

# Definition of the Israeli Coast Lines

Haim SREBRO, Israel

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## SUMMARY

Two initiatives have developed during the last four years to define Israeli "coast lines" along the Mediterranean coast line. One was a requirement by law from the Director General of the Survey of Israel to define a reference line (0.75 m above the zero level of the precise leveling) in support of the law for the preservation of the coastal environment 2004.

The initial program was to define the reference line solely by photogrammetric means. Economic considerations dictated that the mission was eventually accomplished by an integration of photogrammetry and GPS-RTK field measurements. Observations showed that both the water level and the level of the coast (being encroached and rebuilt) change.

The second coast line is required due to the decision of the Director General of the Survey of Israel to define the limit line of the land cadastre along the coast. UNCLOS (UN Law of the Sea 1982) allows for two options to define base lines along the coast line. One refers to the normal baseline, which is based on the low tide line. This line is difficult to monitor and sometimes remote sensing techniques are used for it, e.g. IKBDC (Iraq-Kuwait Boundary Demarcation Commission). Another option is to define base points along the coast line, and to connect them by base lines (UNCLOS, 1982 and US Department of State, 1987).

The paper presents these two procedures.

In addition, following the amendment of the law of preservation of the coastal environment of the Red Sea with regard to the Gulf of Eilat/Aqaba in October 2007 and an additional amendment to that law in April 2008 with regard to the Kinneret (Sea of Galilee), the definition of these two coast lines is referenced as well in the paper.

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## 1. INTRODUCTION

Israel is a maritime state, having 190 km of coast line along the Mediterranean between Rosh Hanikra and the Gaza Strip and nearly 12 km of coast line in the Gulf of Elat (known also as the Gulf of Aqaba) which is an extension of the Red Sea. In addition Israel shares sovereignty over the Dead Sea. In the north the lake Kineret (Sea of Galilee) is fully contained in Israel.

This situation calls for comprehensive attitude of the State of Israel with regard to the sea, mainly in addition to security which is self evident, to safety of navigation, to legal, economical, and environmental considerations and even to the potential of artificial islands. Reconnaissance and survey should be a fundamental condition for any analysis and any decision of policies. A great deal of such efforts lay in the domain of geographers and surveying and mapping experts. Part of this effort is the production of a series of hydrographic charts by the Survey of Israel, based on bathymetric survey.

While the maritime boundaries of Israel, and hence the territorial sea in the Gulf of Eilat and the Red Sea had been settled in the Peace Treaty between Israel and Jordan, its maritime boundaries in the Mediterranean Sea are not settled yet.

Though the adjacent maritime boundaries with Lebanon, Egypt and the Palestinian Authority depend on the future of the Peace Process, there are important considerations which require definition of the maritime zones, the most important of which are security, economical and environmental considerations. Limits of concessions to develop mineral resources are of special interest.

The definition of maritime zones is usually with reference to the coastal baselines of a state.

This article will elaborate on the options of defining the coastal baseline along the Mediterranean coast of Israel.

On the 4<sup>th</sup> of August 2004, the Knesset (the Israeli Parliament) passed the law for preservation of the coastal environment along the Mediterranean coast. The coast line is defined in the definition by the following: "The line defined by the coordinates and marked on a map, at the height of 0.75 m above the zero level of the precise leveling, along the Mediterranean coast, as defined by the Director according to the Survey Ordinance..."

On the 15 Of October 2007 the Knesset passed an amendment to this law with regard to the coast line along the coast of Yam Suf (The Red Sea). On the 1<sup>st</sup> of April 2008 another amendment passed with regard to the coast line around Lake Kineret (the Sea of Galilee).

Derived from this it was that the Director General of the Survey of Israel was required to define the reference coast lines of the Mediterranean Sea, the Gulf of Eilat and the Sea of Galilee.

This article elaborates on the definition of these lines as well.

## **2. THE DEFINITION OF THE COAST LINE - MAPI 2005**

On the 4<sup>th</sup> of August 2004, the Knesset passed the law for the preservation of the coastal environment 2004, along the Mediterranean coast. The law took effect on 15 November 2004.

"The Objectives of this law are:

1. To protect the coastal environment, its natural resources and its heritage; to restore and to preserve them as a special resource and to prevent damage to them;
2. To preserve the environment of the sea shore and the coastal sand for the good and the pleasure of the public and the future generations;
3. To formulate principles and limitations for management, development and usage of the coastal environment".

