**U.S. Coast Guard – Seventh Coast Guard District**
**Center for Interagency Maritime Intelligence**
**Document and Media Exploitation**
**Digital Forensic GPS Analysis Report**



**Case Number: 041 2012**
**Date: June 22, 2012**

**U.S. Coast Guard – Seventh Coast Guard District**
**Center for Interagency Maritime Intelligence**
**Document and Media Exploitation**
**Digital Forensic GPS Analysis Report**

**Electronic Device Analysis Report**

**Requesting Agent and Agency**: Homicide Detective, FLPD
**Device: Garmin GPSMap 5212  S/N 159013235 and S/N 159013140**
**D7 Case Number**: 041 2012

### Synopsis

On June 22, 2012, the USCG D7 (di) Document and Media Exploitation Team (DOMEX), was contacted by Fort Lauderdale Police Department Homicide Division requesting the exploitation of a Garmin GPSMap 5212 S/N 159013140 and a Garmin GPSMap 5212 S/N 159013235. The two GPS units were connected on the same vessel and the data analyzed in this product is from the Garmin GPSMap 5212 S/N 159013140. Data is to be used to try to establish location where an individual may have fallen overboard.  All requested data was successfully extracted from the GPS system. The following analysis is provided.

**Track Logs** – 07
**Waypoints** – 43
**Routes** – 00

Standard GPS Terminology

There are four types of data that are consistently available across almost all GPS devices. These data types can be divided into two categories; system level information and user inputted data.

<u>System Level</u>

• **Track Log**:  The track log is a complete list of track points that the unit has created.  This track log is created such that if the user wants to retrace his/her steps, the user may perform a trackback.  The unit will then navigate the user from point to point in the track log to take the user back to the starting location.

• **Track point**:  A track point is a location stored by the unit as a record of where the GPS has been.  When the GPS unit is turned on, and has acquired satellites, it will begin to record an electronic breadcrumb trail.  The track points are created automatically by the unit and cannot be changed by the user.  The unit, by default, automatically decides how often to create track points.  The user may also program the device to create track points based on a specific time or distance interval.

Standard GPS Terminology

User Level

• **Waypoint**:  a waypoint is a location that the user stores in the GPS.  This location can be a point where the user was physically present and wanted to save, or it can be a location that the user programs into the device from the coordinates, or an address, or selects a point of interest (POI) to which they want to navigate in the future.

• **Route**:  A route is a series of waypoints that the user wants the unit to navigate in a specific order. The advantage of using a route is that upon arrival at the intermediary waypoint, the unit automatically starts navigating the user to the next waypoint in the route.

Generally speaking, system level information such as track points can be used to prove actions, as they show where the device has been. User data such as waypoints can be used to show intent, as they are entered by the user.

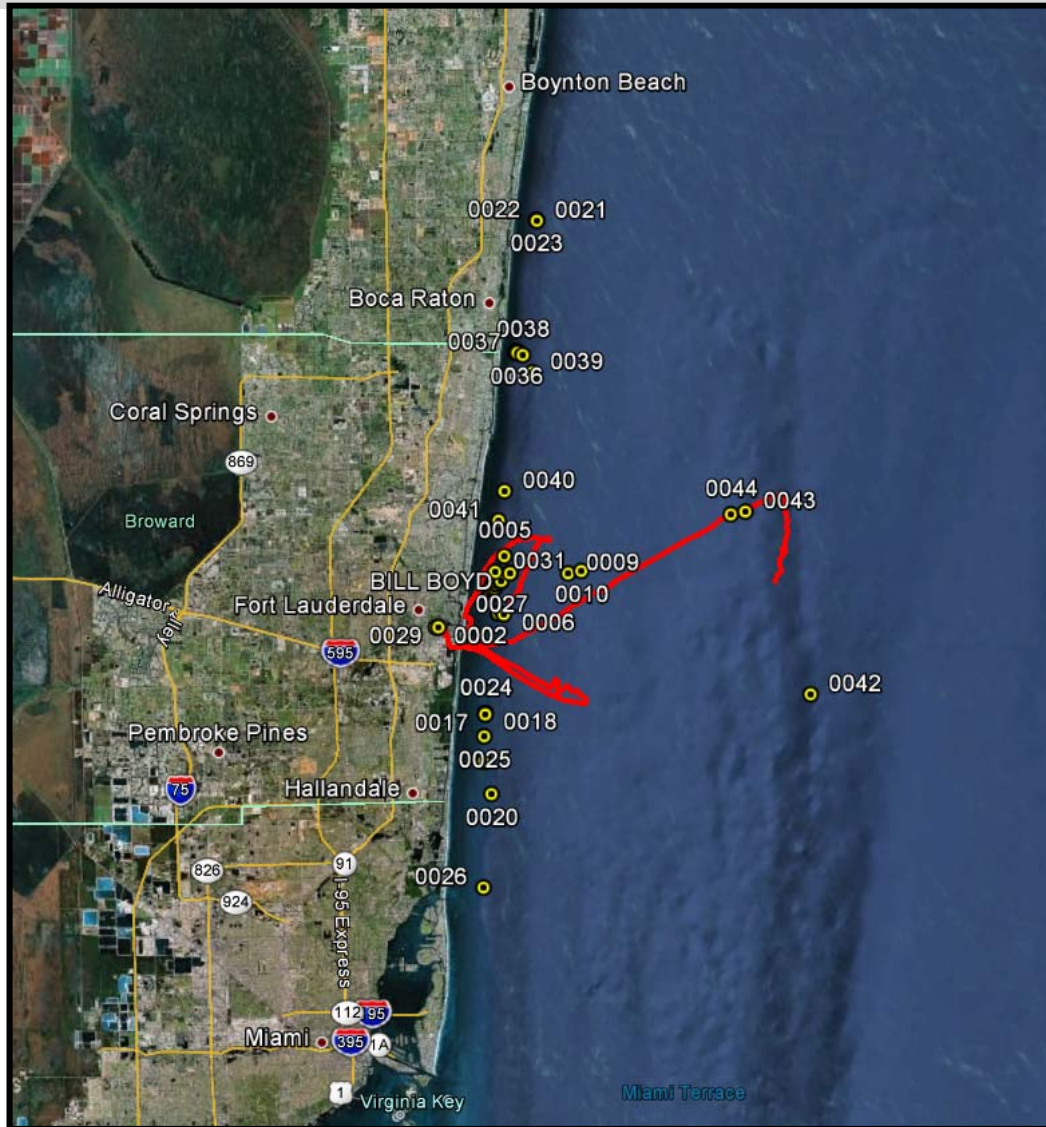# Garmin GPSmap 5212 Track Log (07 Total)

| Name | Points | Date | Elapsed Time | Length | Area | AVG Speed |
|---|---|---|---|---|---|---|
| ACTIVE LOG | 3498 | 6/15/2012 10:44 | 2:23:43 | 27.2 mi | 22.3 sq mi | 11 mph |
| ACTIVE LOG 001 | 4 | 6/16/2012 10:29 | 0:00:23 | 117 ft | 243 sq ft | 3 mph |
| ACTIVE LOG 002 | 796 | 6/16/2012 10:29 | 3:05:48 | 20.7 mi | 2.3 sq mi | 7 mph |
| ACTIVE LOG 003 | 5499 | 6/19/2012 19:29 | 11:19:23 | 16.7 mi | 7.3 sq mi | 1.5 mph |
| ACTIVE LOG 004 | 2 | 6/20/2012 8:49 | 0:25:30 | 1 ft | 0 sq ft | 0.0 mph |
| ACTIVE LOG 005 | 1 | 6/22/2012 13:26 | 0:00:00 | 0 ft | 0 sq ft | |
| ACTIVE LOG 006 | 199 | 6/22/2012 13:26 | 0:04:39 | 0 ft | 0 sq ft | 0 mph |

Active Logs 005 and 006 are of no relevance to the case. These track logs occurred when DOMEX powered on the GPS to place it in "Simulator Mode".

