



The Teaser®

Season Fishing Forecast for 2010: Much Better Than 2009

By Mitchell A. Roffer, Ph.D.

Background:

Since 2003 we have been developing an objective method for forecasting the overall fishing action at all of the Bahamas Billfish Championship (BBC) tournaments. The hypothesis for forecasting the seasonal marlin fishing action stems from the location and geographic extent of the bluer and often warmer water that occurs from the Cat Island – San Salvador Island area where it is presumed that the marlin concentrate before spawning. We have been calling this water “blue marlin water.” We assume that the marlin are associated with this water and the more “blue marlin water” that exists in the Abaco Islands and Eleuthera Island areas, the greater the marlin relative apparent abundance will be in these areas. This assumes that the temperature of the water is within the preferred temperature range of the marlin. It also assumes that the trends in the conditions we observe between January and March will continue through June or that we can observe the conditions east and southeast of the BBC fishing area and forecast what will be coming into the fishery during that period based on our experience and forecasting skill. In addition to satellite observations of the ocean derived by Roffer’s Ocean Fishing Forecasting Service, Inc. – ROFFS™ (www.roffs.com), we rely on various climate forecast products produced by the Columbia University’s International Research Institute for Climate and Society, known as IRI (<http://portal.iri.columbia.edu/portal/server.pt>), and NOAA’s climate prediction website (www.cpc.noaa.gov/), as well as, the Florida State University Center for Ocean-Atmospheric Prediction Studies program (www.coaps.fsu.edu and www.coastalclimate.org/).

Relatively recent electronic tagging and other research results by National Marine Fisheries Service, Southeast Fisheries Science Center suggest that the peak abundance of marlin off Bermuda occurs when the sea surface temperature is between 81°F and 82°F. This is likely to be similar to the conditions in the Bahamas when there has been good catches of blue marlin. However, these temperatures usually do not exist in the Bahamas when we make our seasonal forecast. Instead we monitor the location and condition of the “blue marlin water” from the bluer and clearer water color (Figures 1 & 3) and the signature warmer temperature (see Figures 2 and 4) using a variety of NOAA, NASA, and European satellites. The NASA ocean color satellite data from the Aqua and Terra satellites (MODIS sensor), in particular, provide useful data to identify and track this bluer and more transparent water mass. The European ENVISAT (MERIS sensor) also provides useful ocean color data. These satellites also provide a plethora (18 satellite images a day) of infrared data for observing ocean currents based on their signature surface water temperatures.



It is important to note that in some years the sea surface temperature off Abaco during the BBC barely reaches the 81°F - 82°F temperatures observed off Bermuda when the marlin are abundant. However, our experience in the Bahamas and other areas indicate that blue marlin will swim into surface water with temperatures between 72°F and 86°F. The electronic tagging data indicates that marlin can withstand water temperatures lower than 72°F. Understanding of the effects of the water temperature and dissolved oxygen on blue marlin is a critical aspect when trying to understand their migration routes and local distribution. Since we only have access to water temperature and color data we rely on this information only.

An additional factor comes into play when trying to predict the relative apparent abundance of blue marlin in the BBC tournament region in that there is a 60 mile tournament limit from each tournament location. This means that even if blue marlin are in northern Bahamas region, they may not appear to be abundant to tournament fisherman if they occur beyond the 60 mile limit, i.e., they are not available to your fishing effort. This is different than when the fish are located within the fishery, but not vulnerable to your surface trolling gear, e.g., when the surface water conditions are too hot and fish concentrate deeper in the water column in their more preferred temperature habitat conditions. Availability, vulnerability, and vessel fishing power are the components of what is known in fishery science as ‘catchability.’ These are critical issues in assessing the size of fish populations.

Based on our observations of the fishing action in the Bahamas over the last 20 years it appears that excellent fishing action overall occurs within the BBC tournament area when there is a substantial volume of the blue marlin

water pushing over the 100 fathom ledges along the eastern side of Eleuthera and Abaco. Good fishing seasons occur when this water occurs over the 1000 fathom curves, but not the 100 fathom curve of both areas. While it is obvious that an abundance of marlin be available in the BBC tournament zone for good catches to occur, the daily catch rates are controlled by the persistence of ocean frontal boundaries and direction of the flow which act to concentrate baitfish and cause them to become more vulnerable in the surface waters. When the “blue marlin” water remains outside the 60 mile tournament limit, then overall fishing success with blue marlin during the BBC is relatively poor.