In the Chapter of definitions in the law, under "the coastal environment" we find:

"The area between the Mediterranean coast line and a line that will be measured 300 m inland from the coast line, and the area that will be measured from the coast line seawards to the limit of the territorial sea, including the land surface and the subsurface, and in the sea, the surface of the sea bottom and the subsurface of the sea bottom, all natural and landscape resources, nature and heritage assets, and antiquities, as defined in the Law of Antiquities, in them and above them".

The coast line is defined in the definitions by the following addition:

"The line defined by coordinates and marked on a map, at the height of 0.75 m. above the zero level of the precise leveling, along the Mediterranean coast, as defined by the Director according to the Survey Ordinance (the laws of Eretz Israel, vol. 2, page 1368; 1953, page 98) and published in the Reshumot (the official Gazette) within one year, from the beginning of correction no. 69 correction, and until the above mentioned publication, as surveyed by licensed surveyors as defined in the Survey Ordinance, and in accordance with it".

Derived from it is that the Director General of the Survey of Israel is required to define the coast line, as defined above, within one year, i.e. by November 15, 2005.

The director as required defined the coast line. The line is defined by a series of points along the Mediterranean, numbered sequentially; the position of each point defined in terms of the New Israel Grid coordinates.

This line is called "The Coast Line – MAPI 2005". The defined line has been derived optimally from field surveys supplemented by photogrammetric measurements in inaccessible areas.

The optimal definition of the line was made "at the height of 0.75 m. above the zero level of precise leveling", as specified by the law, and taken from the existing national control network in 2004-2005.

It should be noted that the mean sea level of the Mediterranean during the last year was 10 cm. Consequently 75 cm. above the zero level of precise leveling is actually 65 cm. above the mean sea level during the last year.

It is stressed that the binding definition according to the law of preservation of the coastal sea shore environment is expressed in coordinates published in the 'Reshumot' (The Official Records).

Any other form of publication, either digital or printed, as in this publication, is meant to assist the enforcement of the law of preservation of the coastal (sea shore) environment. If any doubt arises, the binding location is defined by coordinates published in the Reshumot.

## **2.1 Technical clarifications**

The law states that the coast line will be 0.75 m. above the zero level of the precise leveling which means that it is 0.65 m. above the mean sea level in 2005. The annual rate of change as observed over a number of years up to the year 2002 was approx. 1 cm increase in the sea level. In the last few years a slight decrease in the mean sea level occurred.

The Interministerial Committee, headed by the Survey of Israel, recommended defining the line at the elevation of 1.50 m. above sea level. This recommendation meant to define a stable line, taking into consideration short term variations in the sea level, such as tides, temporary variations caused by storms and also long term variations, such as the systematic rise in the sea level caused by global warming and the accompanying melting of ice in the Polar Regions.

The definition of the line at the 1.50 m. elevation would have pushed the line eastwards and would have increased the area for limitations that the law imposes on the coastal environment including limitations on building construction.

The elevation of 0.75 m. was accepted by the law makers as a compromise.

Our estimate was that in part of the area of the shore, the line would be unstable and sensitive to fluctuation. The field parties were instructed to take three measurements at every point along the coast. One at 0.75 m. above the zero level of the precise leveling and additional measurements at 1.0 m. and 1.25 m. above the zero level. This would be a basis for future research regarding the stability of the line through repeated measurements.

During the field surveys we were exposed to the problems with respect to the 0.75 m. line in certain areas. In order to strengthen the professional infrastructure, repeated measurements were made to investigate the sensitivity of the line to changes. As a result, it is possible to state that the 0.75 m. line along the Israeli coast of the Mediterranean is not stable in many areas: The sea level rises and falls, and as a result in combination with sea waves the location of the 0.75 m. line was at certain points in the water. In addition the shore itself was not stable in some places: the sand sometimes is being swept into the water, and at other times the sand piles up and the shore level rises. These phenomena are governed by prevailing winds along

the shore, by the tides and by the energy of the waves breaking on the shore above the elevation of 0.75 m.

Although the 1.0 m. line was more stable than the 0.75 m. line, it was not totally stable along its entire length. The 1.25 m. line was generally stable.

In places where repeated measurements were made, we did our best to preserve the spirit of the law, and ensure a 100 m. dry strip as much as possible.