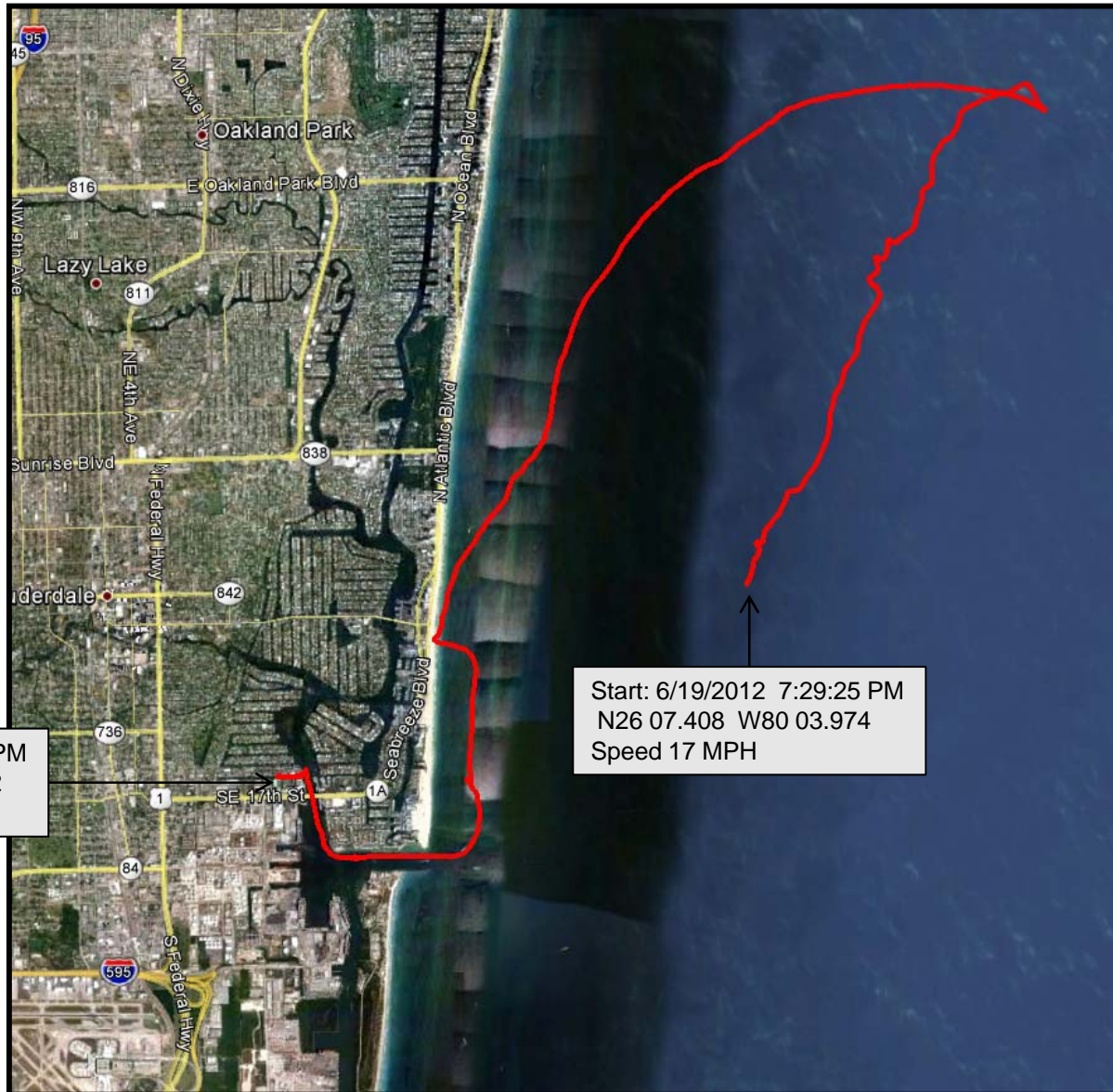# Map Source view of all track data in Garmin GPSMap 5212c
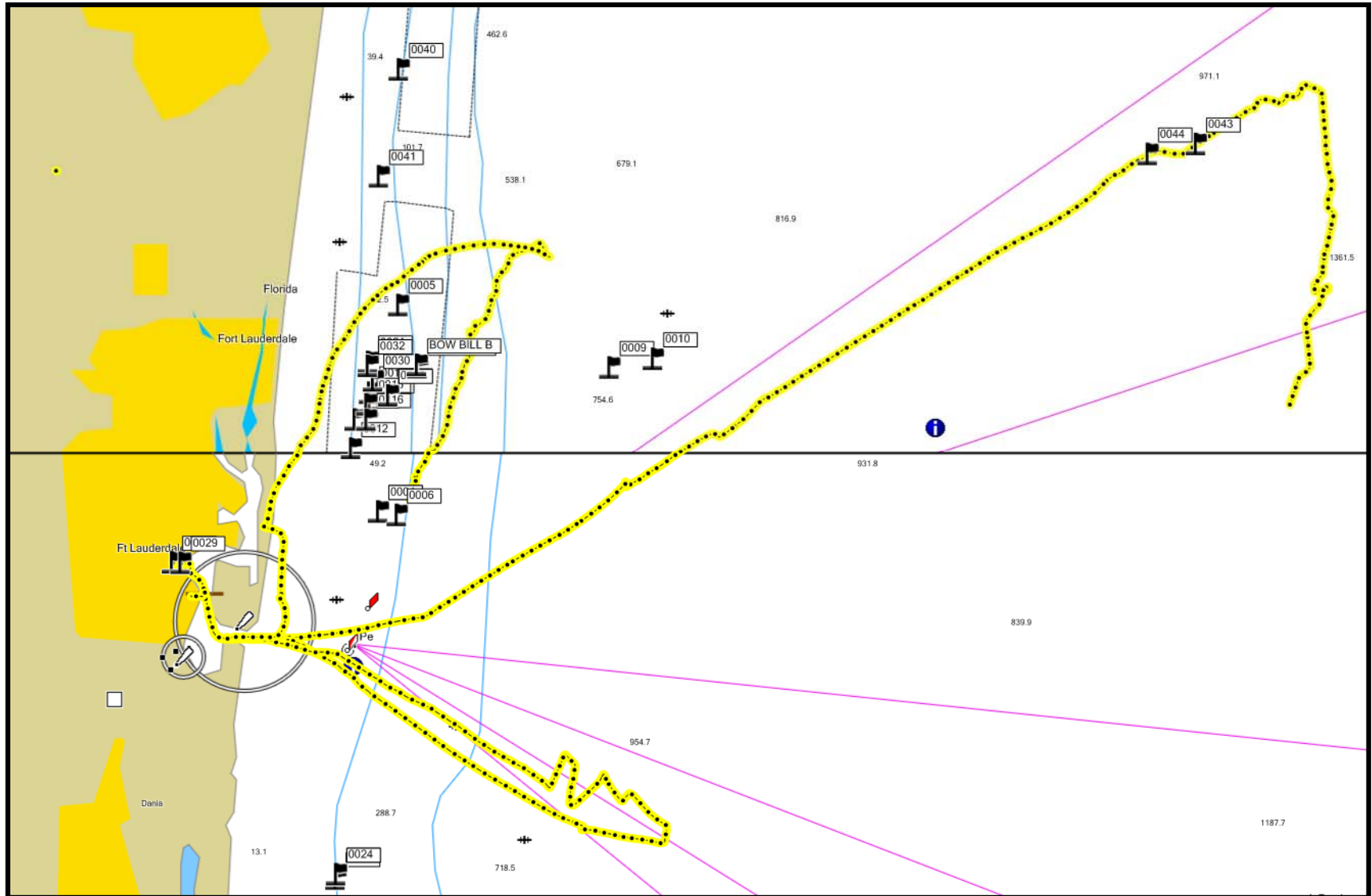
## Google Earth view of all data in the Garmin GPSMap 5212



