

# **THE GEOGRAPHY OF A MARITIME BOUNDARY DELIMITATION**

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## **Abstract.**

A Judgement of the International Court of Justice, dated 8 October 2007, resolved the Case Concerning Territorial and Maritime Dispute between Nicaragua and Honduras in the Caribbean Sea. Essentially the case involved the definition of the maritime boundary between the two countries on their eastern sides. In the course of reaching an agreement that would satisfy the legal issues the Court had to consider a number of matters of geography and to assist it in gaining an understanding on such matters various cartographic, geodetic and hydrographic advisors were employed. This paper describes the geographic matters that had to be considered, the resolution of which was considerably aided by the availability of modern technology.

## **Introduction.**

The written judgement goes at length into the geographic situation.(Judgement, Case Concerning Territorial and Maritime Dispute between Nicaragua and Honduras in the Caribbean Sea. 8 October 2007) The two countries both span the isthmus of Central America and have both a Pacific and an Atlantic (Caribbean) coast. This judgment concerned solely the latter. Much of the land boundary between the two countries follows the Rio Coco. Its own geography, particularly the fluvial processes at its eastern end., had a significant effect on the judgment. The actual coastline, particular that of Nicaragua, is extremely mobile with significant lateral transport of sediments, resulting in the formation of numerous deltas, sandbars and lagoons and other features of an unstable coastline. Offshore there are numerous reefs and small cays of disputed sovereignty, position and dimensions. To complicate this situation the available mapping and charting was of uncertain quality. No national hydrographic charts of the two countries involved were available and the most relevant charts describing the offshore cays were those of the British Admiralty but comprised of surveys dating back to 1830-43. Fortunately the availability of modern satellite imagery, in particular that provided through Google Earth, allowed a reasonably up to date and high resolution description of both the mainland and island coastlines. It was perhaps fortunate that the delineation of the continental shelf, apart from recognising the general shape of the Nicaraguan Rise, was not an issue raised to any degree by the Court, because the amount of offshore data available and in the public domain is very sparse. An examination of the GEBCO( General Bathymetric Chart of the Oceans) digital atlas showed very little systematically measured bathymetric data. It was perhaps ironic that in the final days of preparing the Judgement a major hurricane swept the area causing great damage to property and loss of life. The low cays that had had a major effect on the course of the boundary were totally inundated and it was questionable if the survey monuments to which the boundary was referenced, remained in place.

## **The general direction of the line.**

In their written and verbal pleadings the two countries took two rather different approaches in defining the boundary. Honduras claimed that a parallel of latitude(14 degrees 59.8 minutes North), projected eastwards from a point near the mouth of the Rio Coco, should be used. A similar approach to that has been previously used by some South American countries. Nicaragua, having considered

the difficulty of drawing a median line between adjacent countries, that have a jointly determined convex shaped coastline, stated that the technical method of equidistance is not feasible and proposed the bisector between the two lines that described the general direction of the respective coastlines, termed the coastal front.

This idea of a general line of the coast has been used in other cases, notably that of US and Canada in the Gulf of Maine (Delimitation of the Maritime Boundary in the Gulf of Maine Area. Judgement, ICJ Reports 1984). While the Court showed preference to the method proposed by Nicaragua, which resulted in a boundary line going in a north easterly line, it was concerned about the manner in which the general direction of the coast had been proposed. The Nicaraguan pleadings proposed that the lines should be defined by a point at the entrance to the Rio Coco to which the land boundary had been defined and the point where the two countries joined their adjacent state at the coastline. In the case of Honduras this was its boundary with Guatemala and in the case of Nicaragua this was its boundary with Costa Rica. The Nicaraguan coastal front is approximately 480 km. in length and while generally following the direction of the actual coast it skirts to seaward for most of its length. The Honduran coastal front is approximately 640 km. It leaves most of the actual coastline to its north, resulting in a considerable bias to the north of the general direction of the boundary. The Court requested that the geodesist present it with a number of options that may be said to generally describe the direction of the coast.