In sections of the coast in which there were rocks or vertical cliffs, or protecting walls, in such a way that the elevation of 0.75 m. was on the vertical face the elevation measurements were made on the westernmost spot which was approachable from the shore. The coast line was measured with the aid of a GPS-RTK receiver, with respect to base points determined by the Survey of Israel in the vicinity of the coast along its entire length.

In those places where the coast can be termed as artificial (ports, marinas, fortress walls, etc.) the measurements were made using photogrammetric methods.

In the vicinity of the Ga'ash coast which suffered from limitations in GPS reception, the measurements were made by total station instruments.

The coordinates of the "The Coast Line – MAPI 2005" were defined in New Israel Grid as defined in the Survey Ordinance (Surveying and Mapping) – 1998.

The elevation of 0.75 m. was determined with reference to the orthometric height datum, as defined in Survey Ordinances and based on the precise leveling elevation found in the geodetic data files of the Survey of Israel, established with respect to this datum.

Based on conclusions drawn from the many repeated measurements made, the Director General included the following recommendation: In the face of the instability of the sea shore at the 0.75 m. elevation above the precise leveling datum as described above, I recommend to consider in the future increasing the elevation defined by law to 1.5 m. or at least 1.25 m. above the datum of precise leveling.

## **2.2 The Preliminary Photogrammetric Option**

The length of the coast line from Rosh Hanikra in the north, to the Egyptian border near Rafiah in the southwest, is close to 230 km. The plan called for photogrammetric mapping of the coastal area and was to include 400 m inland toward the east. The mapped area would have totaled 92 sq. km. Flight time for aerial photography back and forth along the coast line is approximately 3 hours and including the special sections like the ports and marinas. In order to prepare a cost estimate, two mapping scales were chosen: 1:1,250 and 1:2,500. At a mapping scale of 1:1,250, planimetric and altimetric mapping accuracy is  $\pm 0.25$ m and DEM was planned for a grid of every 10 m. At mapping scale of 1:2,500, planimetric and altimetric mapping accuracy is  $\pm 0.50$  m and DEM would have been measured as a grid of every 15 m.

## 2.3 The Geodetic Alternative

The pilot project:

Due to the high cost of the photogrammetric option the director general decided to consider a geodetic alternative for the measurement of the required coast line. A Preliminary Study was defined in a pilot project.

The purpose of the pilot was to evaluate the validity of GPS-RTK field measurement along the coast line, to find the optimal distance between the surveyed points along the coast line, to check the stability of the 0.75 m height line and to better evaluate the cost of the geodetic option.

In addition a field survey was executed along the entire coast in order to check and chose adequate control points – out of existing 500 points – to serve as geodetic control reference for the project.

The pilot project took part north of Nahariya near the beginning of the coast line. The 0.75 line was measured repeatedly in different dates (weeks apart) by different surveyors.

The results of the pilot showed differences of up to 18m in the east-west direction between the measured 0.75m height lines, which reflected the instability of the sand in the area. Part of the line appeared sometimes inside the water. Since this instability was anticipated, measurement lines at the levels of two additional heights were also taken.

The results of the repeated measurements show that the line at a height of 1.25 m was found to be stable and should be preferred from the professional point of view if the law will be altered in the future.

The evaluation of costs showed that the geodetic option was lower in cost in comparison to the photogrammetric one.

The technical recommendations, which were taken out of the pilot project, were to base the GPS-RTK field measurements on horizontal and vertical reference points 5km apart. The chosen density of measurement was one every 40 m, except areas of abrupt changes where shorter distances were chosen usually of every 15 m.

## 2.4 The Decision of the Director General

The evaluation of the two alternatives showed one advantage of the photogrammetric option but many more advantages to the GPS field survey.

The advantage of the photogrammetric option was that it would cover the entire coast line, thus using one consistent method and technology. The disadvantages of the photogrammetric option were that it could not meet the accuracy which could be achieved by the ground survey ( $\pm 25$  cm using the large scale photography versus  $\pm 4$  cm of GPS measurement accuracy and 10cm of the final line definition).

In addition, as was faced during the pilot, the height of 0.75 m is situated sometimes beneath the water level, thus not enabling photogrammetric measurements.

In addition the movement of the 0.75 m contour line due to local periodical changes could not be traced by photogrammetric means without repeated aerial photography.

This would raise the costs of the project very much. The field survey is much more flexible. Due to these considerations the decision was to adopt the field survey for most of the line and to define the rest of the line along the inaccessible area by photogrammetric methods.