Tracks: Red
Waypoints Yellow/White

# Google Earth view of tracks in Garmin GPSMap 5212 for 6/19/2012
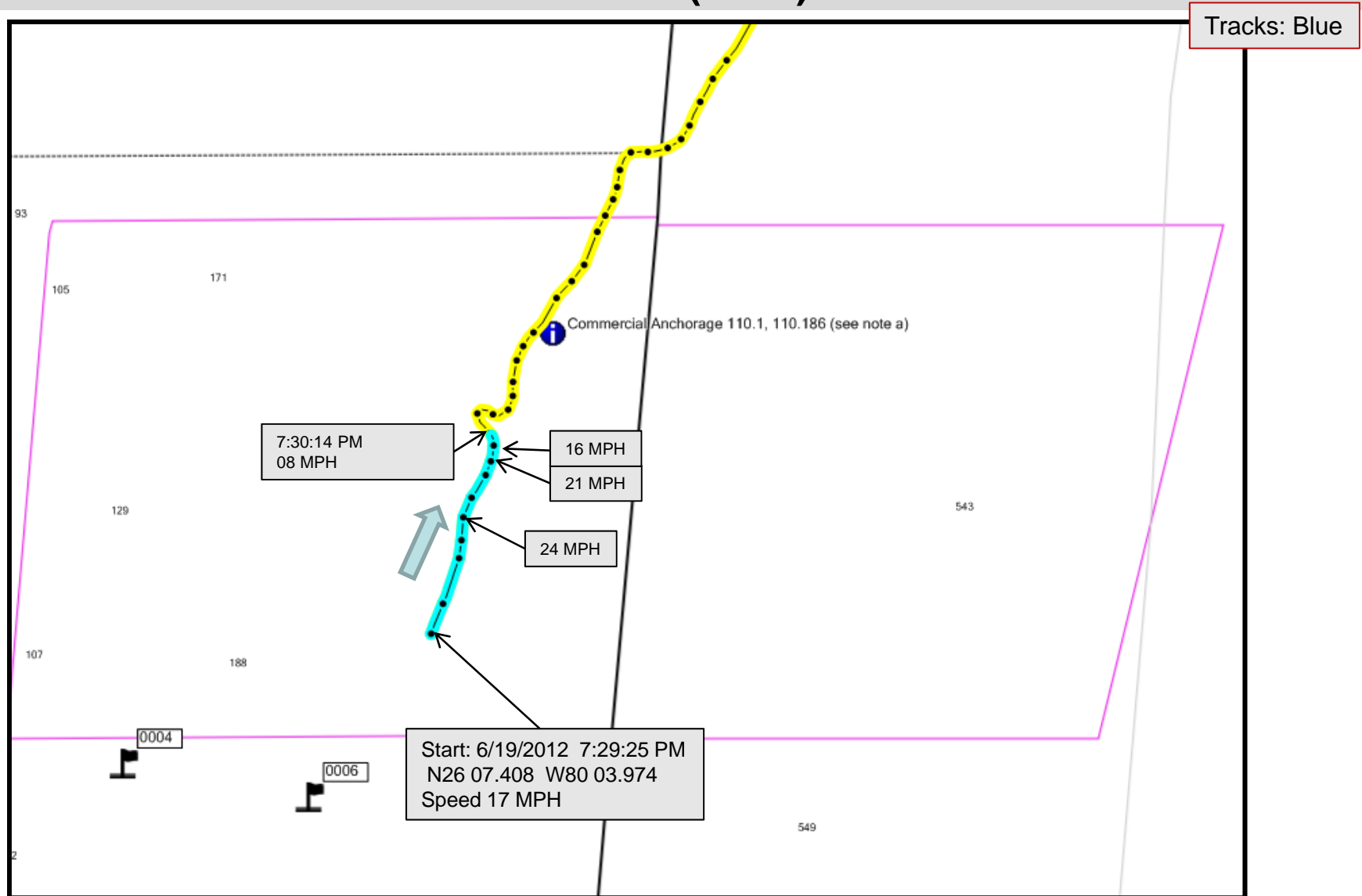


Tracks: Red

Start: 6/19/2012  7:29:25 PM
N26 07.408  W80 03.974
Speed 17 MPH

End: 6/19/2012  7:29:25 PM
N26 06.201  W80 07.192
Speed 00 MPH

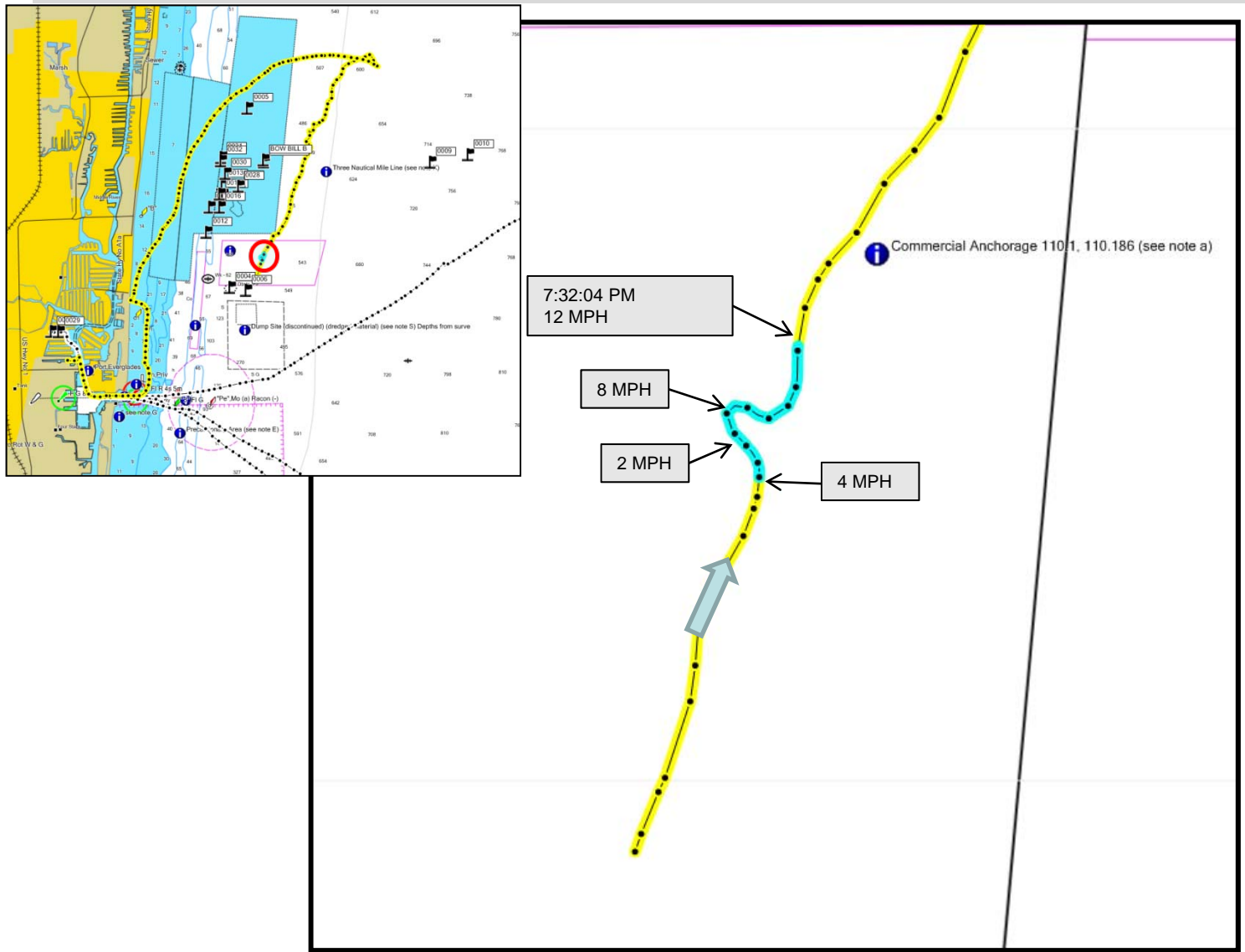# Google Earth view of tracks in Garmin GPSMap 5212 for 6/19/2012 (End)



End: 6/20/2012  6:48:48 AM
N26 06.201  W80 07.192
Speed 00 MPH

Tracks: Red

SE 15th St

Portside D.

## Detailed Map Source view of the data in Garmin GPSMap 5212 for 6/19/2012 (Start)

Tracks: Blue

Commercial Anchorage 110.1, 110.186 (see note a)

93

105

171

129

107

188

543

549

0004

0006

7:30:14 PM
08 MPH

16 MPH

21 MPH

24 MPH

Start: 6/19/2012  7:29:25 PM
N26 07.408  W80 03.974
Speed 17 MPH

# Detailed Map Source view of the data in Garmin GPSMap 5212 for 6/19/2012

Tracks: Blue

Commercial Anchorage 110.1, 110.186 (see note a)

7:32:04 PM
12 MPH

8 MPH

2 MPH

4 MPH

# Detailed Map Source view of the data in Garmin GPSMap 5212 for 6/19/2012

Tracks: Blue

7:33:09 PM
15 MPH

20 MPH

21 MPH

19 MPH

Commercial Anchorage 110.1, 110.186 (see note a)

13 MPH
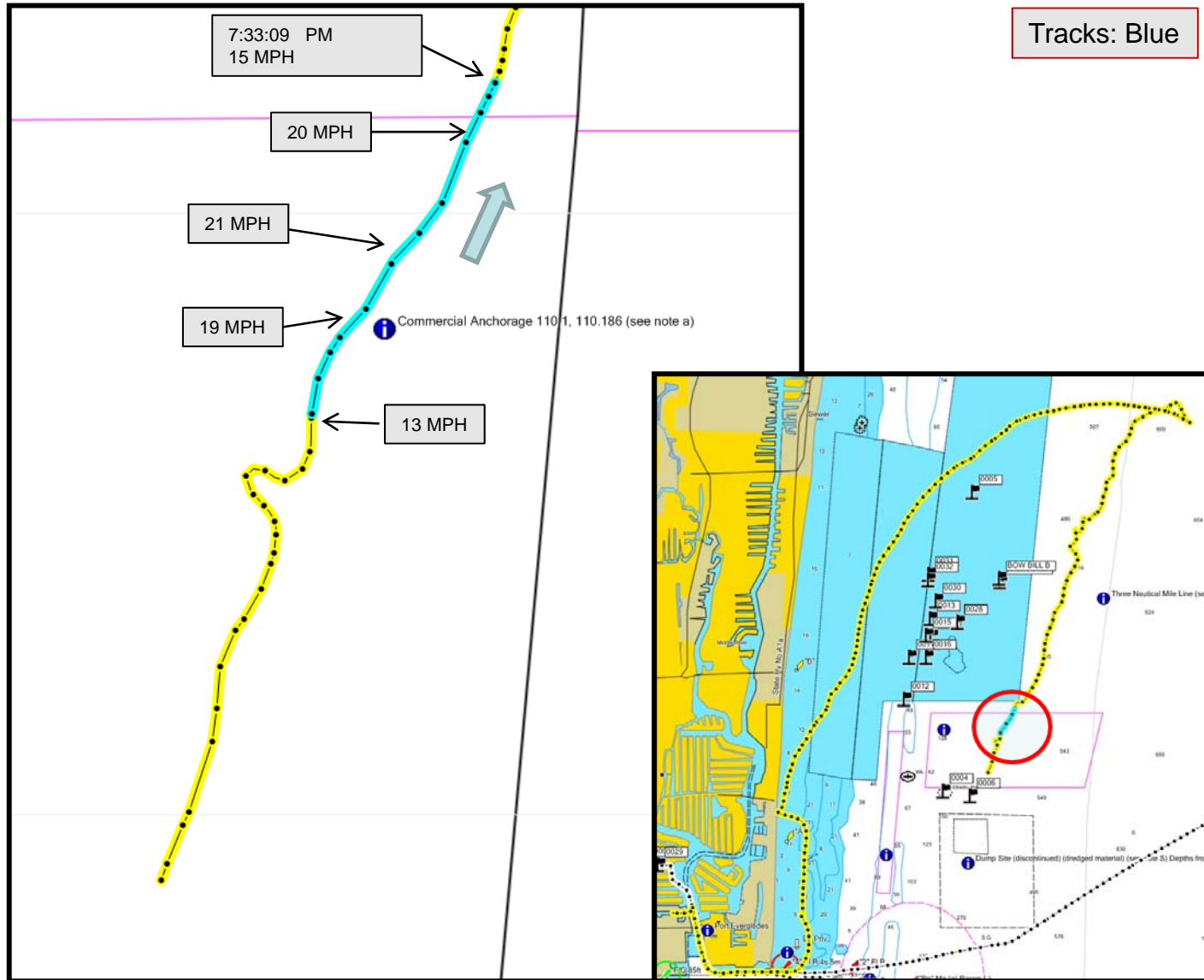
# Detailed Map Source view of the data in Garmin GPSMap 5212 for 6/19/2012
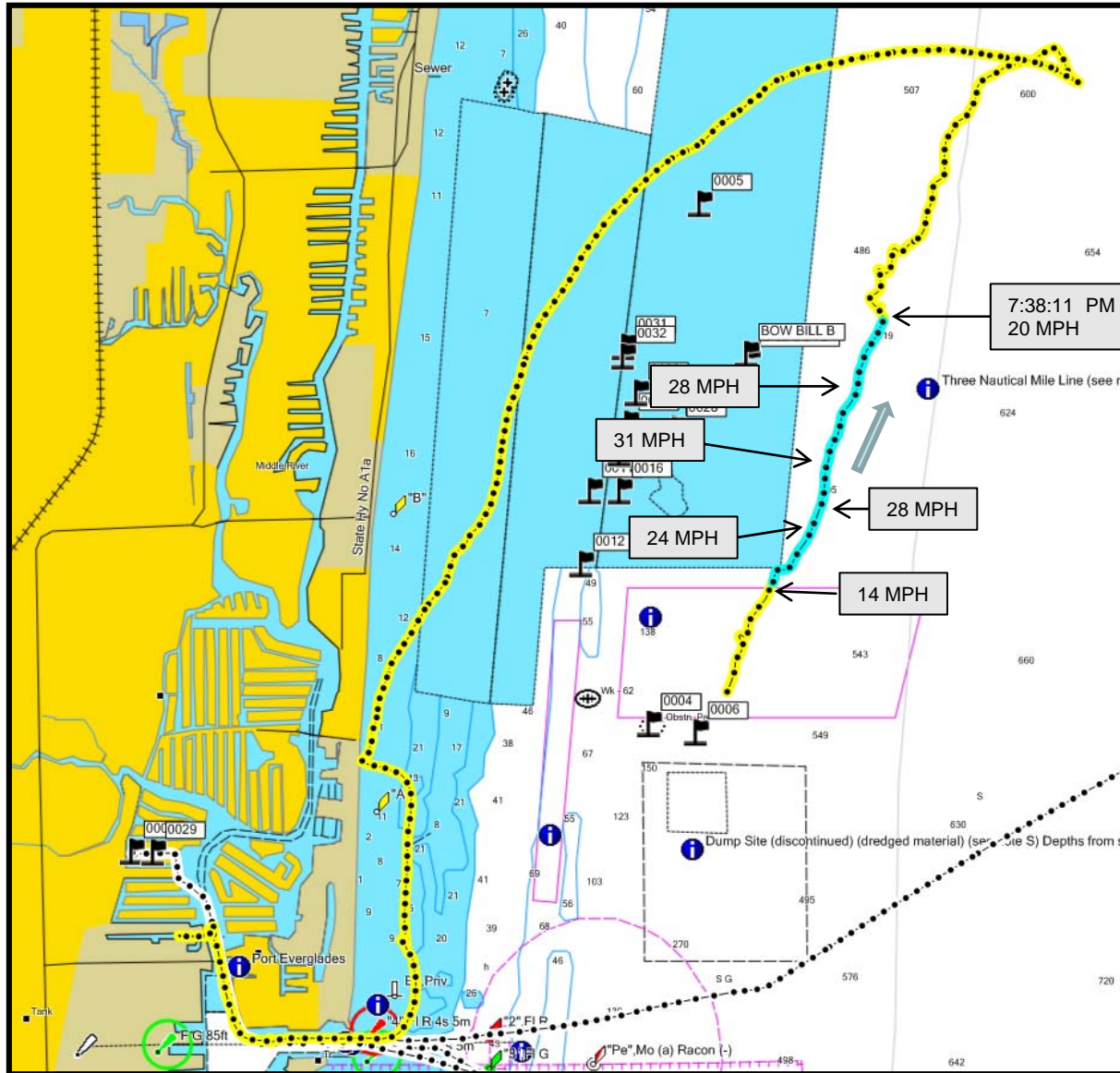