Before going on to describe the various options of selecting the general directions of the two coastlines it may be useful to digress onto the possible use of a median or equidistant line and its subsequent rejection. The Court had been asked to determine a single maritime boundary between the area of territorial sea, continental shelf and exclusive economic zone. The 1982 Convention on the Law of the Sea (UNCLOS 1982) differs in its article 15 describing the delimitation of the territorial sea between States with opposite or adjacent coasts with article 83 on the delimitation of the continental shelf between States with opposite or adjacent coasts. The first article is more prescriptive in terms of the possible use of the median line, although it is not mandatory. The possibility of using a median line was explored by both Nicaragua and the Court but the geography of the coastline in the vicinity of the mouth of the Rio Coco does not result in a satisfactory solution. There are in fact, only two points that could control the direction of the median line. These are a point in Nicaragua and a point in Honduras that face each other across the mouth of the river. From these points the respective coastlines trend away as the mouth of the River Coco has a convex shape. The general situation of drawing a median line between two adjacent states works well enough on a concave coast, as the direction of the line can be positively described by relating it to equal distances from the respective States. However in this case the direction of the boundary line is totally dependent upon the stability of the two points. As historical data presented that the deltaic nature of the mouth of the River Coco shows it to be extremely mobile with an overall accretion in a seawards direction, the use of the two points would result in an unstable and hence, unsatisfactory boundary. Just how unstable is the river mouth topography may be judged by the fact that during the hurricane that occurred just after the Judgement was made it was stated that the river level rose by 11 metres. The problems of using a median line were recognised by both Nicaragua and the Court and some other approach was sought.

In an attempt to find some other method of defining the boundary the Court decided to examine the coastal front line of each State. At the request of the Court the geodesist, in his report proposed that four different points on each coastline be

identified and using a common starting point, four different bisectors were computed. The points chosen were:

For Nicaragua: Punta Gorda; Wounta, Rio Grande and Punta de Perlas.

For Honduras: Cabo Falso; Punta Patuca; Cabo Cameron and Cabo de Honduras.

The central point was a point on the Rio Coco that had been chosen by the Mixed Commission when it decided on it as the eastern terminus point of the land boundary in 1962.

At that time this point was located on the thalweg of the river but alluvial changes since that time had changed its relative position in the river. The next consideration was the precise coordinates to use, both for the central point and for the limiting points of the general direction line in Nicaragua and Honduras respectively. While the original coordinates of the Mixed Commission point are presumed to have been referenced to North American 1927 datum the geodesist decided that all points used in these calculations should be referred to the WGS 84 datum. A first step was therefore to convert the Mixed Commission point to the latter datum. A second step was to identify precise coordinates for the outside points that must also be referred to WGS 84. Unfortunately the mapping and certainly the charting, of the coastline of both countries is neither precise nor up to date. It was clear that to describe a general direction of the coast the points should be on or near the coastline but geomorphologically both coastlines are very unstable. It was therefore open to question precisely where the points were located. In some cases structures in the form of lighthouses or buildings could be considered stable but these had to be clearly identified on the maps or charts. In the case of lighthouses, the United Kingdom and other Hydrographic Offices had data bases with precise values that had been converted into WGS 84 coordinates. In some cases it is understood that the geodesist had scaled the values off the charts and had used the latest data available from Google Earth to support the interpretation. On the Nicaraguan coast it appears that the point at Wounta had been chosen as being on the coastline itself. In a subsequent search for a more permanent point a small town shown on the UK chart under the name of Wounta was thought suitable but in spite of a careful search of the available satellite imagery, no sign of any buildings could be seen in the forested area

Having made the best possible attempt to identify stable points and assigning them coordinates referred to the WGS 84 datum, the geodesist then computed the azimuth and distance to each external point from the central Mixed Commission point. In doing this and recalling the difficulties of the Anglo-French Continental Shelf arbitration, these calculations were carried out on the geodesics, using software developed by the National Geodetic Survey of the USA. It remained now to calculate four bisectors between four pairs of points in the two countries respectively. This resulted in the azimuth of the bisector ranging between 059 degrees ( the original Nicaraguan proposal) and 070 degrees. If these lines are extended some distance seaward it may be realised that a very large area could be in dispute depending upon the choice of bisector.

Once the Court had decided to reject the median line method it was faced with choosing which bisector to use. The question was which lines really best represented the general direction of the coastal front and which lines could best compare the coastlines of the two countries. In this evaluation the actual length of the lines had some bearing. The following figure outlines the computations.

- a) Cabo Falso (distance= 137 km) with Punta Gorda ( distance = 74 km.)
- b) Punta Patuca ( distance = 154 km) with Wounta ( distance = 166 km)

- c) Cabo Cameron ( distance = 230 km) with Rio Grande ( distance = 235 km)
- d) Punta de Perlas ( distance = 379 km) with Cabo de Honduras ( distance = 375 km.)