The final resolution:

The resolution following the pilot was to define the line by three methods: a. 152 km by GPS-RTK field survey; b. 8 km by traditional field survey; c. 30 km by photogrammetric measurements.

## **2.5 Description of the Integrated Project**

The definition of the final coast line was based on a mixture of 3 methods. 160 km out of 190 km of coast line were measured by geodetic field surveying methods. For most of the area (152km) GPS-RTK was used. The rest 8 km where the GPS-RTK was not applicable due to poor GPS and Cellular reception – EDM survey equipment was used for measurements of distances and angles.

30 km of the line were measured, using photogrammetric methods, along artificial installations like ports, marinas, walls etc. and along inaccessible areas.

Three lines were measured in the field along the coast: the required line at 0.75 height and two additional lines at 1.0 m and 1.25 m heights, for potential use in case that the law will change.

For control purposes, at three areas the lines were measured repeatedly by different surveying teams.

The accuracy of the field measurement was better than 4cm (r.m.s). The accuracy of the resulting definition of the final line was 10 cm (r.m.s).

An evaluating team led personally by the Director General defined the final line, especially along the photogrammetric coverage.

After the geodetic measurements were performed in the open natural areas, the project was handed over to the Dept. of Photogrammetry in order to complete the measurements. For the photogrammetric measurements, 2004 aerial photos from the Survey of Israel archives were used. Photogrammetric measurements were taken only in built-up areas bordering the waterline, where walls are upright (perpendicular to ground). In light of the fact that features are upright and higher than 0.75 m, the contour line 0.75 m (the Coast Line), will coincide, planimetrically, with the topline of the measured features. Each photogrammetric model was based on the same control points measured in the field and connected to the control points used for the geodetic measurements. The photogrammetric measurements of the coast line were connected to the geodetic measurements and thus created the coordinate points of the coast line.

After completion of the measurements and final quality control application, all the measurements were collected into one file. The coast line points were consecutively numbered from north to south. In total there were 6194 points which were measured. The length of the coast line is approximately 190 km long (not including the Gaza shoreline); the density of the points is about 30 m along the line.

## 2.6 The Coast Line Atlas

At the end of the project, the Survey of Israel produced the Coast Line Atlas. It is composed of four chapters: Introduction, Legend, the coast line printed on an orthophoto background and the Coast Line Coordinate List. For user convenience, the digital data of the coast line was prepared in six formats: EXCEL, DXF, SHAPE, ATL/KLT, ASCII, PDF.

This publication is composed of two parts:

The first part presents the "The Coast Line – MAPI 2005" on the background of orthophoto sheets at 1:10,000 scale (or enlargement of 1:50,000 maps to this scale). This part includes 77 orthophoto sheets covering the shore line from Rosh Hanikra to the Gaza Strip.

The second part of the publication gives the list of coordinates of the coast line published in the Reshumot. Again, the version in the Reshumot is binding. The coordinates defined by field surveys are of the points actually measured.

For convenience, the orthophoto sheets of the first part are preceded by 4 index maps at 1:250,000 scale and two tables which provide the connection between the orthophoto and the points defined by coordinates in the second part.

"The Coast Line – MAPI 2005" is shown on the maps as a yellow line. In addition to this line, a line 100 m. from the coast line, is shown as a purple line, and is meant to assist the users in identifying "the area of the sea shore" mentioned in the law in the land part of the area.

"The area of the sea shore" is defined in the appendix to the law, as defined by a line 100 m. from the coast line, as measured inland, and a line matching the 30 m. depth of water line in the sea, or 1 nautical mile distance from the coast line, whichever is more distant from the coast line seawards.

The line defining the limit of "the area of the sea shore" seawards is marked on the 1:250,000 scale index maps as a green line.

The 300 m. line is presented, for the convenience of the users, for the purpose of illustrating the environment of the sea shore and is marked as a red line

Every page bears the signature of the Director General of the Survey of Israel, approving the presentation of the coast line. The signature does not approve the exact location of the 100 m. line and 300 m. line, which appear for illustration purposes only. As stated before, in case of any doubt as to the line, as it appears on the orthophoto and the location published in the Reshumot, the location published in the Reshumot is binding.

For any authoritative advice one should consult the Survey of Israel.

The following project with regard to the definition of the coast line with reference to the law of preservation of the coastal environment was launched by the Survey of Israel after the amendment to the law covering the Israeli coast along the Red Sea.