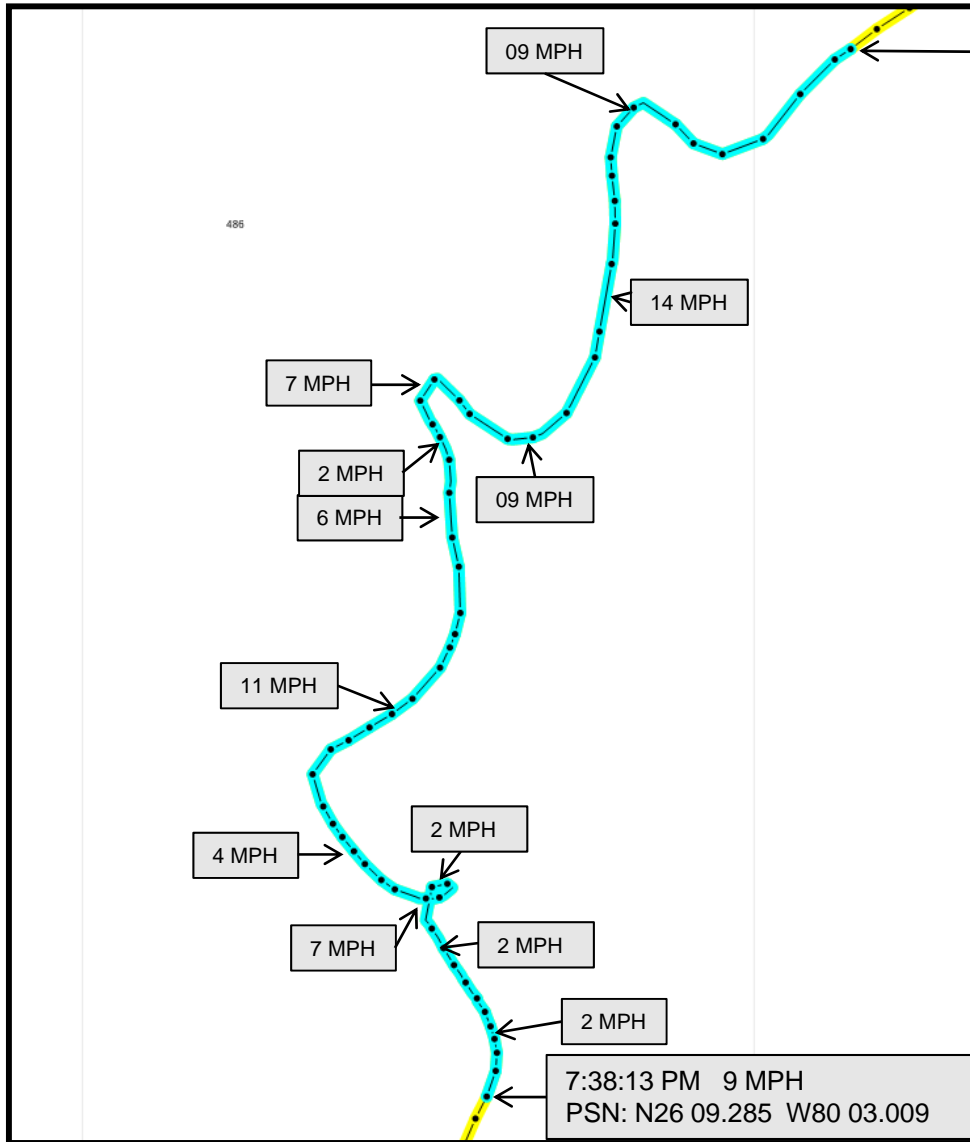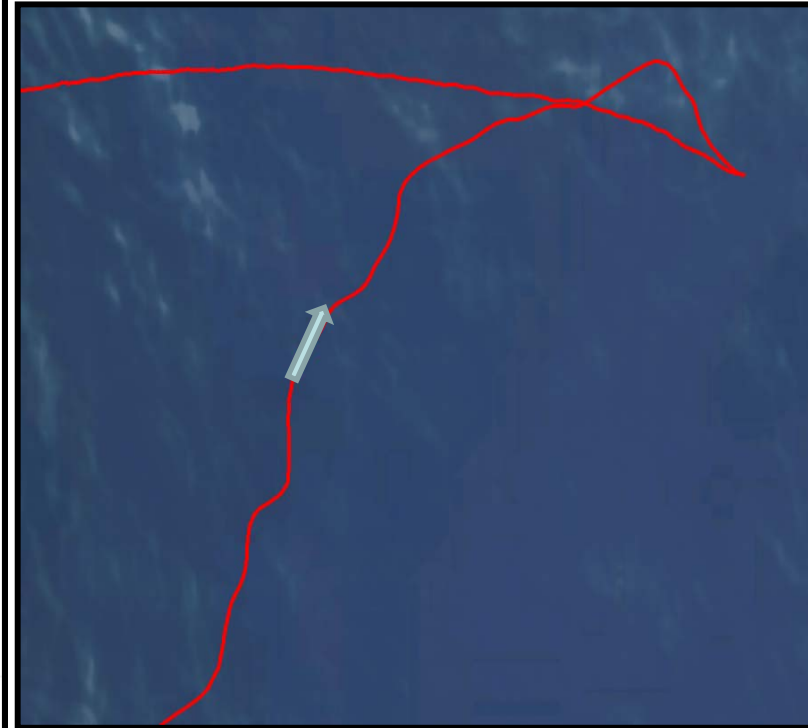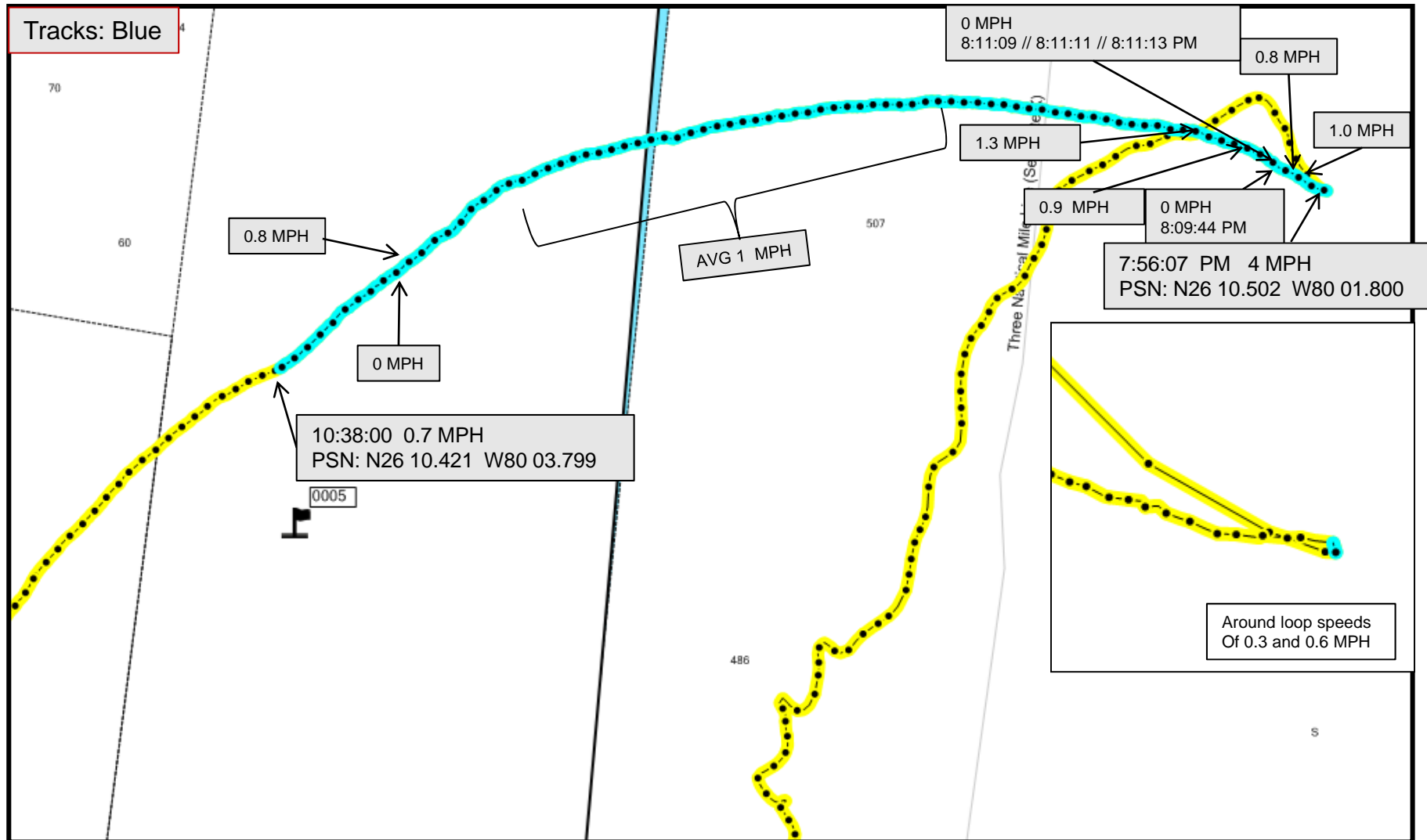Tracks: Blue

