Office in Tampa Bay (TBWFO) packages its meteorological forecasts and delivers them to the NWS/National Centers for Environmental Prediction (NCEP) who in turn deposit them into a public FTP (<ftp://tgftp.nws.noaa.gov/data/tampa>) site for CO-OPS ingestion. During times of mild weather, the TBWFO only updates its meteorological forecasts every six hours (0, 6, 12 and 18 UTC). During these times of mild weather, the same 0 UTC files are delivered to the FTP site at 0, 1, 2, 3, 4 and 5 UTC. In other words, the 1 UTC through 5 UTC files are duplicates of the 0 UTC files. During times of severe weather (thunderstorms, fog, etc.) the TBWFO updates its weather forecasts much more frequently (hourly). During those times, when forecasts are updated more frequently, each set of files delivered to the FTP site at 0, 1, 2, 3, 4 and 5 UTC is distinct and contains the most recent forecast data.

TBOFS, on the other hand, only has four daily nowcast and forecast cycles at 0, 6, 12, and 18 UTC. TBOFS operates within the NOS Coastal Ocean Modeling Framework (COMF) and details of its schedule, CORMS flags and responses are documented in SOP #6.5.1.1.7.1 Standard Operating Procedures for the Chesapeake Bay Operational Forecast System (CBOFS). TBOFS runs on NOAA’s Central Computing System operated by NCEP Central Operations four times per day and produces nowcast and forecast guidance. All model output files are pushed onto NOAA’s Web Operation Center (WOC). Graphics and web products are generated on CO-OPS’ Linux server (ofs1) and displayed on CO-OPS’ Tides and Currents website (<https://tidesandcurrents.noaa.gov/>).

In turn, the TBMCF has 24 daily cycles. The TBMCF reaches out to the FTP site on an hourly basis for the most recent TBWFO forecast files, reaches out to TBOFS for its most recent output, and generates a new suite of integrated meteorological and oceanographic products. TBMCF also operates within the COMF.

The TBMCF relies on the forecast files provided by the TBWFO and TBOFS as well as a portion of the graphics also provided by TBOFS. Occasional operational shutdowns at the TBWFO lasting less than 24 hours as well as occasional communication difficulties between CO-OPS and the WOC resulting in a failure to obtain TBOFS output, will in turn affect the TBMCF. There are no secondary, or backup, sources of meteorological and oceanographic data for Tampa Bay in the TBMCF. During short-lived shutdowns and communication breaks, the TBMCF will use the forecast files from the most recent successful cycle. TBWFO forecast files extend out to at least 24 hours and TBOFS output extends out to 48 hours allowing time for troubleshooting before the TBMCF begins to fail.

- **Detailed Sub-Processes/Checklists:** The TBMCF runs at CO-OPS on an hourly basis. It reaches out to the NWS FTP site for the TBWFO forecast files and to TBOFS for its forecast files and a portion of its graphics. The TBMCF then reformats the forecast data and generates a set of graphics and web products on CO-OPS’ Linux server (ofs1) and displays them on CO-OPS’ Tides and Currents website (<https://tidesandcurrents.noaa.gov/>).

6.1 TBMCF Schedule

See Table 1 below for the TBMCF schedule. At the end of each cycle simulation (posted time), the system will send automated emails to CORMS and other key team members. The automated messages will be generated based upon various flag settings.

Table 1 TBMCF Schedule

Cycle	Category	Hour (GMT)	Posted Time (GMT)
0	Obtain Files, Reformat, Generate Products	18	2:40
1	Obtain Files, Reformat, Generate Products	18	3:40
2	Obtain Files, Reformat, Generate Products	00	4:41
3	Obtain Files, Reformat, Generate Products	00	5:43
4	Obtain Files, Reformat, Generate Products	00	6:41
5	Obtain Files, Reformat, Generate Products	00	7:41
6	Obtain Files, Reformat, Generate Products	00	8:40

7	Obtain Files, Reformat, Generate Products	00	9:41
8	Obtain Files, Reformat, Generate Products	06	10:41
9	Obtain Files, Reformat, Generate Products	06	11:41
10	Obtain Files, Reformat, Generate Products	06	12:41
11	Obtain Files, Reformat, Generate Products	06	13:41
12	Obtain Files, Reformat, Generate Products	06	14:40
13	Obtain Files, Reformat, Generate Products	06	15:41
14	Obtain Files, Reformat, Generate Products	12	16:41
15	Obtain Files, Reformat, Generate Products	12	17:41
16	Obtain Files, Reformat, Generate Products	12	18:41
17	Obtain Files, Reformat, Generate Products	12	19:41
18	Obtain Files, Reformat, Generate Products	12	20:41
19	Obtain Files, Reformat, Generate Products	12	21:41
20	Obtain Files, Reformat, Generate Products	18	22:41
21	Obtain Files, Reformat, Generate Products	18	23:41
22	Obtain Files, Reformat, Generate Products	18	0:41
23	Obtain Files, Reformat, Generate Products	18	1:41