The first contribution of the Survey was when the Knesset (The Israeli Parliament) committee accepted the suggestion of the Director General of the Survey, to define the maritime boundary line as the limit of the coastal environment sea wards. The maritime boundary line between Israel and Jordan in the Gulf of Eilat had been jointly prepared and signed by him and the Jordanian colleague following the peace agreement and the maritime boundary agreement between the two states.

The main argument of the DG was that unlike the Mediterranean Sea the head of the Gulf of Eilat is a closed area, sensitive to pollution without an adequate circulation to expel pollutions. He recommended that after the law will pass Israel should cooperate with Jordan to extend the preservation all over the head of the gulf.

His other suggestion was to define the reference coast line as 0.95m above the zero level of the geodetic network due to the fact that the mean sea level along the Gulf of Eilat is around 20cm above the sea level along the Mediterranean coast and thus the suggestion will adopt practically the declared level intention of 0.75m above the sea mean level as of the declared coast line along the Mediterranean.

This suggestion was not accepted by the legislators. The argument of the legislators was that it would be faster to pass the amendment with no change. This had in fact very minor practical influence due to the narrow sloppy Israeli coast along the Red Sea. The amendment to the law passed in October 2007.

The field survey along the 12 km of coast line was performed by the SOI. The campaign took only a few days during March 2008 using RTK equipment. The results were very accurate due to the fact that one of the stations of the APN is located near the coast of the Gulf of Eilat.

Photogrammetric models were used to measure the coast line along inaccessible installations.

The definition of the two edge points of the line was easy since these points were defined between Israel and Egypt and between Israel and Jordan following the relevant Peace Treaties (Israel-Egypt Treaty of Peace 1979, and Israel-Jordan Peace Agreement 1994).

A new amendment to the law with regard to the preservation of the coastal environment of the Sea of Galilee passed in the Knesset on the 1<sup>st</sup> of April 2008. The sea ward coastal environment covers in this case all the water area of the lake, while the land area along the coastal environment is up to the surrounding main roads, sometimes only 50 m off the defined coast line. The problem in this area is the conflict between those who look at the coast as needed for preservation like the other coasts and those who see it as a water reservoir, which is actually the main water reservoir of Israel. The latter want full freedom in handling the water as well as controlling the water level.

The current status is that all of the Sea of Galilee is going to be considered a coastal environment. The level along which the coast line is going to be declared is -208.80 m (below sea level), taking into account that unlike the open seas, no storms can level up the water higher than exit dam to River Jordan.

The definition of the coast line along the 56 km of coast of the Sea of Galilee is going to be more complicated because of many small un accessible private controlled areas. On the other end the continuous shortage of rains during last years is reflected by a significant withdrawal of the water front. This fact will contribute to the field survey of the required coast line along the lake in the current situation since all the survey will be carried out on dry ground.

### **3. DEFINITION OF A BASELINE ALONG THE MEDITERRANEAN COAST**

The Israeli law of territorial waters replaced in 1956 the original mandatory definition of 3 nautical miles of territorial sea by 6 nautical miles from the low tide point or another point on the coast. The interpretation law defined in 1981 a strip of 6 miles and the 1990 update replaced it by 12 nautical miles. No directive was mentioned how to define the point of low tide, or the other point on the coast.

The UN Convention on the law of the Sea 1982 (UNCLOS) defines in Section 2 limits of the territorial sea.

Articles 2 to 16 of Section 2 define rules and conditions with regard to the implementation of limits of the territorial sea.

Article 3 and 4 refer to a breadth of the territorial sea not exceeding 12 nautical miles from the nearest points on the baselines.

Article 5 refers to the normal baseline as the low-water line as marked on official large scale charts unless otherwise provided by the Convention.

With regard to islands Article 6 refers to the seaward low-water line of the reef as relevant for the definition of the baseline.

Article 7 refers to conditions of using straight baselines in cases of indented coast lines and islands.

Article 10 refers to the conditions set for applying closing lines of bays except when straight baselines are applied.

Article 11 regards the outer most permanent harbor works as forming part of the coast.

Article 12 recognizes Roadsteads which are used for loading, unloading and anchoring of ships with regard to the definition of the territorial sea.

Article 16 defines the form of publication of the baselines, either by showing them on charts of adequate scales for ascertaining their position or by publishing a list of geographic coordinates of points specifying the geodetic datum.

