

# TEXAS TIDES

by Tony Amos

The University of Texas at Austin, Marine Science Institute  
750 Channel View Drive, Port Aransas, Texas 78373  
(361) 749-6793, fax (361) 749-6777, Cell (361) 442-7638  
[afamos@utexas.edu](mailto:afamos@utexas.edu)

*We provide these calendar-tide charts free of charge, but if you would like to contribute to the Animal Rehabilitation Keep (ARK) here at UTMSI, we would gratefully accept any donations. The ARK is in partnership with the Mission Aransas National Estuarine Research Reserve (NERR) ([missionaransas.org](http://missionaransas.org)).*

*The ARK rehabilitates injured and sick sea turtles and large aquatic birds such as pelicans, herons, loons, cormorants, gannets, boobies, gulls and terns. You can find out more about the ARK on FACEBOOK at*

*<https://www.facebook.com/ARKWildlifeRehab/> or <https://utmsi.utexas.edu/about/facilities/ark> Send donation checks to The University of Texas Marine Science Institute, 750 Channel View Drive, Port Aransas, Texas 78373-5015. Make them out to UTMSI, but mark "For the ARK" on the check. All monies donated go towards the maintenance of the facility (food, medicines, supplies, etc.) We have no overhead. Donations are fully tax-deductible.*

Ocean "tides" are controlled by the gravitational pull of the moon and the sun on the surface of the sea, causing it to rise and fall in a rhythmic pattern which we familiarly call the tides. Predicting the tides ahead of time in any location is a complex business and, in fact, is not completely possible because the rise and fall of the sea or of bay and estuary waters is also affected by the following: winds, storms, rainfall, floods, atmospheric pressure, temperature, earthquakes, the shape of the coastline and large-scale alteration of the natural topography (dredged channels, waterways, passes between bays and the sea). Quite accurate predictions can be made of those changes in water level caused by the moon's and the sun's pull. These are called the astronomical tides, and it is these which this calendar is based, and which are referred to here as "The Tides". Along the Texas coast the range of the tides, the difference in height between the highs and the lows, is quite small, amounting to less than two feet on average. Because the slopes of our beaches are slight and our bays are shallow, the tide is nonetheless very important to coastal residents, navigation, commerce, and recreation. There are many peculiarities about our tides some of which will be explained here without going into too much technical detail. There are 37 different periods of tidal fluctuation which go into the prediction of the tides. Two of those periods dominate; the once-per day high and low (diurnal) tide, and the twice-per day high and low (semidiurnal) tide. Unlike most places on the East Coast of the US, for example, where they get two high tides and two low tides each day, we get week-long periods with only one high and one low per day, followed by a week of semidiurnal tides. Because of this, you cannot rely on the time of high tide one day to be a predictable number of minutes later the next day, and so-on, as you can along other US coastlines. Some say the "tide goes backwards" here (meaning that for a few

days the tides progress as above, but then one day, the main tide is at an earlier time than it was the day before). This makes those watches and clocks that show the tides not too reliable here. The diurnal tides here have a much greater range (difference in height between successive high and low tides) than do the semidiurnal periods. To simplify all these peculiarities, I have developed tide calendars for several places along the Texas coast.

#### The Amos Tide Calendars:

Calendars are available showing predicted tides for the Galveston Jetties, Freeport Harbor, Port O'Connor, the Aransas Pass Ship Channel connecting the Gulf of Mexico with Corpus Christi Bay, and Port Isabel. Predictions are based on measurements of the actual tides at each location. The method needs at least a year of data, but Galveston is based on a 19-year record. At Port Aransas, a one-year series of measurements made in 1993 at the University of Texas Marine Science Institute's Pier Laboratory which is located off the South Jetty of the Aransas Pass. From the series, 37 harmonic constituents of the astronomical tide were calculated and used in a modification of the standard National Ocean Survey tidal prediction program to make hourly water level predictions and the times of the highs and lows for each day. The water level is adjusted to mean sea level rather than the Gulf Coast Datum. Consequently, the annual and semi-annual variation in sea level can be clearly seen in the position of the daily tide fluctuations relative to the zero mean sea level line (Compare January when low tides prevail with October when the opposite is true). Each hour is indicated by a vertical line connecting the curve with the zero line. In general, slack water will be at the times which the curve intersects the zero axis, but when the curve is offset as in January and October, some interpolation may be necessary. Flood and ebb tidal currents will be at a maximum at the times of high and low water respectively. This astronomical tide is often radically changed by strong winds before and during the passages of cold fronts and during extra tropical depressions. The astronomical signal will still be found "riding" on top of the meteorological surges. Past history has shown that the predicted times are quite accurate, although the range of the tides in the predictions is somewhat exaggerated

Local times of the highs and lows are listed beneath each daily box (all heights are given in feet and all times are local). They are listed in "order of appearance"; if the first tide extreme is a low then the time and height will be preceded by L1, for Low 1. Heights here are given in feet and inches. The next tide will be H1 for High 1, etc. These numbers may be difficult to read on some older VGA screens. Note: the English units are given here because it is the system most commonly used by the general public. The shaded areas each day show the hours of darkness. Phases of the moon are shown for each day with the New Moon (NM), First Quarter (FQ), Full Moon (FM), and Last Quarter (LQ) marked on the moon symbol where appropriate. The relative size and shape of the moon will be quite close to reality each day, but the moon's orientation is always vertical on the calendar. The author is working on a method of depicting

the moon as it appears to the observer. The symbols appear on the night of the day closest to when the phase occurs, e.g. If full moon is at 1215 (24-hour clock) on the 25<sup>th</sup> of the month, then the symbol will appear straddling midnight of the 25<sup>th</sup>. Should it occur at 1145 then the symbol will appear on the 24<sup>th</sup> of the month. Also shown is the Julian Day (JD). In 2015, a non leap year, 1 January = JD 1, and 31 December = JD 365. These numbers appear either to the upper right or lower right of each daily box. In case you want to know how fast time flies, in the opposite corner of each box, the number of days left in the year is printed.

The local time zone in use is given at the top of each monthly chart. On the days when Daylight Savings Time comes into effect in April and reverts to standard time in October, the symbol “CDT” for Central Daylight Time, or “CST” for Central Standard Time appears. The appropriate day’s length will be 23 hours in April and 25 hours in October. Notice how this messes up a perfectly good calendar. This was one of the more difficult aspects of the calendar to program. If anyone notes any obvious errors or has any comments, please let me know at my E-MAIL address of [afamos@utexas.edu](mailto:afamos@utexas.edu) Hard copies may be obtained by writing or E-mailing me a request. The tides for Port Aransas are also on-line at UTMSI’s World-Wide Web Home Page, reachable at <https://utmsi.utexas.edu/> and then by clicking on Current Conditions and Port Aransas Tide Charts. I do maintain copyright on these calendars, so they are for your personal, non-profit use only.