6.2 Product Location

TBMCF CORMS Hyperlink

https://tidesandcurrents.noaa.gov/ofs/mcfmodel_status.html?region=tb

TBMCF [MAIN WEB PAGE](#)

https://tidesandcurrents.noaa.gov/ofs/tbofs/tbofs_mcf.html

The TBWFO NetCDF forecast files are available at the NOS/CO-OPS OPeNDAP server and the THREDDS server under TBOFS:

<https://opendap.co-ops.nos.noaa.gov/netcdf/>

<https://opendap.co-ops.nos.noaa.gov/thredds/catalog.html>

6.3 CORMS Schedule for Inspection and Monitoring

Following all cycles

1. Read and follow the instructions of automated emails.
2. Inspect the **Reporting Tool** and refer to the flag protocols for necessary actions (Table 2) and contacts (Tables 4 and 5).
3. Inspect all the **Time Series graphics and Data Charts**.
4. Inspect all the **Animations graphics**.

6.4 CORMS Flags and Responses

Table 2 provides a summary of the flags that the CORMS operators will monitor and notify responders of during periods of specified failures. Table 3 provides a more detailed explanation of each CORMS flag.

NOTE: A portion of the products displayed on the TBMCF are directly from TBOFS. As a result, in the CORMS OFS Control Panel (CCP), dissemination of TBOFS and the TBMCF is linked. If CORMS stops dissemination of TBOFS (all products) then dissemination of all TBOFS-related products is also stopped in the TBMCF. The TBOFS-related products are currents and water levels along-channel cross-sections, map animations, and time series and all station data charts. Additionally, dissemination of all TBOFS-related products is also stopped in the TBMCF whenever CORMS stops dissemination of TBOFS water levels and/or TBOFS currents on the CCP.

Table 2 Summary of CORMS Flags and Protocols for TBMCF

Flags			Actions	
#	Flag Name	Key Flag	Core Hours Mon-Fri 6:30-15:30	Off Hours
			[#] = cycles failed red or black before contact {who to contact} <how to contact>	
1	DISKFREE	Yes	[4]{ISD Ops and MT}<E,T>	Same
2	NETCDF_INPUT	Yes	[2]{MT and TBWFO}<E,T>	same
3	CO-OPS_TEXT	Yes	[1] {MT}<E,T>	same
4	GRAPHICS	Yes	[2]{MT}<E,T> STOP	same

Table 3 Table of CORMS Flags for TBMCF

#	Flag	Color	Messages/Actions
1	DISKFREE	Red	DISKFREE and ARCHIVE WARNING: Either /opt/archive directory is over 95% full or the archiving and purging code experienced a failure. Core/Off Hours: Notify ISD Ops Team and Modeling Team if Red for 4 Continuous cycles.
		Yellow	WARNING: Either /opt/archive directory is over 85% full or the archiving and purging code experienced a failure. Core/Off Hours: Notify ISD Ops Team and Modeling Team if Red for 4 Continuous cycles.
2	NETCDF_INPUT	Red	NetCDF INPUT FAILURE: Failed to obtain TBWFO forecast data from NCEP FTP site. Core/Off Hours: Notify Modeling Team and NWS Tampa Bay Weather Forecast Office if Red for 2 Continuous cycles.

3	CO-OPS_ TEXT	Red Yellow	TEXT OUTPUT FAILURE: Failed to reformat TBWFO data into station forecast files or both TBWFO and TBOFS data are missing and station forecast files are empty. Core/Off Hours: Notify Modeling Team and STOP dissemination. WARNING: missing TBOFS data in TBMCF station forecast files. Notify Modeling Team.
4	GRAPHICS	Red Green	GRAPHICS FAILURE. Failed to generate NWS map animations. Core/Off Hours: Notify Modeling Team if Red for 2 continuous cycles and STOP dissemination. GRAPHICS --- SUCCESSFUL. Conduct detailed QC inspection of products.