While we have developed a standard method in investigating the ocean and atmospheric conditions for providing the annual fishing forecast for the entire BBC season, we have learned the limitations that some of the indicators provide. One of the limitations relates to forecasting the number, location and velocity of relatively large (> 30 miles in diameter) clockwise and counter-clockwise eddy features in the Bahamas region. Since we started this annual oceanographic challenge in 2003, we continue rely on our main working hypothesis which has proven effective these last seven years.

During the last few years, the conditions were particularly favorable as early as January and February in terms of the presence of blue marlin water off Abaco and Eleuthera. However, due to the currents generated by relatively large eddy features located 60-90 miles northeast of Eleuthera, the “blue marlin” water was pulled away from the BBC tournament area. In these recent years there have been several days when some of this water moved into the tournament area and catch rates increased. Unfortunately, these favorable conditions were not persistent throughout the entire tournament season.

Current Conditions:

As customary we consider the regional and global conditions before we discuss the local and forecast conditions for the upcoming season. Presently in the eastern tropical Pacific Ocean there are El Niño conditions that have been affecting the weather in the Gulf of Mexico and eastern U.S. seaboard all winter. See NOAA’s climate prediction website (www.cpc.noaa.gov/) especially their frequently asked questions page for more details on El Niño and La Niña. After several years of trying to associate the eastern tropical Pacific Ocean conditions to Bahamas fishing we still have not learned of any relationship during the BBC season. However, we are continuing our evaluations. Perhaps you have observed some relationships of which we are not aware.

Since the El Niño and Southern Oscillation (ENSO) of the Earth’s atmosphere, land and oceans are known to affect many aspects of our weather and ocean conditions we continue to monitor and report these conditions. Some day we may learn the importance of these variable climate conditions on our fishing. According to the Columbia University’s International Research Institute for Climate and Society (IRI) March – August 2010 Climate Outlook issued in February the central and east-central tropical Pacific sea surface temperature (sst) will be above average indicative of moderate El Nino conditions, but declining as the summer progresses. For the BBC area the IRI models forecast for the April-June period that the sst is likely to have a negative 0.45°F – 0.9°F anomaly (cooler than the climatologically mean), while the southeastern Caribbean Sea to west Africa is forecast to have a positive 0.45°F – 0.9°F anomaly (warmer than the mean). Do not be too dismayed because the May - July period forecasts that the sst are to return to be normal (mean conditions) for both of these areas. They are forecasting “normal” precipitation for the April, May and June period for the BBC area, while Florida and rest of southeastern coastal states are forecasted to experience above normal rain. For air temperatures the forecast is split with the western Bahamas (Bimini and western Andros) cooler than normal, but with Abaco, Nassau and eastern Andros “normal.” The southeastern Bahamas air temperatures are expected to be warmer than normal.

While climate scientists use much longer records, we have evaluated the sea surface temperature in the core of Gulf Stream off Miami, Florida for the last eight years and use it as an index of the winter, pre-season conditions. The mean sea surface temperature during the 2003-2010 during the March 5th - 6th time period is 78.2° F. This is above the 77.0° F longer term mean that climatologists use. This year (2010) the water temperature was 76.9°F in the warm core of the Gulf Stream. This was a surprising result since we had such a cool winter in Florida. However, one must remember that the source of the Gulf Stream water is the Caribbean Sea which apparently did not have an abnormally cold winter. We also evaluated the water temperature of the “blue marlin water” water off the Cat Island – Eleuthera area. While we have not been studying this area’s temperature as long, we noted that this year the sst is approximately 76.9° F, while it was approximately 74.5°F in 2009 and 77.0°F in 2008. While the three year mathematical mean is not very useful for considering climate based research, the value is 76.7°F. While the water temperatures in the BBC region are below the short-term and long-term statistical mean at the present time and are likely to remain during the BBC season, the water temperatures are expected to be within the temperature tolerance of blue marlin. This is favorable. It is important to note that we had to look much farther offshore to locate this “blue marlin water” this year compared with past years. The importance of this aspect will be considered next.

