Northeast U.S. Early Season Preview 2018
PROMISING FEATURES SHOULD LEAD TO A PRODUCTIVE SEASON

By: Matthew A. Upton

ROFFS™ concludes its 2018 spring preview series by providing an overall update of the oceanographic conditions from mid-to-late April offshore of the northeastern United States focusing in on the Mid-Atlantic Bight region and its canyons that includes the zone from Cape Hatteras to Georges Bank into the Gulf of Maine. We again utilized a combination of many different data sets mainly satellite derived sea surface temperature (SST) and ocean color/chlorophyll images. In this article we will discuss the present ocean conditions and what it means for the upcoming late-spring to summer fishing season for the North Carolina to Massachusetts area.

For forecasting short-term oceanographic conditions related to finding fish, ROFFS™ uses real-time direct observations. We have learned that evaluating the preseason conditions along with regional, downscaled climate models provides insight into future seasonal trends for fishing. Experience and understanding the ocean – atmospheric dynamics is our guide as we have had moderate success in forecasting seasonal trends of fishing productivity based on the stepwise progression in the location of the fishes' preferred habitat based on temperature and water color. Please reference our 2018 Bahamas forecast for more in-depth discussion on the environmental and climate indicators that goes into our detailed evaluation of the eastern United States fishing forecasting analysis (Click Here).

Background and Some Observations for 2018

It is important to look at the year-to-year trends including the anomalies to gain insight into the location and condition of the fishes' preferred habitat compared with previous years. Comparing similar locations and features to last year during the same mid-to-late April time period we found that the SST of the core of the Gulf Stream off of Cape Hatteras, NC for 2017 was approximately 78.0°F – 78.5°F and for this year it is 1.5°F to 2.0°F cooler (76.0°F – 77.0°F). The SST of the coastal water off of New Jersey, Delaware and Maryland is approximately 1.0°F cooler this year than during the same time period in 2017. Furthermore, the SST offshore of Long Island is also about 1.0°F cooler than this time last year. These and other indicators that will be described below suggest a slightly later arrival or a closer to normal arrival of the main migration of tuna, wahoo, dolphin and billfish into the northeast canyon region this year compared to last year.

One of the main reasons for the cool spring SST's in the Northeast U.S. region can be attributed to the North Atlantic Oscillation (NAO) switching from a positive phase in February to an extreme negative phase in March. NAO index is based on the atmospheric surface sea level pressure difference between the Subtropical (Azores) High and the Subpolar Low within the North Atlantic Ocean (https://www.ncdc.noaa.gov/teleconnections/nao/). This extreme negative NAO index in March is likely responsible for the cooler than normal temperatures in the eastern United States and also associated with an increase of nor'easters and higher wind events in the Northeast U.S., which is exactly what we have been observing in this region this spring

(http://view.surfline.com/eastcoastmarch/8/). Stay tuned or contact ROFFS™ for updated reports of the always-changing ocean conditions related to the best fishing action near your inlet.

The good news is the atmospheric temperatures are finally starting to warm and the SST will start to increase at a more rapid pace as April transitions into May. Also, please see ROFFS™ recent Southeast U.S. Gulf Stream fishing conditions analysis (Click here). These Gulf Stream conditions to the south are usually a good indicator and associated with an abundance of yellowfin tuna and marlin along with other highly migratory species. Recent reports the past two weeks have already confirmed a number of yellowfin tuna catches off of Oregon Inlet to Cape Hatteras, NC, where you find the Gulf Stream filaments and Gulf Stream edges. Based on historical observations we anticipate that these fish along with other tuna, dolphin, wahoo and then billfish will move to the northeast U.S. region from the Gulf Stream and into the relatively large eddy features that move over the canyon areas. Additional good news is that wahoo, dolphin, tuna and sailfish have already been caught off of South Carolina, North Carolina and northern Florida suggesting these species are already within the Gulf Stream and migrating north and soon (if not already) within the northeastern U.S. waters when the habitat is favorable.