Table 4 Standard Notification Protocols for TBMCF

Contacts	Core Hours Mon-Fri 06:30-15:30 <how to contact> <E=email, T=Telephone>	Off Hours <how to contact> <E=email, T=Telephone>
Modeling Team: {MT}	1. <E,T> MT On-Call. 2. If no confirmation from step 1, wait 1 hour and repeat step 1. 3. If no confirmation from step 2, then <T> MT On-Call Backup cell.	1. <E,T> MT On-Call cell(s). 2. If no confirmation from step 1, wait 1 hour and repeat step 1. 3. If no confirmation from step 2, then <T> MP On-Call Backup cell.
ISD Ops Team (on-call schedule provided by ISD): {ISD}	1. <T> ISD On-Call. 2. If no confirmation from step 1, wait 1 hour and repeat step 1. 3. If no confirmation from step 2, then <T> ISD On-Call Backup cell.	1. <T> ISD On-Call cell.
NWS Tampa Bay Weather Forecast Office: {TBWFO}	1. <E> TBWFO at SR-TBW.OPS@noaa.gov include "Marine Channels Forecast" in the subject. 2. If no confirmation from step 1, wait 1 hour and repeat step 1.	1. <E> TBWFO at SR-TBW.OPS@noaa.gov include "Marine Channels Forecast" in the subject. 2. If no confirmation from step 1, wait 1 hour and repeat step 1.

- **Quality Assurance/Control:** The CORMS staff is responsible for the 24 hours a day, 7 days a week monitoring of NOS’ operational observations, predictions, and forecast systems (models). The Modeling Team will work with CORMS to investigate the flags and work on solutions to ensure timely and correct information is displayed on the TBMCF web page.
- **Management/Responsibility:** Table 4 provides the protocols and contacts for notifications required for responding to the TBMCF flags detailed in Table 2. The members of the Modeling Team are the primary contacts for TBMCF (nos.co-ops.modelingteam@noaa.gov) and have the responsibility for maintaining this SOP. The Modeling Team will notify ISD if ISD support is required.
- **Change History:**

Appendix A: Technical Summary of TBMCF Implementation

In 2013, the NWS Weather Forecast Office (WFO) in Tampa Bay, developed an experimental Tampa Bay Marine Channels Forecast (TBMCF) product at the request of and with input from local Tampa Bay pilots. In 2014, NOS and the WFO began to transition TBMCF to CO-OPS. The TBMCF fully integrates NWS forecasts (wind direction and speed, wind gust, significant wave height and period, swell, rain chance, weather, hazards and the probability of visibility of less than one statute mile) with NOS water level and current forecast guidance from the CO-OPS Tampa Bay Operational Forecast System (TBOFS). TBMCF operates within the existing OFS COMF system.

The WFO's meteorological forecast files are made available to CO-OPS at a NWS public FTP site by NCEP. CO-OPS then reads, reformats and integrates the weather forecasts with TBOFS oceanographic forecasts. A full suite of integrated products is generated; these include time series, along-channel cross-sections, map animations and forecast data charts.

Missing products at the TBMCF website would result from a failure to transfer TBOFS output from NCEP to CO-OPS. Missing TBOFS output files would translate to missing products for both TBOFS and TBMCF. In this instance, TBMCF would continue to display the NWS WFO's data until the TBOFS output became available.

Occasional missing data from the WFO would most likely be the result of an intentional operational shutdown (to upgrade servers, for example). In this case the failures would be short-lived (generally 8-12 hours) and would only occur during mild weather. In this case, CO-OPS would continue to display products from the most recent successful iteration.

Appendix B: Trouble Shooting

This appendix describes strategies and approaches to diagnose and fix some common failures of TBMCF.

Case 1: Failed to obtain Tampa Bay WFO forecast data from NCEP FTP site. NetCDF_INPUT CORMS flag will be red.

This is most likely the result of an intentional operational shutdown at the Tampa Bay WFO which allows them to update and/or upgrade their systems. These events occur approximately twice per year and last no more than 24 hours (typically about 8 hours). The TBMCF product will continue to display NWS products based on the last successful iteration.

Contact the WFO to confirm the failure is the result of an intentional shutdown. If the failure is not due to an intentional shutdown then the WFO can now begin investigating the cause of the missing forecast files (<ftp://tgftp.nws.noaa.gov/data/tampa>).

WFO and determine if they have made any changes to the forecast files or if perhaps a software upgrade has altered the structure or content of their files.

**Case 3: Failure to generate the map animations based on the WFO's forecast files.
GRAPHICS flag will be red.**

A failure in this instance may be due a recent update or upgrade occurring at the WFO, which altered the format or content of the WFOs files resulting in a failure to create the products. This issue would perhaps have been identified in Case 2. Reach out to the WFO and determine if they have made any changes to the forecast files or if perhaps a software upgrade has altered the structure or content of the files.