7:38:11 PM
20 MPH

28 MPH

31 MPH

28 MPH

24 MPH

14 MPH
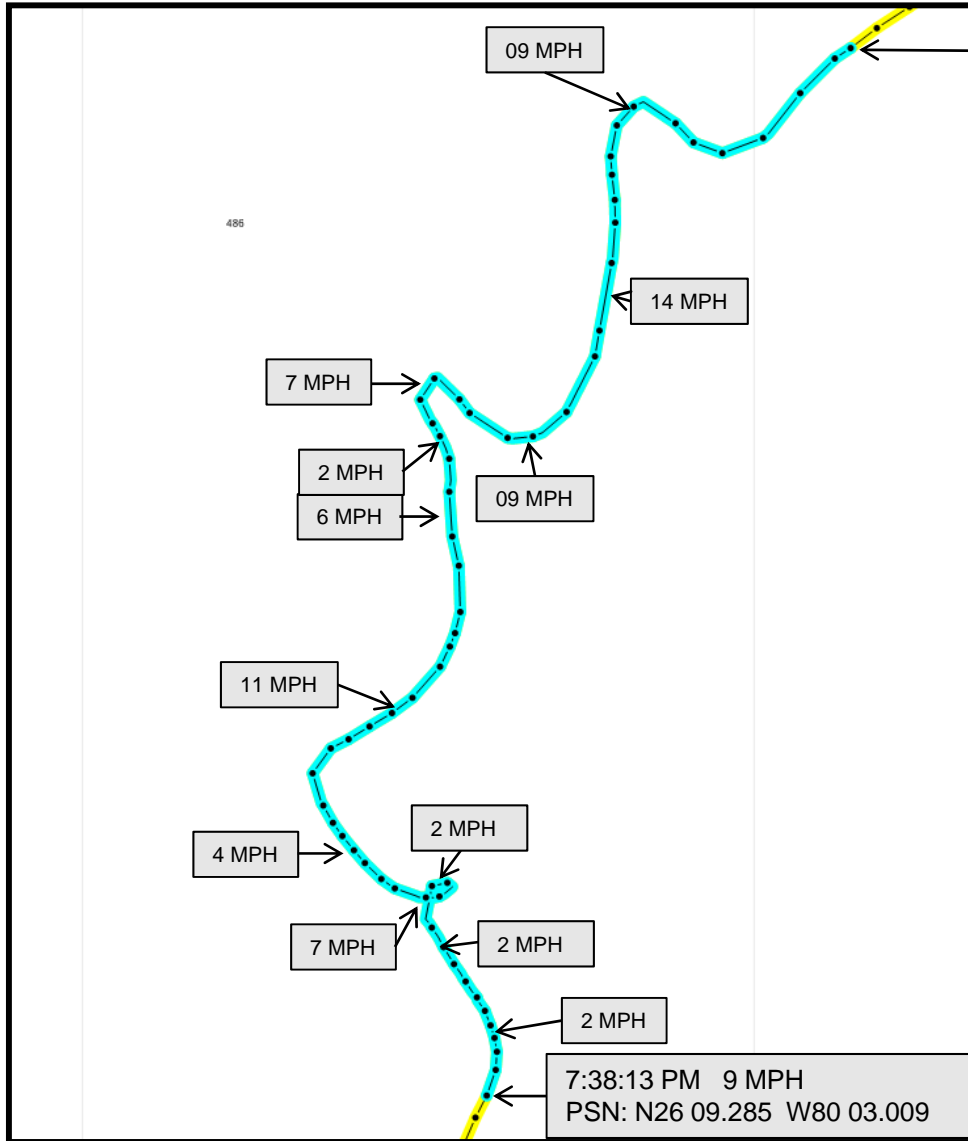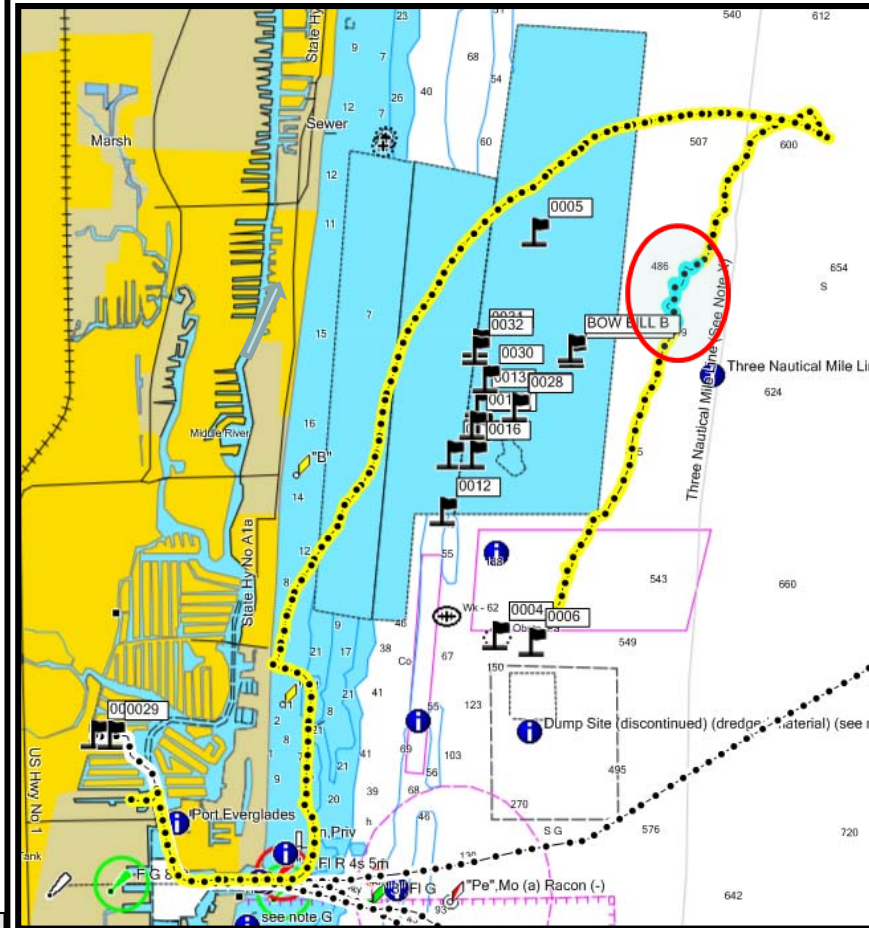
# Detailed Map Source view of the data in Garmin GPSMap 5212 for 6/19/2012