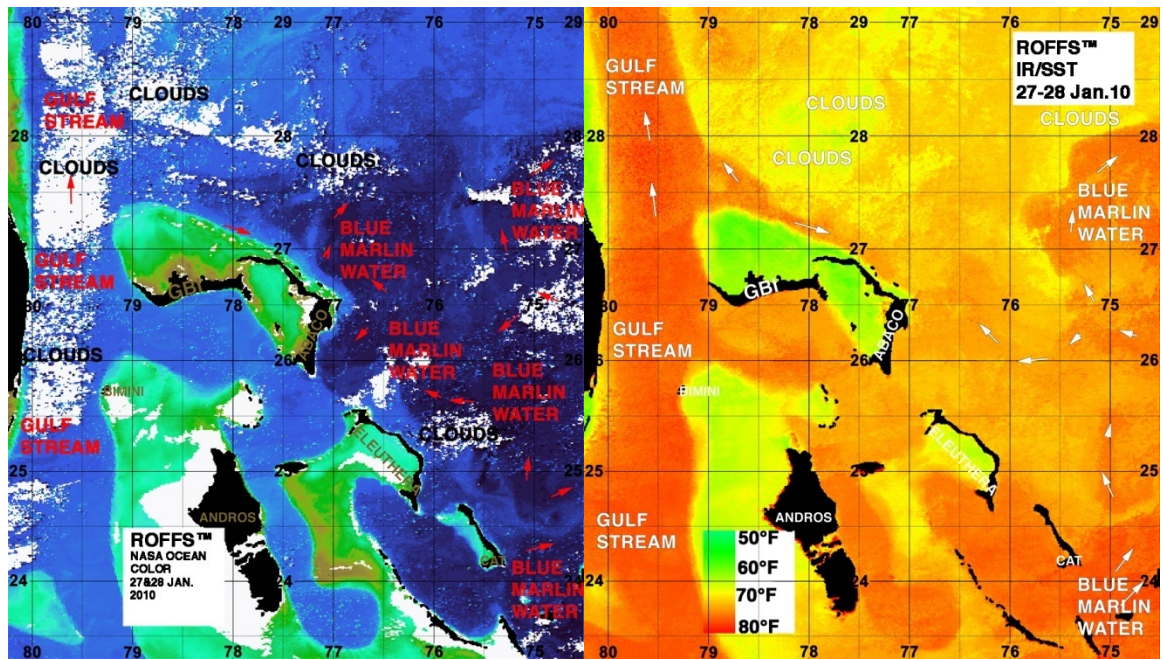


Figure 1 (left hand side) is the ROFFS™ color enhanced ocean color satellite composite derived from January 27-28, 2010 and Figure 2 (right hand side) is the ROFFS™ color enhanced infrared – sst satellite composite derived from January 27-28, 2010. We observed in early January the “blue marlin water” with its characteristic purple – blue color was not moving northeastward from the Cat Island area to Eleuthera and Abaco. These were poor conditions for bringing in blue marlin to the BBC zone. It was particularly disconcerting because of a complex circulation northeast of the Cat Island – Eleuthera Island area which was pulling the “blue marlin water” eastward relatively far away from Cat Island and then northward. While we had substantial difficulties observing the conditions continuously due to clouds this winter there appeared to be a clockwise rotation of the water approximately 120 miles east of Abaco that pulling the “blue marlin water” northward and away from the area between Eleuthera and Abaco. By the end of January (Figures 1 - 2) a substantial pool of this water had separated from the main mass and moved westward covering most of the BBC tournament area. Unfortunately for the anglers fishing from Eleuthera and the northern side of Cat Island the water was relatively cool and not the classic “blue marlin water.” Their marlin catch rates were slow.