Nowcast Analysis

One of the most valuable features that we look at when trying to forecast the region in the Northeast U.S. is the number, size and location of clockwise rotating warm-core Gulf Stream eddies that are located north of the Gulf Stream region from south of Georges Bank to offshore of the New York, New Jersey to Delaware areas. These are eddies that have broken off from the Gulf Stream and tend to slowly drift westward toward the Atlantis Canyon to Hudson Canyon and then in a southwestward direction toward the Norfolk Canyon before being pulled back into the Gulf Stream. The environment associated with warmer blue water and the mixing boundaries of the eddy features provide valuable habitat for the highly migratory large pelagic fish that enter this region in the spring and early summer seasons. Although, last year started out looking promising, there were an overall lack of warm-core eddies and they were further offshore of the New Jersey to Maryland canyon areas. This year already looks more promising as we will discuss in detail below.

The spring satellite data shown in Figure 1 and 2, and the fishing reports we have already received may provide insight into the upcoming fishing season. Figure 1 was derived from a variety of U.S. (NOAA and NASA) and European (ESA) satellites to show the SST during April 20-23, 2018 period. Figure 2 was derived from the NASA MODIS ocean color satellites (Aqua and Terra) showing the ocean color/chlorophyll image data during this same period April 18-23, 2018.

We used a combination of imagery over a few days with the time-tested ROFFS™ cloud reduction algorithm to produce these relatively cloud-free images over this large area. The time of the satellite passes and the amount of data taken from each image is not the same for the SST and ocean color images. Thus, there are some subtle differences in locations of where the water mass boundaries derived from the SST and ocean color occur. Again, a noted mismatch is seen in the area east of Cape Hatteras to east of Oregon Inlet, NC where in the SST (Fig. 1), the Gulf Stream is closer to shore and relatively straight but in the Ocean Color (Fig. 2), the Gulf Stream appears further offshore and contains more meandering. In spite of these and some other issues this image pair is considered more than adequate for the purposes of our seasonal discussion.

The directional flow of the water was derived from our ROFFS™ sequential image analysis techniques, following the water masses, image to image based on the water mass's distinct, i.e. signature value. An example of this year's SST satellite infrared imagery in a greytone movie can be found on the ROFFS™ YouTube™ site (https://www.youtube.com/watch?v=QcMD6XNxpUE). Viewing the movie several times allows one to visualize the flow of the Gulf Stream and other currents, where the darker greytoned water is the warmer water and white areas are clouds.