The Court in its Judgment, examined each possibility in turn and decided in the end ( see paragraph 298): “ The front that extends from Punta Patuca to Wouhnta, would avoid the problem of cutting off Honduran territory ( as proposed in the original Nicaraguan proposal) and at the same time provides a coastal façade of sufficient length to account properly for the coastal configuration in the disputed area. Thus a Honduran coastal front running to Punta Patuca and a Nicaraguan coastal front running to Wouhnta are in the Court’s view the relevant coasts for drawing the bisector. The resulting bisector has an azimuth of 70 degrees 14 minutes and 41.25 seconds.”

### **The effect of the cays**

It was noted earlier that a number of reefs and cays are located off the coast. It was stated that the cays are small, low islands, comprised largely of sand derived from the physical breakdown of the coral reefs. The reefs are very extensive but the cays are small. Depending up on their sovereignty and location the Court had to decide in what way they may influence the boundary line. This not only brought into question, matters of a social nature but of geography and its interpretation. The mapping and charting of these offshore features is probably even less precise than that of the mainland. In fact, an important reference used in the discussions was the UK Chart 2425 which dated its surveys into the nineteenth century. Most of the reefs and cays that had a possible bearing on the case were located approximately 20 miles from the mainland and as such, outside the territorial sea. Fortunately, information was available from US – Honduran surveys, dated in the early nineteen seventies. Although these surveys made no attempt to precisely delineate the features they did measure the precise horizontal position of survey markers that had been embedded in the islands. These surveys used a Doppler satellite system for the measurements. Accompanying the measurement data were some diagrams and photographs, which gave some idea of the visual appearance of the islands. Photographs of the actual survey marker appear to show that they are embedded in the coral core of the cays rather than in the sand. This was later important in view of the hurricane which swept over and immersed the islands soon after the Judgement was made.

Several of the cays were located within 12 miles of the previously determined bisector line. As it was decided that such islands could be allowed a territorial sea of their own, there was a possibility that their existence would influence the direction of the line as it passed in their vicinity. A first task for the Court was to decide upon the disputed sovereignty of some of the cays. This having been done it was decided that each of the cays would be allowed a 12 mile territorial sea and it became a matter of precisely determining the sea areas that would be included and how these areas would affect the division made by the bisector line described previously. The most precise geographic positions for the cays were mainly obtained from the results of surveys carried out in a USA/Honduran operation in the nineteen seventies and recorded by the US Board of Geographical Names. The cays were positioned using observations of Doppler satellite shifts. Survey markers were embedded in the coral base of the islands. A number of photographs taken during these surveys were available to the Court and show that the cays were covered with some vegetation and there were some buildings. Owing to the lack of information on the actual shape and dimension of the cays no attempt was made to draw the 12 mile limits from the actual low water line as

is prescribed for the Normal baseline in Article 5 of UNCLOS 1982. Furthermore, there are very large areas of reef surrounding some of the cays but once again these are poorly mapped and no attempt was made to use their seaward low-water line as prescribed for Reefs in Article 6. The circles of 12 mile radius were entirely centred on the single survey point on each cay. The Court discussed the possible use of low-tide elevations and the lack of a general customary rule, as noted in the Qatar and Bahrain Judgement (ref.), which supported the decision not to use low-tide elevations in this case.

The territorial sea of four Honduran cays( Bobel, Savanna, Port Royal and South) overlapped the Nicaraguan area to the south of the bisector and the territorial sea from one Nicaraguan cay(Edinburgh) overlapped the 12 mile territorial claimed for the Honduran cays. The overall effect of these overlaps was to break the bisector line and draw the boundary in a series of arcs to the southwards of the bisector line.

### **Discussion on geographic uncertainty and assistance of technology.**

It is only when one is faced with the actual task of delimiting a maritime boundary that the theory must give way to the practical and the unique geographic conditions of an area have to be examined. This is particularly evident in the lack of precise geographic data in some parts of the world and is particularly evident in the nautical charts. Priorities for charts are usually driven by concern for the safety of shipping and if there is little shipping the existing charts may be found quite lacking in both the density and the precision of data needed for precise boundary delimitation. Adding to this problem is the fact that some developing countries have yet to develop any hydrographic capabilities and there may be no charts published by the country itself of its own territory. In the case of the Nicaragua/Honduras boundary it is significant in this regard that one of the most significant references in the case was a chart produced by the British Admiralty drawn mainly from surveys carried out in the nineteenth century.(UK Chart 2425). This chart covered the critical areas of the mouth of the River Coco and the cays that influenced a departure from the bisector line. Even the much smaller scale and general charts produced by both British and American agencies were probably not the result of modern systematic and precise surveys.