7:45:58 PM   16 MPH
PSN: N26 09.675  W80 02.849

Tracks: Blue

09 MPH

14 MPH

7 MPH

2 MPH

6 MPH

09 MPH

11 MPH

4 MPH

2 MPH

7 MPH

2 MPH

2 MPH

7:38:13 PM   9 MPH
PSN: N26 09.285  W80 03.009

# Detailed Map Source view of the data in Garmin GPSMap 5212 for 6/19/2012

09 MPH

7:45:58 PM   16 MPH
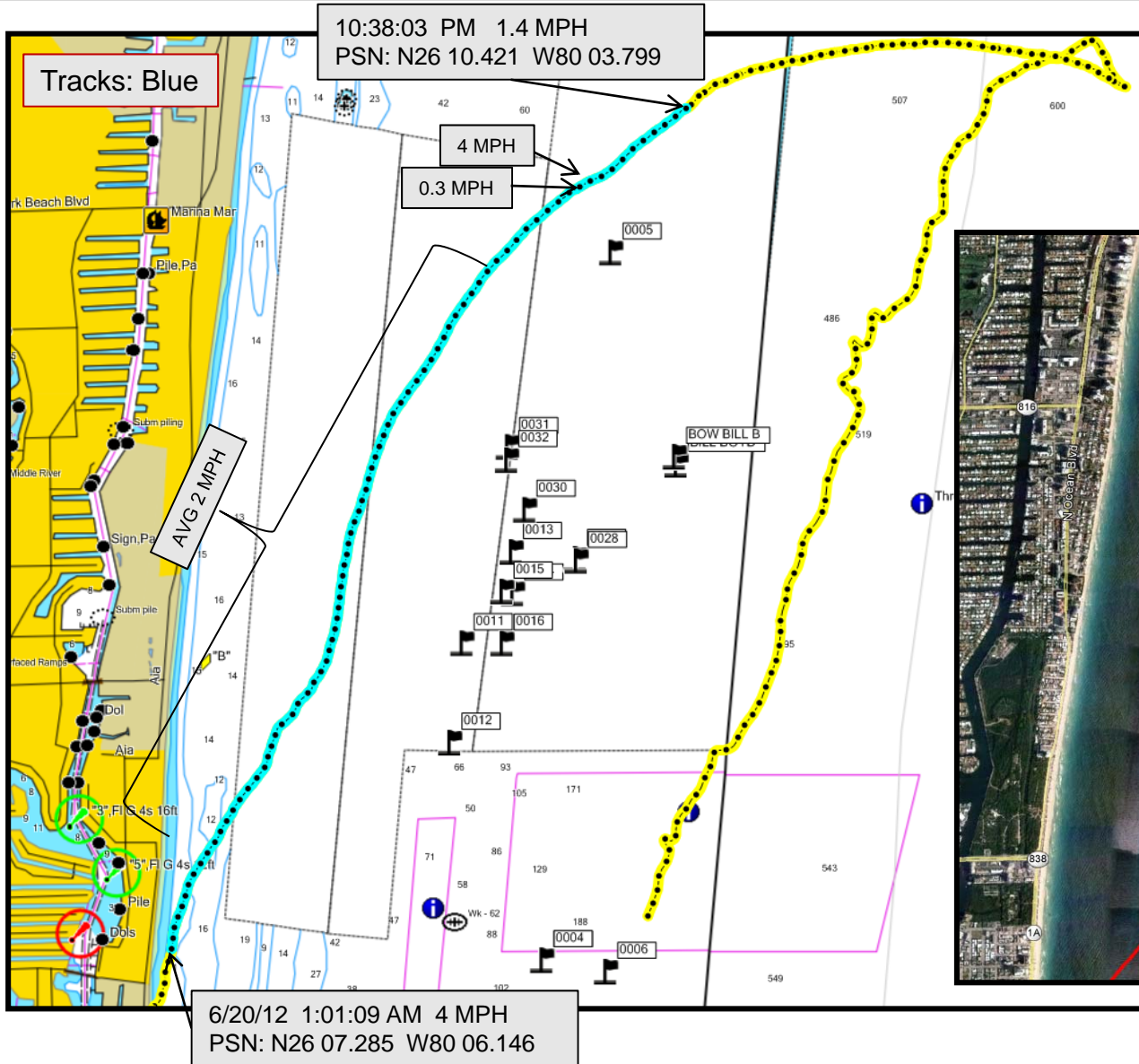PSN: N26 09.675  W80 02.849

Tracks: Blue

14 MPH

7 MPH

2 MPH

6 MPH

09 MPH

11 MPH

4 MPH

2 MPH

7 MPH

2 MPH

2 MPH

7:38:13 PM   9 MPH
PSN: N26 09.285  W80 03.009

486

# Detailed Map Source view of the data in Garmin GPSMap 5212 for 6/19/2012



08 MPH

10 MPH

7:56:00 PM   7 MPH
PSN: N26 10.508  W80 01.812

Tracks: Blue

09 MPH

11  MPH

05 MPH

507

15 MPH

16 MPH

18 MPH

16 MPH

486

654

S

7:45:52 PM   13  MPH
PSN: N26 09.662  W80 02.865

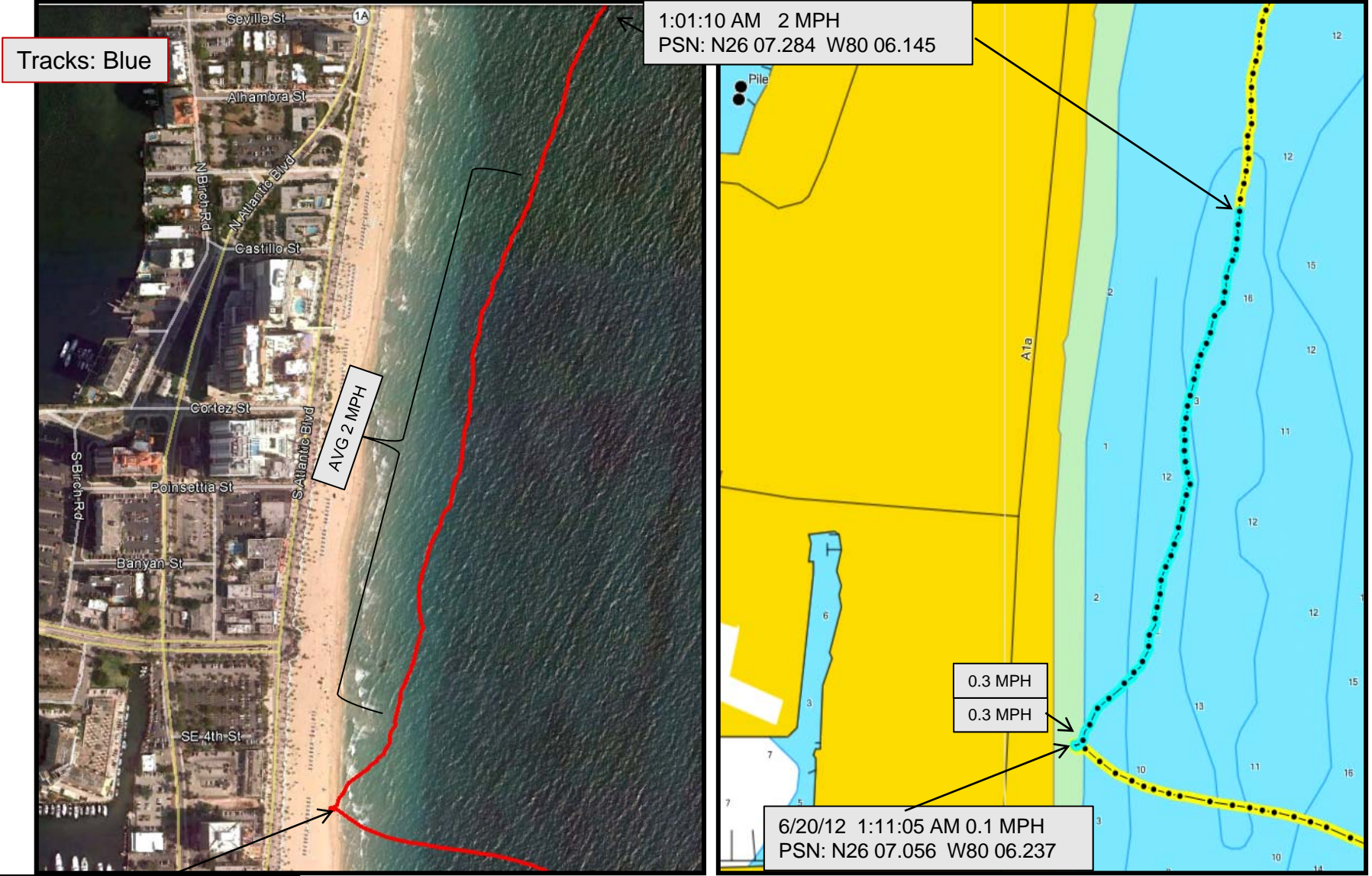# Detailed Map Source view of the data in Garmin GPSMap 5212 for 6/19/2012