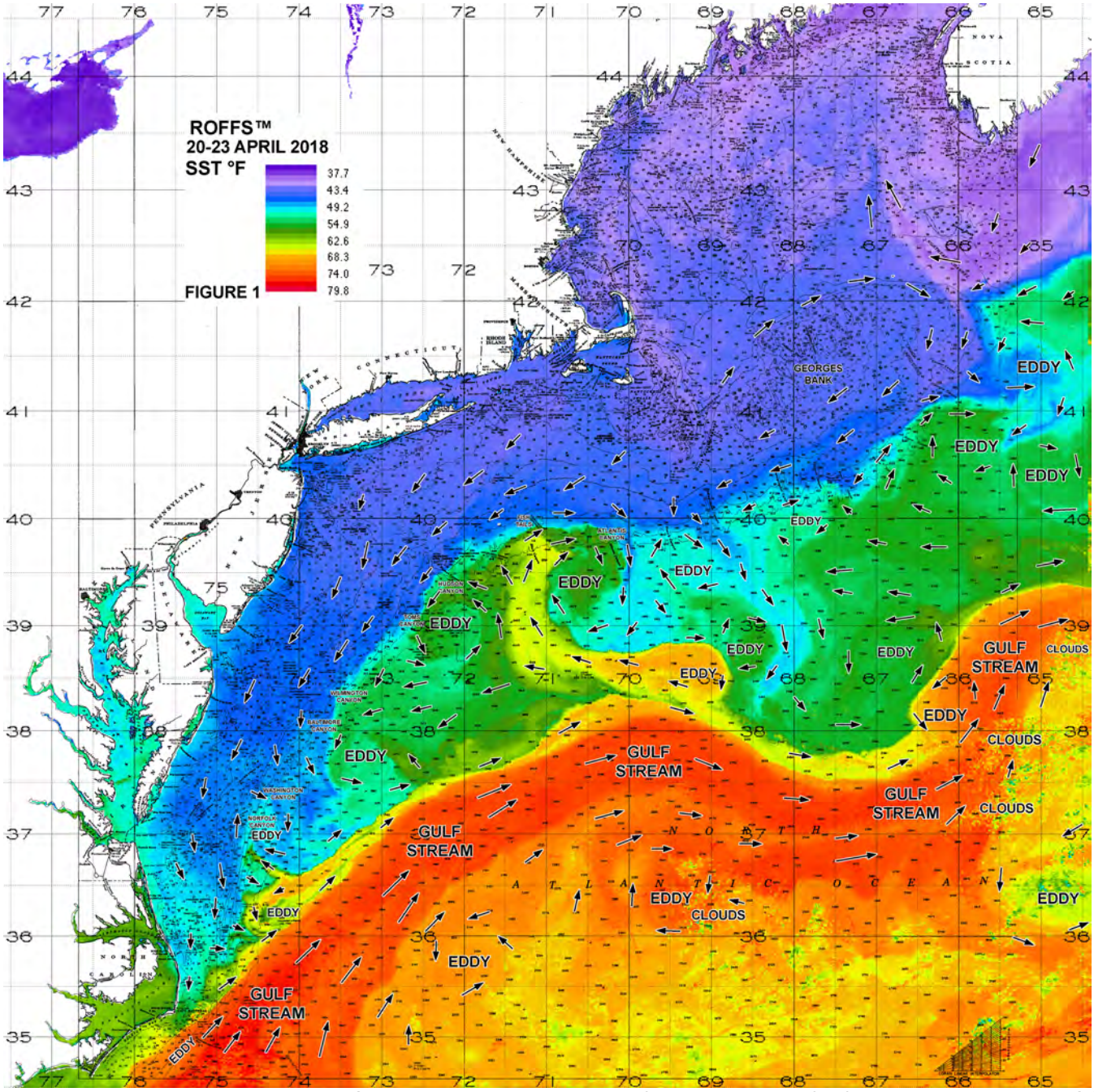

Figure 1: *This year's Northeast U.S. conditions were derived from a variety of infrared sensors to get SST from NASA, NOAA and ESA satellites during April 20-23, 2018. Main features, canyons and surface currents are labeled.*