A precise definition of a low water line is very difficult to be implemented. Such an attempt was exercised by the IKBC (Iraq-Kuwait Boundary Commission) for a relatively short length (Brown, 1994). Following the UN decision, the international boundary along the Kawr az Zubayr section follows the spring low waterline. In another section the median line was defined by the commission using as base lines the spring low water marks. The definition of the low water marks involved remote sensing using commissioned aerial photograph and an admiralty chart. The situation would be much more complicated if the two states were to arrive at an agreed definition of the low water lines.

The production of a normal base line can be based on the coast line as it appears on large-scale maps. But such a line could become involved with many problems: it is changing continuously due to both natural and artificial reasons. The first and most prominent of which depends on the tremendous change in sediment load transfer from the Nile region since the construction of the Aswan Dam. In addition the existence of islands and natural indentation along the coast line lead to the need of local deviation from a regular normal baseline. Artificial features along the coast such as: ports, marinas and roadsteads affect the deviation of the coast line. If a normal baseline method were adapted the baseline would not be steady but should be changed due to these features.

Many countries adopt straight base lines either for their entire coast line, or for portions of the coast line. A review of the declarations of the Mediterranean coastal states show that Egypt, Syria, Cyprus, Turkey, Italy, France, Spain, Morocco, Tunisia, Algeria, Albania and other states published coordinates of base points, defining base lines along their entire coast lines, or along portions of their coast line.

Following this trend we don't see a reason for Israel not to follow it, especially when we see that the effect of drawing straight base lines is not enclosing considerable bodies of sea as international waters.

Referring to prominent base points along the Israeli coast line one should refer to the common coastal boundary point between Israel and Lebanon of Rosh Hanikra. South West of this point there are a few islands which should be considered for a base point following UNCLOS as well as the international trend. The head of the Carmel could serve as the next base point covering the local indentations of the coast line, including the indentation of the bay of Haifa.

The length of a straight line between the head of the Carmel and the common coastal boundary point with Egypt or the common boundary point with the Gaza Strip is more than 75 nm. This length is unusual in comparison to the trend. The longest straight line, which was published by Egypt (Presidential Decree, 1990) for a similar coast line along the Mediterranean, is 29.8 nm, and for the Red Sea 40.5 nm (US Department of State, 1994). The longest base line declared by Cyprus (UN Law of the Sea Bulletin, 1993) is 16 miles. On the other hand Russia published a straight line of 103.9 nm along the Pacific Ocean (US Department of State, 1992).

There is no juridical limitation on the length of a straight baseline drawn in accordance with Article 4 of the Territorial Sea Convention or Article 7 of UNCLOS.

In spite of it the US document which refers to this issue (Limits in the Seas No 106 Developing Standard Guidelines for Evaluating Straight Baselines) suggests a limit of maximum 48 nautical miles for any baselines segment.

Other prominent base points which may be considered are the edges of the roadsteads in Hadera and Ashkelon, following UNCLOS and publications of other states like Egypt in Port Said, and harbour works like the port of Ashdod.

The definition of these points can be made using GPS surveying or preferably by the use of aerial photography and satellite imagery.

#### **4. SUMMARY AND CONCLUSIONS**

The fast development of the coastal zone together with the potential development of the maritime zone, call for better protection and more sophisticated planning of these areas.

These requirements which follow also the new law for the preservation of the Israeli Mediterranean sea shore environment motivated us to define two coast lines. One is a line at a height of 0.75 m above the zero level of the geodetic network following the requirements of the above mentioned law. The production of this line was described in the article. This line was officially published.

The recommendation of the author is to raise the line to a higher level since 0.75 m is still on unstable ground along this coast.

Following this experience, the Survey of Israel is in a process of defining the coast lines along the Gulf of Eilat and around the Sea of Galilee as required by relevant amendments to the original law of preservation of the coastal environment.

The second line which should serve as a base line for maritime requirements, including the definition of the Territorial Sea, has not yet been established, but the discussion deals with options of defining such a line.

None of these lines follows the coastline as defined in the national GIS. This line was defined by photogrammetric methods derived by operators as it appeared on aerial photographs on the time that the photographs had been taken.

Thus, the GIS coast line is adequate for general purpose use but not for specific applications which have to follow specific rules.

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## CONTACTS

Haim Srebro  
Director General  
Survey of Israel  
1 lincoln st.  
Tel-Aviv  
ISRAEL  
Tel. + 972-3-6231901  
Fax + 972-3-5610866  
Email: haim@mapi.gov.il;  
Web site: www.mapi.gov.il