Tracks: Blue

0 MPH
8:11:09 // 8:11:11 // 8:11:13 PM

0.8 MPH

1.3 MPH

1.0 MPH

0.8 MPH

0 MPH

AVG 1 MPH

0.9 MPH

0 MPH
8:09:44 PM

7:56:07 PM   4 MPH
PSN: N26 10.502  W80 01.800

10:38:00  0.7 MPH
PSN: N26 10.421  W80 03.799

0005

Around loop speeds
Of 0.3 and 0.6 MPH

## Map Source view of the data in Garmin GPSMap 5212 for 6/19-20/2012



Tracks: Blue

10:38:03 PM   1.4 MPH
PSN: N26 10.421  W80 03.799

4 MPH

0.3 MPH

AVG 2 MPH

6/20/12  1:01:09 AM  4 MPH
PSN: N26 07.285  W80 06.146

# View of the data in Garmin GPSMap 5212 for 6/20/2012



Tracks: Blue

1:01:10 AM   2 MPH
PSN: N26 07.284  W80 06.145

AVG 2 MPH

0.3 MPH

0.3 MPH

6/20/12  1:11:05 AM 0.1 MPH
PSN: N26 07.056  W80 06.237

6/20/12  1:11:05 AM 0.1 MPH
PSN: N26 07.056  W80 06.237

## View of the data in Garmin GPSMap 5212 for 6/20/2012
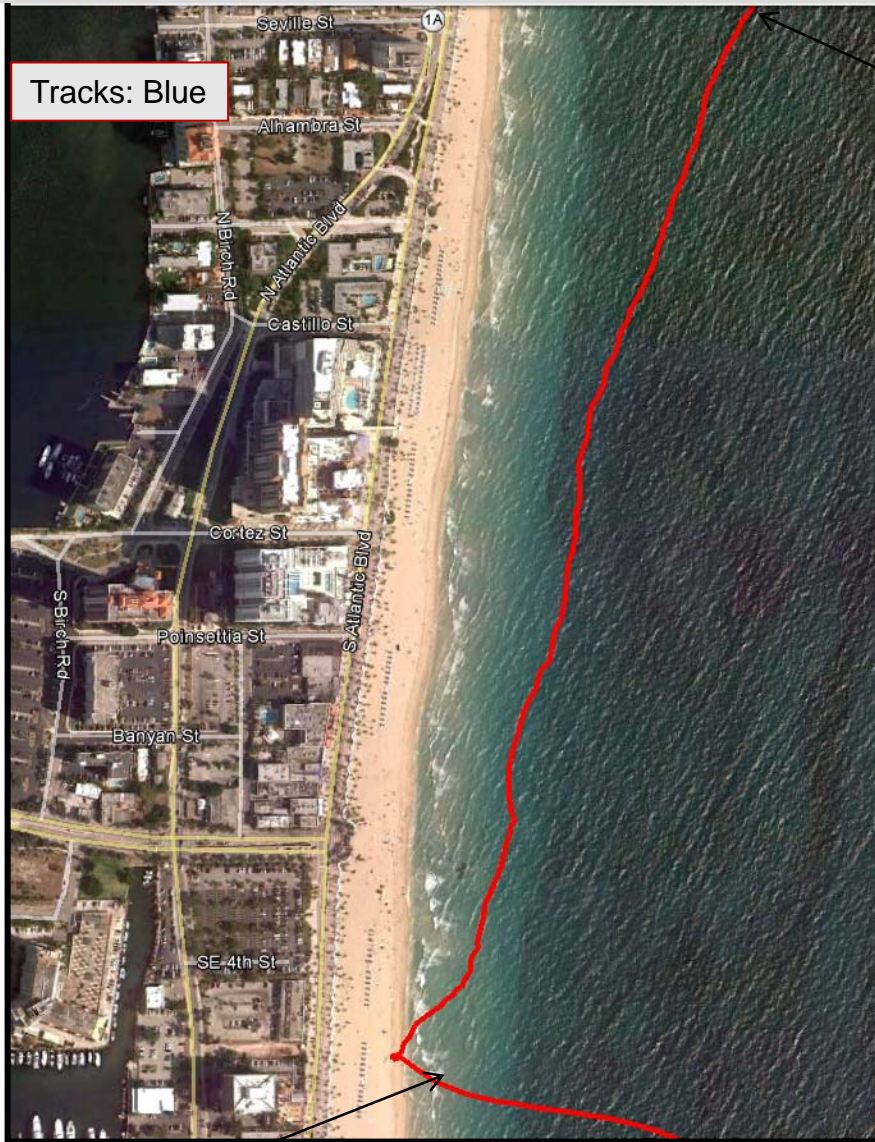
Tracks: Blue



1:10:04 AM   1.1 MPH
PSN: N26 07.058   W80 06.232
Landed at beach

1:12:05 AM   0 MPH
PSN: N26 07.055   W80 06.235
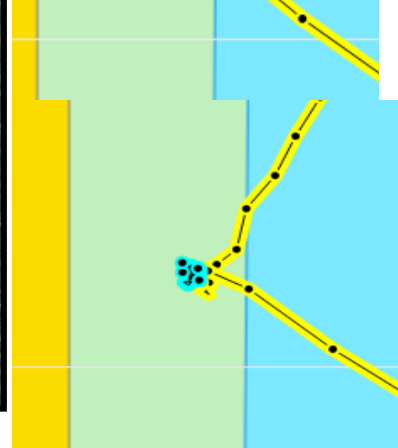
6/20/12   1:12:05 AM to 5:54:09
AM Average speed is 0 MPH
PSN: N26 07.056   W80 06.237

6/20/12   1:11:05 AM 0.1 MPH
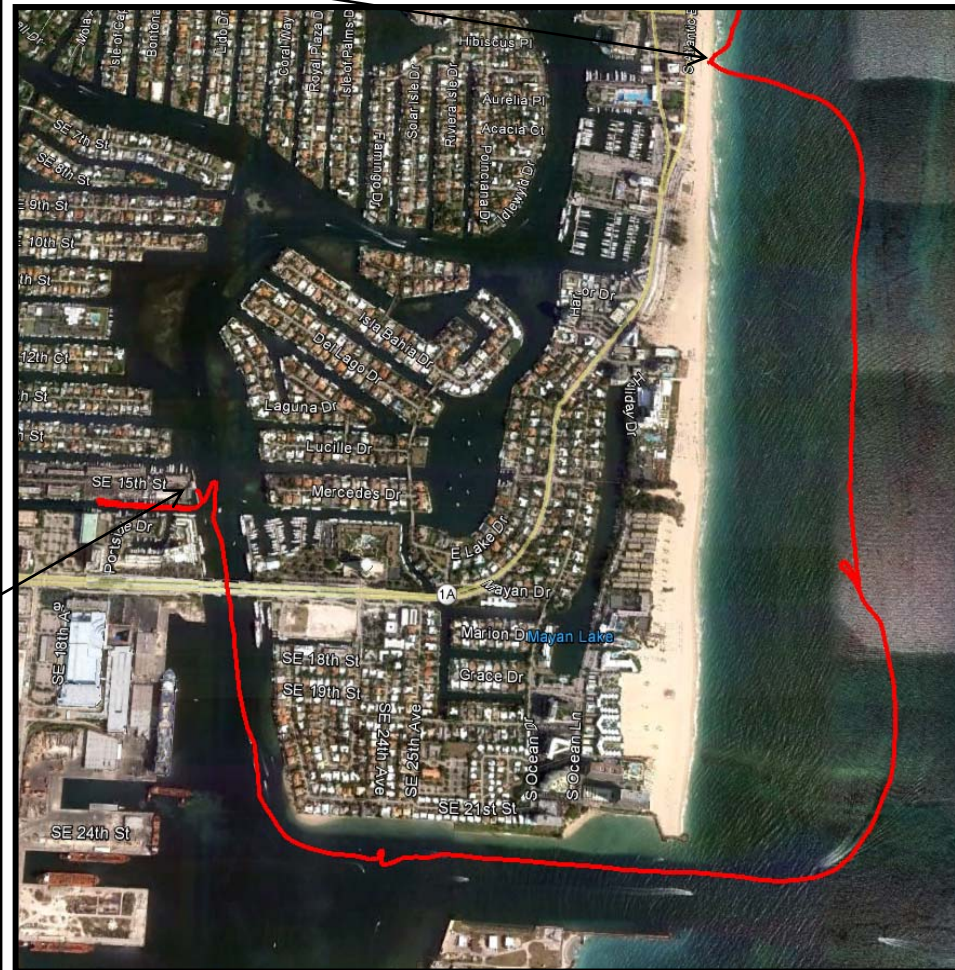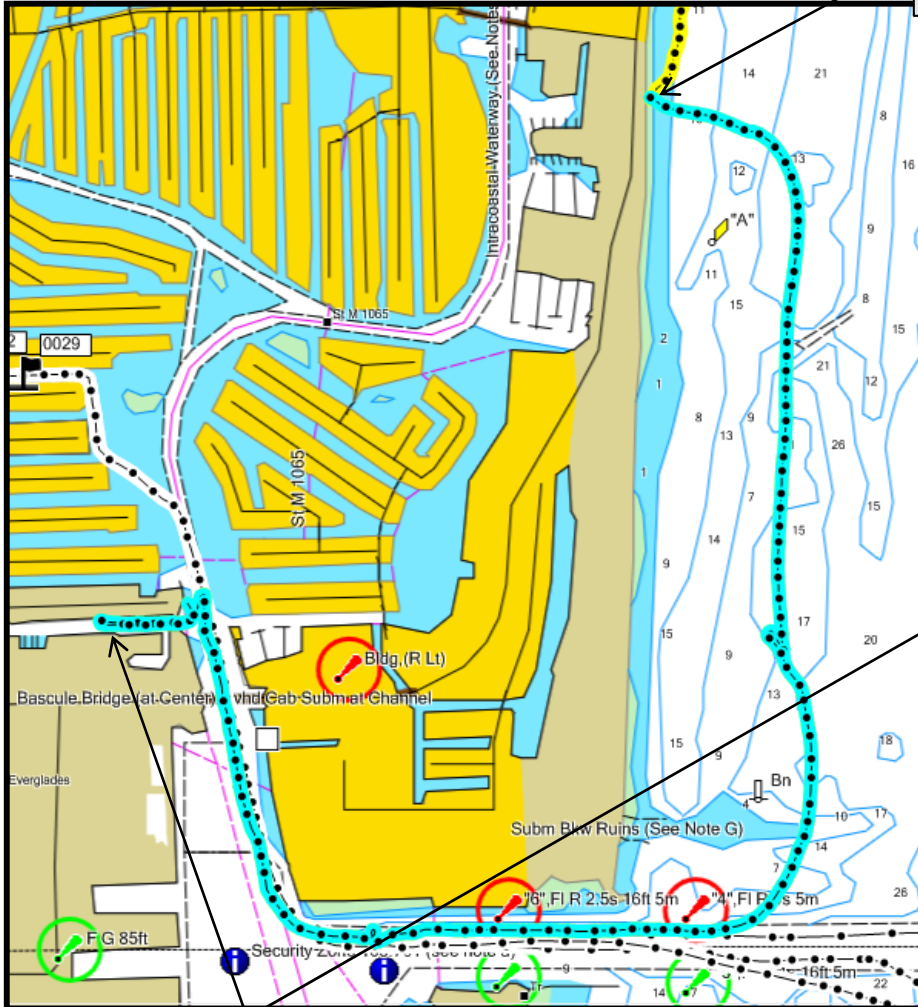PSN: N26 07.056   W80 06.237