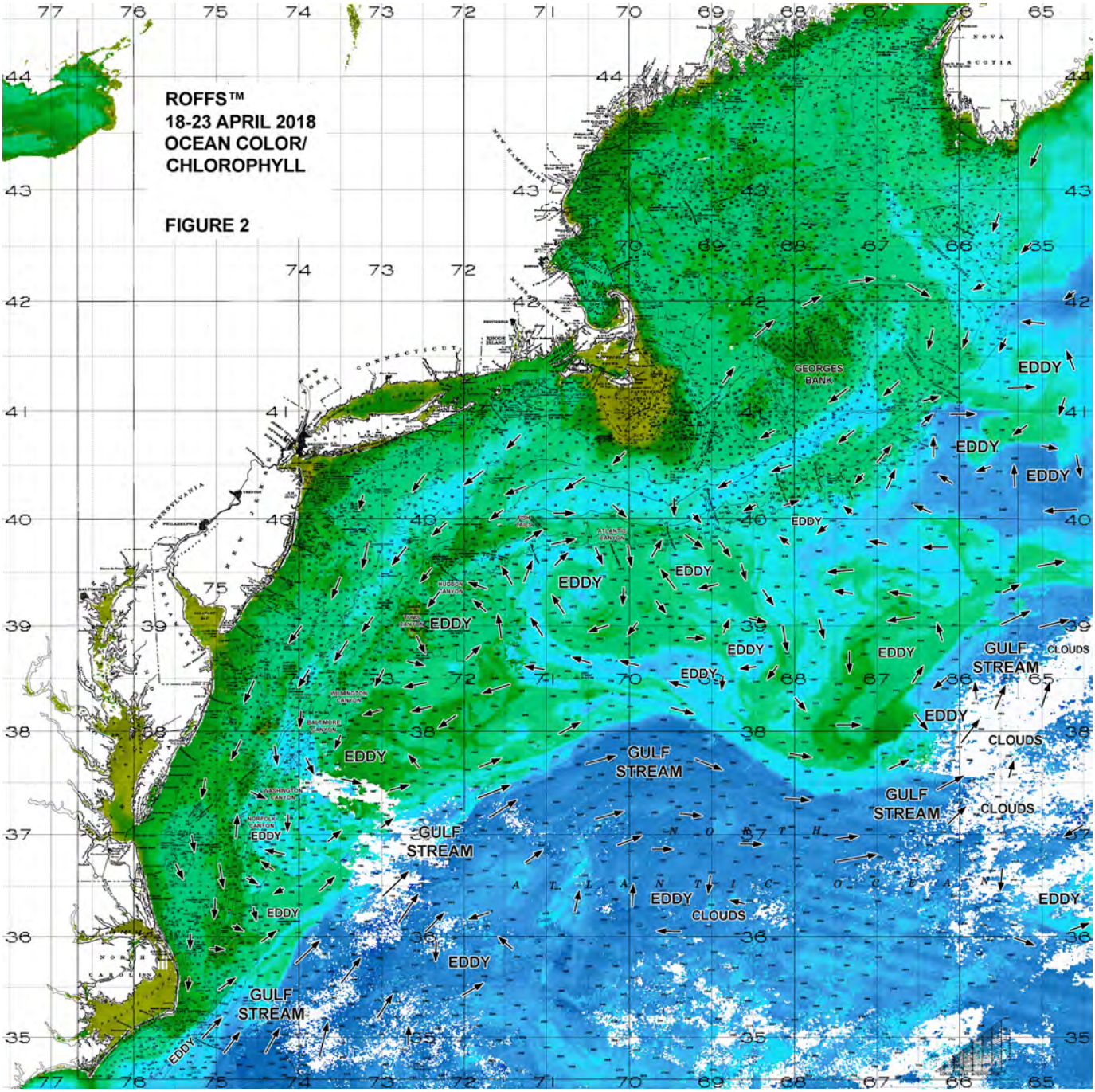

***Figure 2**: This year's Northeast U.S. conditions derived from the ocean color/chlorophyll imagery during April 18-23, 2018 from the Aqua and Terra sensors on the MODIS satellite. We consider this an image pair with the above SST Figure 1 image. Same main features and surface currents labeled, white indicates clouds.*

The most exciting news is that we continue to observe a series of these clockwise rotating warm core Gulf Stream eddies stacked up north of the Gulf Stream from southeast of Georges Bank, south of Oceanographer Canyon, south of Veatch Canyon and **most importantly** right now is the larger eddy centered at 70°45'W & 39°30'N offshore between Block Canyon and Atlantis Canyon. Also of note is the counter-clockwise rotating eddy centered offshore between Hudson and Toms Canyon. These eddies, although still relatively cool, will start to warm rapidly over the next few

weeks. Also, depending on proximity, these eddies will interact with the Gulf Stream and will be pulling new warmer Gulf Stream water toward the canyon areas and providing the pathway for the tuna and other migratory fish to enter the canyon areas.

In fact, looking at Figure 1, the eddy pair offshore of Atlantis Canyon to Block Canyon and Hudson to Toms Canyon is already pulling up warmer Gulf Stream related water (64°F - 65°F) directly into Block Canyon toward the Fish Tails area and will soon be pulling this water toward Hudson Canyon to the west and West Atlantis Canyon to the east for some good early season shark, tuna and swordfish opportunities. As these eddies continue to warm and pull up Gulf Stream water and progress west then southwestward, fishing action should improve rapidly for good late April and May fishing in the northern canyons and remain favorable for early season shark and tuna action into late May and June between Hudson Canyon to Lindenkohl Canyon and into Wilmington Canyon by Memorial Day weekend if not sooner.

It is also important to look further east to the eddies and conditions forming east of the Atlantis Canyons to Oceanographer Canyons and southeast Georges Bank. As these will likely be the features that contribute and progress west then southwest and what fishers will be targeting during the mid-to-late summer season from the Gulf of Maine to the canyons south of New York to the canyons offshore of New Jersey, Delaware, Maryland and Virginia. It appears that if the eddies we see now south of Veatch Canyon in conjunction with the large amount of bluer water and eddies south of Georges Bank remain in tact and drift in the traditional westward direction, it has the potential to be a good if not excellent fishing season offshore of the Northeast U.S. later this spring and into the summer. As always it only takes a few days to a week for the Gulf Stream to shift and push farther north and form more warm-core eddies to further improve the fishing conditions so please contact ROFFS™ for your analysis and updates.