Particularly important to the definition of the coastal front lines was the precise positioning of the coastline. Although some national topographic maps were available to supplement information shown on the nautical charts there was some doubt as to the precise position of the coastline. Much of this, particularly along the Nicaraguan coast, is of a mobile nature, as evidenced by the numerous spits, lagoons and other features, which tend to evidence a mobile geography. The mouth of the River Coco was much discussed by the Court as satellite imagery, taken over a period of time and presented in the pleadings, showed just how changeable was both the course of the river and the islands within its deltaic mouth. Evidence was presented showing how the mouth of the river was being gradually extended seawards and the entrance channels were continuously changing their position and probably depth. A key feature in the discussions was a point determined in 1962 by a Mixed Commission as the eastern end of the land boundary. In the recent judgement it was decided that this point was to be used as the central point for the two coastal front lines, even though the point itself was no longer either at the mouth or in the thalweg of the channel. Although there was agreement to use this point to obtain the general direction of the coastal front lines and consequently the direction of the bisector line, there was not agreement that it should be the starting point of the maritime boundary.

Instead Honduras argued that the starting point for the maritime boundary should be 3 miles from the Mixed Commission point and Nicaragua argued that it should be 3 miles from the river mouth. However as the mouth is continually accreting and generally changing some difficulty still exists in defining the precise point

The availability of satellite imagery, some of which can be found in Google Earth, was found most useful in view of the lack of precise mapping and charting. The imagery was inspected in looking for terminal points of the coastal front line. It was felt that lighthouses and other buildings would be more durable than some natural coastal feature that may be subject in the future to coastal range. Satellite imagery was also helpful in trying to identify the cays and their surrounding reefs. A final call for such imagery came after the hurricane that occurred just after the judgement was made to see if any significant changes had occurred. It appears that the cays, although often covered with sand and vegetation are comprised of a core of coral and consequently able to withstand the inundation.

The possible use of low-tide elevations was a matter for consideration, as apart from the cays, which are relatively small, there are extensive shallow areas of coral reef, parts of which appear to dry at low tide. Although Article 121 on the Regime of Islands (UNCLOS 1982) is explicit in saying that low-tide elevations do not enjoy that regime. Article 13 does not permit them a territorial sea if they are not situated beyond the width of the territorial sea from the land or an island. However the Court noted that there is no general assumption that low-tide elevations are territory in the same sense as islands (Judgement. Para. 141). Apart from the legal arguments is the practical difficulty of just how precisely such features are defined. Prior to the availability of airborne and satellite methods, the surveying of such features was extremely difficult due to the surf and breaking seas generally associated with the features. The information on existing charts, particularly those comprised of old data, must therefore be suspect and boundaries defined using them will probably be inaccurate. Significant differences of position were found between the positions of the reefs on UK Chart 2425 and imagery found on Google Earth.

### **Conclusions.**

The Nicaragua/Honduras maritime boundary case has demonstrated clearly how difficult it is to define boundaries in areas of the World that are lacking in both topographic and hydrographic data. Mapping and charting agencies are today driven by economic factors and if there is limited demand for their products their work is given low priority. Fortunately, countering this difficulty, the ready availability of satellite and other aerial imagery has done much to provide precise geographic information. Although several articles of the Law of the Sea Treaty 1982, such as the critical Article 5 Normal Baselines, stress that only features as “marked on large scale charts officially recognised by the coastal State,” this is in fact unrealistic. Not only because the best charts are often not those of the coastal State but also because the charts officially recognised by the coastal State are sometimes inaccurate when compared with the latest satellite and other aerial imagery.

The commonly accepted practice of using rivers to define boundaries is also another cause of difficulty. Large rivers carrying large quantities of sediments frequently have a highly dynamic topography. The thalweg, frequently used as a delimiting feature, are constantly on the move and the question is raised whether the boundary, once decided remains at that geographic spot or if it moves as the thalweg moves. Deltas resulting from such dynamic river systems are also a cause for debate as they are in a continual state of opening and closing channels and defining and erasing islands that may be used to delimit boundaries, such as described in Articles 7,

9 and 13.( UNCLOS 82) This matter of unstable deltas is addressed in Article 7.2 but such is the variability of fluvial geography that the boundary maker will always be faced with an original situation in each case.

Finally, the technical difficulties of defining the median line(equidistant line), such as prescribed in Article 15 (UNCLOS 82), when the adjacent coasts join in a convex line, requires re-visiting. Not only does any geometric approach result in a very weak control of the direction of the median line but it requires some innovative approach to provide the control at all. It may be said that the alternative method of using coastal fronts to control the direction of a boundary also has its problems as the choice of the coastal front will frequently need to be quite arbitrary.

The Nicaragua/Honduras boundary provided a fine laboratory for studying all the above difficulties facing the maritime boundary maker.