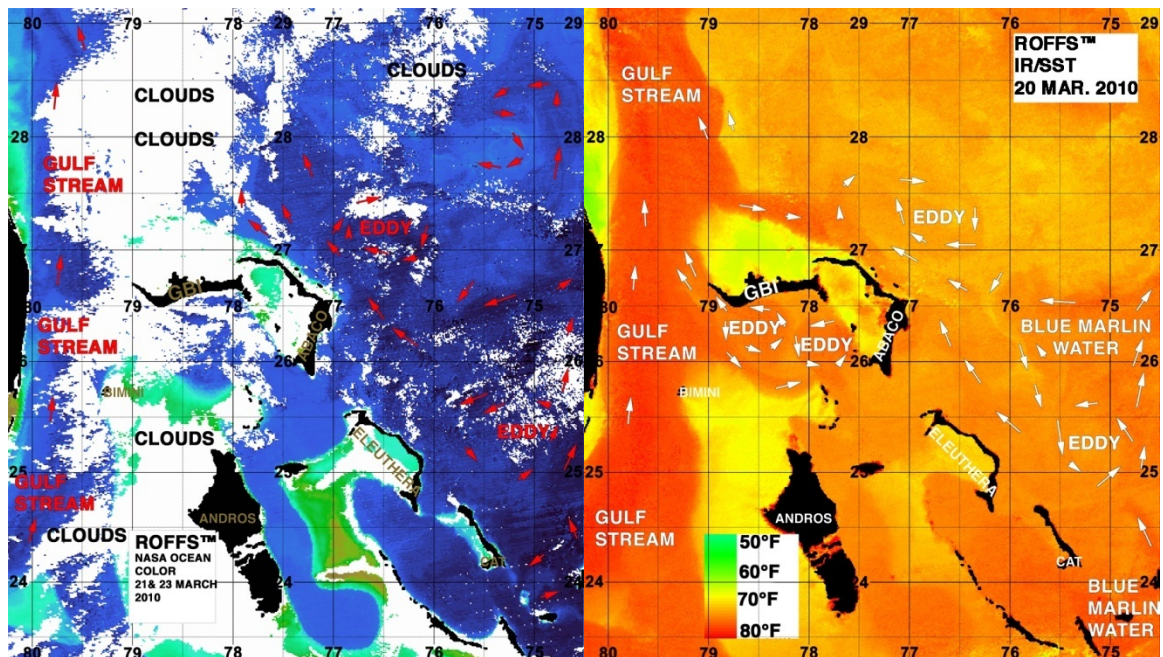


Figure 3 (left hand side) is the ROFFS™ color enhanced ocean color satellite composite derived from March 21 & 23, 2010 and Figure 4 (right hand side) is the ROFFS™ color enhanced infrared – sst satellite composite derived from March 20, 2010. From the end of January until the third week of March the conditions dramatically changed. Presently (third week in March) there is a unusually large (approximately 120 mile diameter) clockwise rotating eddy centered east of the study area near 74°00'W longitude and 26°00'N latitude that is again pulling the “blue marlin water” eastward from Cat Island and away from the BBC tournament area. However, there are two eddy features, one clockwise rotating (centered near 77°00'W & 26°30'N) and one counter-clockwise rotating (centered near 75°15'W & 25°30'N) that are pulling the “blue marlin water” away from the large eddy and circulating it throughout the BBC area. This circulation is bringing the favorable water to the Abaco area and some of it, albeit a diluted water mass is even being pulled through the Northwest Providence Channel by two other relatively smaller eddy features. Blue marlin have been hooked in recently.

Evaluation of the U.S. Navy NLOM model (www7320.nrlssc.navy.mil/global_nlom32/ias.html) and HYCOM model (www7320.nrlssc.navy.mil/GI.Bhycom1-12/intram.html), the satellite altimetry data available NOAA Atlantic Oceanographic and Meteorological Laboratory (www.aoml.noaa.gov/phod/altimetry) and the NOAA GOES satellite data it appears that several additional eddy features are headed toward the northern Bahamas area. By the end of April the U.S. Navy NLOM model forecasts the dissolution of the unusually large eddy presently east of this area. This suggests that the flow of the “blue marlin water” will be from Cat Island toward Abaco which is a very favorable condition for marlin action in the BBC area.

When viewing the altimetry data along with the Navy models that are based on the altimetry remember that the model that calculates the flow fields uses a 10-day running mean of all the altimeter satellite passes over the area and that the resolution of the data are significantly lower than what is derived from the NOAA and NASA satellite data shown in Figures 1 - 4. An advantage of the derived altimeter data is that it is not affected by clouds like the infrared and ocean color data. It is important to note that altimetry data are good for observing large scale geotropic ocean current flow, but not for finding fish on a daily basis at sufficient spatial resolution.

Since we are paid the big bucks for this forecast, we have been told to stick our necks out. After all it is our necks and reputation, not the staffs' necks from the BBC. Thus, we are now forecasting a better beginning of the BBC marlin season for 2010 compared with 2009, particularly the first three tournaments and probably the final two. It remains to be seen what the eddies east of the Bahamas will do because if they move northeastward and pull the bluer water away from the BBC zone, then fishing action will decline. However, if they move in a more westward motion and end up between Eleuthera and Abaco, then fishing action should be excellent in the later tournaments. These conditions also suggest that there will be a good season for yellowfin tuna from the Bahamas to at least as far north as Cape Hatteras, since it appears that the “blue marlin water” carries a substantial amount of tuna with it. Farther north for the Virginia to Massachusetts canyon anglers, if they get to fish a few relatively slow moving, stable eddy features over the 100 fathom curve, then good yellowfin tuna action is likely to come this summer. This necessitates a healthy yellowfin tuna stock. But that is a subject for another article.

Finally, while the occurrence of the “blue marlin water” is a prerequisite for the arrival of the blue marlin, the daily catch rates are controlled by the presence and longevity of concentrations of baitfish that are strongly influenced by the persistent convergence of water mass boundaries (ocean fronts) and the direction of the current flow. Such conditions cannot be forecast this far in advance and must be determined on a daily basis from skilled and experienced fisheries oceanographers that have a successful history of providing such fishing oceanographic analyses.

Safe and Successful fishing for all!