For shorter term promising conditions, we are keeping a close eye on two other developed eddies; a counter-clockwise rotating eddy centered east of the 1000 fathom contour in the Poor Mans Canyon area (73°25'W & 37°45'N) and a clockwise rotating eddy centered just offshore of Norfolk Canyon. These two eddies are already pulling in warmer Gulf Stream filament water closer to the bank and especially south of Norfolk Canyon toward Norfolk Canyon for potential for good early season fishing action for the Delaware, Maryland and Virginia crowd. If the eddy that is now well east of Poor Mans Canyon continues to pull in Gulf Stream water and progresses west or southwest, the areas over the bank between Poor Mans Canyon to Washington Canyon will be improving for sharks and tuna very soon. We are not concerned about the lack of blue water over this region at this time because we are in the peak season of the spring algae bloom (as evident in the large abundance of greener water in Figure 2.). This is an annual event that provides the food for many of the baitfish species for the next month or two.

Another effective indicator for forecasting a good 2018 season is the recent fishing reports. Some recent fishing reports (mid-to-early April) have already confirmed the good conditions and fishing action for tuna (mainly yellowfin) and sharks (mako and thresher), as well as, for the newly arriving yellowfin tuna and mahi along the Gulf Stream edges and related warmer filaments offshore of Cape Hatteras, NC to offshore of Oregon Inlet, NC. There have even been at least a couple of reports of wahoo caught in these areas already. Based on the current conditions and eddy locations, it will not be long and would not be surprising if some bigeye tuna, sharks, swordfish and maybe even yellowfin tuna start arriving between Hudson Canyon, Block Canyon and Atlantis Canyon within the next week or two if not already.

Conclusion

Based on what we have been observing over the last several weeks from the Bahamas to North Carolina along with the number of Gulf Stream warm-core eddy features in the Northeast U.S., it seems that the tuna will be in some of the northern canyon areas in May and a productive season for first tuna then dolphin, wahoo and marlin is highly likely as you progress into early-to-mid summer. Although it has been a cooler than normal spring and a slow start to the season and the majority of the population of fish may be arriving slightly later then normal, sharks and yellowfin tuna have already been caught off of North Carolina and soon wahoo, mahi and then marlin will follow. It remains to be seen how many bigeye tuna and albacore tuna will arrive this year as this is still a mystery over the last few years. Two years ago bigeye tuna were caught at higher rates, while last year was relatively slow. We still have so much to learn about the distribution and migrations of these and other fish and their association with different oceanographic conditions.

We encourage you to take a look at these early season conditions and get your boat ready for when the weather permits. **The bottom line is**, the existing eddies and oceanographic conditions suggest, especially for the New Jersey, New York, Connecticut, Rhode Island crowd that you should be in final preparations for your offshore season. Get your boats in the water now as it is very possible that the areas of West Atlantis Canyon to Block Canyon to Hudson Canyon and Toms Canyon will be seeing tuna, shark and swordfish action in the next week or two (if not already) and then the conditions will rapidly improve between Toms Canyon to Baltimore Canyon to Washington Canyon into May and June. Keep in mind that during 2016 and 2017 some of the best tuna fishing occurred in May and June.

It is important to note that good fishing action on a daily basis is strongly linked to local, short-term (days) current conditions that concentrate the fish once the preferred habitats of the fish are in a particular region. When the water mass boundaries associated with these currents are geographically stable and favorable, i.e., persistently pushing over “good” bottom topography and/or in a favorable inshore direction, then they concentrate the baitfish and larger fish can be found foraging. This indicates that the fishing action on any given day is controlled by relatively short-term (hourly to daily) and relatively small-scale (1-5 mile) movements of the currents and their water mass boundaries. Our experience indicates that to reliably forecast specific concentrations of fish on a daily basis one must evaluate the ocean conditions on these scales. Relatively small subtle changes in the currents and their associated water mass boundary zones often have dramatic effects on the distribution and concentration of fish.

Please contact ROFFS™ (1-321-723-5759 / fish7@roffs.com / www.roffs.com) for the up-to-date detailed fishing conditions and get the inside track to where the better fishing locations will be tomorrow. The weather should be improving and when weather permits you should be ready to get offshore. Our experienced satellite and fishery oceanographers will continue to monitor the northeast U.S. oceanographic conditions closely as the shark and tuna season quickly develops (and is already here off of North Carolina) and the busier summer fishing season rapidly approaches.

Safe and Successful Fishing