THE GULF STREAM

The region where the Gulf of Mexico narrows to form the channel between Florida Keys and Cuba may be regarded as the head of the Gulf Stream. From this region the stream sets eastward and northward through the Straits of Florida, and after passing Little Bahama Bank it continues northward and then northeastward, following the general direction of the 100-fathom curve as far as Cape Hatteras. The flow in the Straits is frequently referred to as the Florida Current.

Shortly after emerging from the Straits of Florida, the stream is joined by the Antilles Current, which flows northwesterly along the open ocean side of the West Indies before uniting with the water which has passed through the straits. Beyond Cape Hatteras the combined current turns more and more eastward under the combined effects of the deflecting force of the Earth's rotation and the eastwardly trending coastline, until the region of the Grand Banks of Newfoundland is reached.

Eastward of the Grand Banks the whole surface is slowly driven eastward and northeastward by the prevailing westerly winds to the coastal waters of northwestern Europe. For distinction, this broad and variable wind-driven surface movement is sometimes referred to as the North Atlantic Drift or Gulf Stream Drift.

In general, the Gulf Stream as it issues into the sea through the Straits of Florida may be characterized as a swift, highly saline current of blue water whose upper stratum is composed of warm water.

On its western or inner side, the Gulf Stream is separated from the coastal waters by a zone of rapidly falling temperature, to which the term "cold wall" has been applied. It is most clearly marked north of Cape Hatteras but extends, more or less well defined, from the Straits to Grand Banks.

Throughout the whole stretch of 400 miles in the Straits of Florida, the stream flows with considerable speed. Abreast of Havana, the average surface speed in the axis of the stream is about 2 1/2 knots. As the cross-sectional area of the stream decreases, the speed increases gradually, until abreast of Cape Florida it becomes about 3 1/2 knots. From this point within the narrows of the straits, the speed along the axis gradually decreases to about 2 1/2 knots off Cape Hatteras, N.C. These values are for the axis of the stream where the current is a maximum, the speed of the stream decreasing gradually from the axis as the edges of the stream are approached. The speed of the stream, furthermore, is subject to fluctuations brought about by variations in winds and barometric pressure.

The following tables give the mean surface speed of the Gulf Stream in two cross sections in the Straits of Florida:

Between Rebecca Shoal and Cuba

Distance south of Rebecca Shoal	*Mean surface speed observed*
Nautical miles	Knots
20	0.3
35	0.7
50	2.2
68	2.2
86	0.8

Between Fowey Rocks and Gun Cay

Distance east of Fowey Rocks	*Mean Surface Speed observe*
Nautical miles	Knots
8	2.7
11 1/2	3.5
15	3.2
22	2.7
29	2.1
36	1.7

Crossing the Gulf Stream at Jupiter or Fowey Rocks, an average allowance of 2.5 knots in a northerly direction should be made for the current.

Crossing the stream from Havana, a fair allowance for the average current between 100-fathoms curves is 1.1 knots in an east-north-easterly direction.

THE GULF STREAM

From within the straits, the axis of the Gulf Stream runs approximately parallel with the 100-fathom curve as far as Cape Hatteras. Since this stretch of coast line sweeps northward in a sharper curve than does the 100-fathom line, the stream lies at varying distances from the shore. The lateral boundaries of the current within the straits are fairly well fixed, but when the stream flows into the sea the eastern boundary becomes somewhat vague. On the western side, the limits can be defined approximately since the waters of the stream differ in color, temperature, salinity, and flow from the inshore coastal waters. On the east, however, the Antilles Current combines with the Gulf Stream, so that its waters here merge gradually with the waters of the open Atlantic. Observation of the National Ocean Service indicate that, in general, the average position of the inner edge of the Gulf Stream as far as Cape Hatteras lies inside the 50-fathom curve. The Gulf Stream, however, shifts somewhat with the seasons, and is considerably influenced by the winds which cause fluctuations in its position, direction, and speed; consequently, any limits which are assigned refer to mean or average positions.

The approximate mean positions of the inner edge and axis (point where greatest speed may be found) are indicated in the following table:

Approximate mean position of the Gulf Stream

Locality	Inner Edge	Axis
North of Havana, Cuba		25
Southeast of Key West, Florida		45
East of Fowey Rocks, Florida		10
East of Miami Beach, Florida		15
East of Palm Beach, Florida		15
East of Jupiter Inlet, Florida		20
East of Cape Canaveral, Florida	10	45
East of Daytona Beach, Florida	25	75
East of Ormond Beach, Florida	25	75
East of St. Augustine, Florida. (coast line)	40	85
East of Jacksonville, Florida. (coast line)	55	90
Southeast of Savannah, Georgia. (coast line)	65	95
Southeast of Charleston, South Carolina. (coast line)	55	90
Southeast of Myrtle Beach, South Carolina.	60	100
Southeast of Cape Fear, North Carolina (light)	35	75
Southeast of Cape Lookout, North Carolina (light)	20	50
Southeast of Cape Hatteras, North Carolina.	10	35
Southeast of Virginia Beach, Virginia.	85	115
Southeast of Atlantic City, New Jersey	120	
Southeast of Sandy Hook, New Jersey.	150	

At the western end of the Straits of Florida the limits of the Gulf Stream are not well defined, and for this reason the location of the inner edge has been omitted for Havana, Cuba, and Key West, Florida., in the above table. Between Fowey Rocks and Jupiter Inlet the inner edge is deflected westward and lies very close to the shore line.

Along the Florida Reefs between Alligator Reef and Dry Tortugas the distance of the northerly edge of the Gulf Stream from the edge of the reefs gradually increases toward the west. Off Alligator Reef it is quite close inshore, while off Rebecca Shoal and Dry Tortugas it is possibly 15 to 20 miles south of the 100-fathom curve. Between the reefs and the northern edge of the Gulf Stream the currents are ordinarily tidal and are subject at all times to considerable modification by local winds and barometric conditions. This neutral zone varies in both length and breadth; it may extend along the reefs a greater or lesser distance than stated, and its width varies as the northern edge of the Gulf Stream approaches or recedes from the reefs.

The approximate position of the axis of the Gulf Stream for various regions is shown on the following National Ocean Service Charts: No. 11013, Straits of Florida; No. 411, South Carolina to Cuba; No.11460, Cape Canaveral to Key West; No. 11420, Alligator Reef to Havana. Chart No. 11009 show the axis and the position of the inner edge of the Gulf Stream from Cape Hatteras to Straits of Florida.