**Google Earth view of the data in Garmin GPSMap 5212 for 6/20/2012**

# View of the data in Garmin GPSMap 5212 for 6/20/2012

Tracks: Blue

5:54:31 AM 0.2 MPH
PSN: N26 07.057 W80 06.237
At Beach

6/20/12 6:48:48 AM
PSN: N26 06.201 W80 07.192

# Google Earth view of the end of the track in Garmin GPSMap 5212 for 6/20/2012



6/20/12  6:48:48 AM
PSN: N26 06.201 W80 07.192

## Garmin GPSmap 5212 Waypoints (043 Total)

| Name | Position | Depth | Temp | Date/Time Modified |
|---|---|---|---|---|
| 2 | N26 06.593 W80 07.661 | | | 11/2/2011 15:29 |
| 3 | N26 07.240 W80 04.454 | | | 2/8/2012 15:40 |
| 4 | N26 07.240 W80 04.454 | | | 2/8/2012 15:40 |
| 5 | N26 09.880 W80 04.140 | | | 2/8/2012 15:42 |
| 6 | N26 07.197 W80 04.163 | | | 2/8/2012 15:44 |
| 9 | N26 09.084 W80 00.855 | | | 2/18/2012 10:56 |
| 10 | N26 09.196 W80 00.178 | 751.0 ft | 71.4 °F | 2/18/2012 11:09 |
| 11 | N26 08.422 W80 04.819 | 57.9 ft | 74.7 °F | 3/24/2012 11:24 |
| 12 | N26 08.051 W80 04.874 | 59.2 ft | 74.9 °F | 3/24/2012 11:37 |
| 13 | N26 08.763 W80 04.594 | 92.7 ft | 75.2 °F | 3/24/2012 11:52 |
| 14 | N26 08.609 W80 04.587 | 98.8 ft | 76.6 °F | 4/6/2012 10:10 |
| 15 | N26 08.615 W80 04.637 | 81.3 ft | 76.6 °F | 4/6/2012 10:11 |
| 16 | N26 08.422 W80 04.636 | 84.0 ft | 76.7 °F | 4/6/2012 10:39 |
| 17 | N26 02.566 W80 05.117 | 85.1 ft | 72.6 °F | 4/9/2012 10:49 |
| 18 | N26 02.621 W80 05.107 | 90.6 ft | 72.6 °F | 4/9/2012 10:55 |
| 19 | N26 00.401 W80 05.196 | 82.6 ft | 73.4 °F | 4/9/2012 11:43 |
| 20 | N25 58.896 W80 04.799 | 128.2 ft | 74.8 °F | 4/9/2012 14:34 |
| 21 | N26 25.369 W80 02.478 | 174.3 ft | 71.5 °F | 4/27/2012 8:41 |

## Garmin GPSmap 5212 Waypoints (043 Total)

| Name | Position | Depth | Temp | Date/Time Modified |
|------|----------|-------|------|--------------------|
| 22 | N26 25.391 W80 02.497 | 170.2 ft | 71.5 °F | 4/27/2012 8:41 |
| 23 | N26 25.411 W80 02.516 | 165.4 ft | 71.5 °F | 4/27/2012 8:41 |
| 24 | N26 02.621 W80 05.108 | 87.9 ft | 75.2 °F | 5/5/2012 10:49 |
| 25 | N26 01.559 W80 05.170 | 75.8 ft | 75.1 °F | 5/5/2012 11:21 |
| 26 | N25 54.573 W80 05.209 | 71.9 ft | 76.4 °F | 5/5/2012 12:34 |
| 27 | N26 08.737 W80 04.302 | 146.1 ft | 77.9 °F | 5/19/2012 16:03 |
| 28 | N26 08.730 W80 04.297 | 131.9 ft | 77.9 °F | 5/19/2012 16:03 |
| 29 | N26 06.588 W80 07.527 | 6.5 ft | 79.3 °F | 5/25/2012 15:31 |
| 30 | N26 08.920 W80 04.532 | 100.4 ft | 76.9 °F | 5/26/2012 11:30 |
| 31 | N26 09.155 W80 04.612 | 74.2 ft | 77.3 °F | 5/26/2012 12:42 |
| 32 | N26 09.106 W80 04.615 | 76.3 ft | 77.3 °F | 5/26/2012 12:42 |
| 33 | N26 19.323 W80 03.552 | 58.1 ft | 80.2 °F | 6/7/2012 16:40 |
| 34 | N26 19.341 W80 03.543 | 49.8 ft | 80.3 °F | 6/7/2012 16:48 |
| 35 | N26 19.284 W80 03.551 | 65.9 ft | 80.3 °F | 6/7/2012 17:05 |
| 36 | N26 19.263 W80 03.552 | 68.4 ft | 80.7 °F | 6/7/2012 19:25 |
| 37 | N26 19.274 W80 03.461 | 77.6 ft | 80.7 °F | 6/7/2012 19:28 |
| 38 | N26 19.169 W80 03.202 | 137.8 ft | 80.7 °F | 6/7/2012 19:30 |
| 39 | N26 18.360 W80 02.709 | 325.2 ft | 80.6 °F | 6/7/2012 19:46 |

# Garmin GPSmap 5212 Waypoints (043 Total)

| Name | Position | Depth | Temp | Date/Time Modified |
|---|---|---|---|---|
| 40 | N26 12.881 W80 04.131 | 79.0 ft | 77.7 °F | 6/8/2012 18:13 |
| 41 | N26 11.519 W80 04.442 | 60.2 ft | 78.4 °F | 6/8/2012 21:15 |
| 42 | N26 03.496 W79 48.389 | | 78.0 °F | 6/15/2012 9:55 |
| 43 | N26 11.931 W79 51.731 | 1136.7 ft | 78.5 °F | 6/15/2012 11:43 |
| 44 | N26 11.804 W79 52.481 | 947.3 ft | 78.6 °F | 6/15/2012 11:51 |
| BILL BOYD | N26 09.088 W80 03.842 | | | 2/8/2012 15:49 |
| BOW BILL B | N26 09.118 W80 03.850 | 276.3 ft | 73.5 °F | 2/8/2012 17:05 |

# Google Earth view of all Waypoints
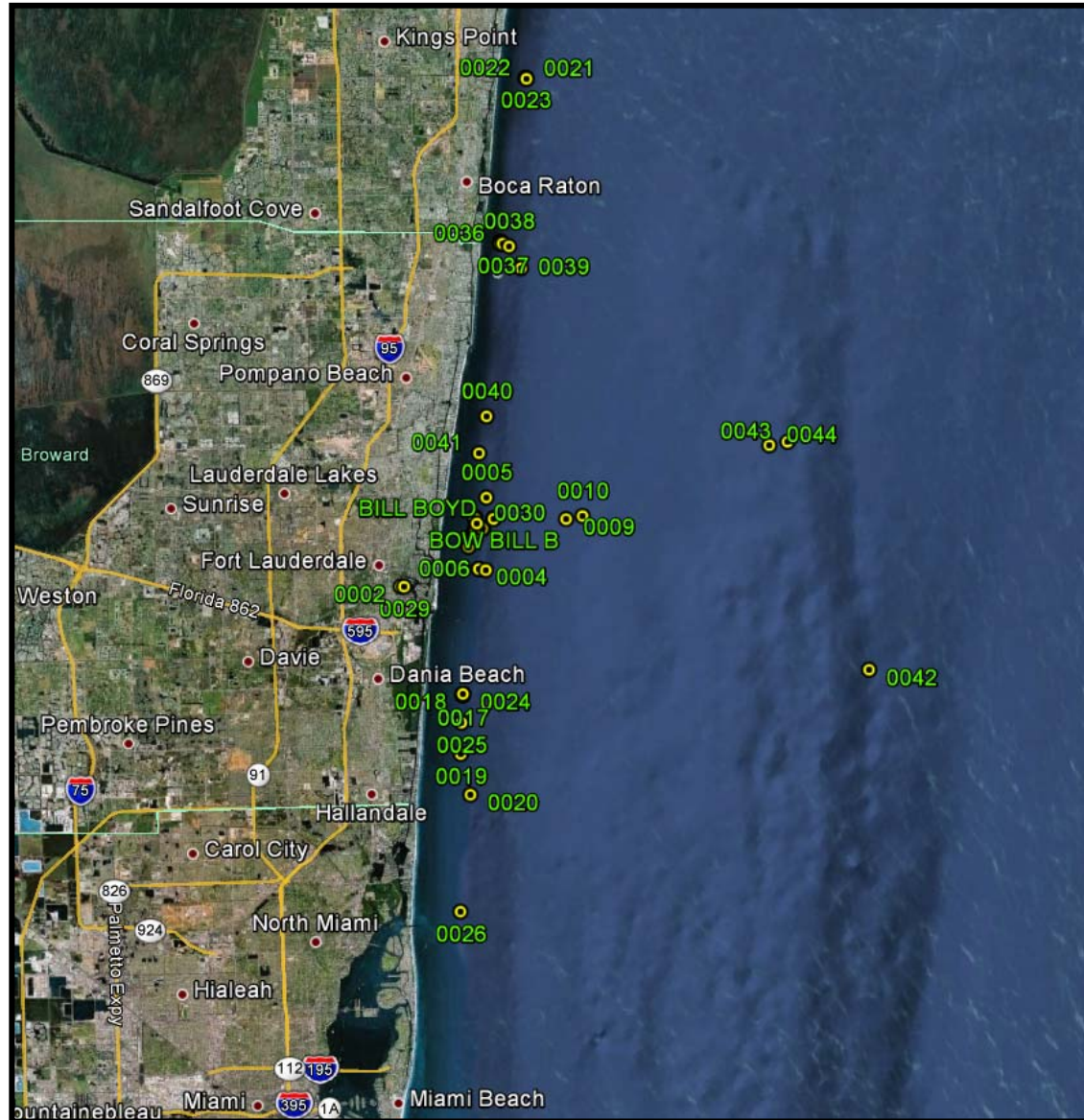
## Google Earth view of Waypoint
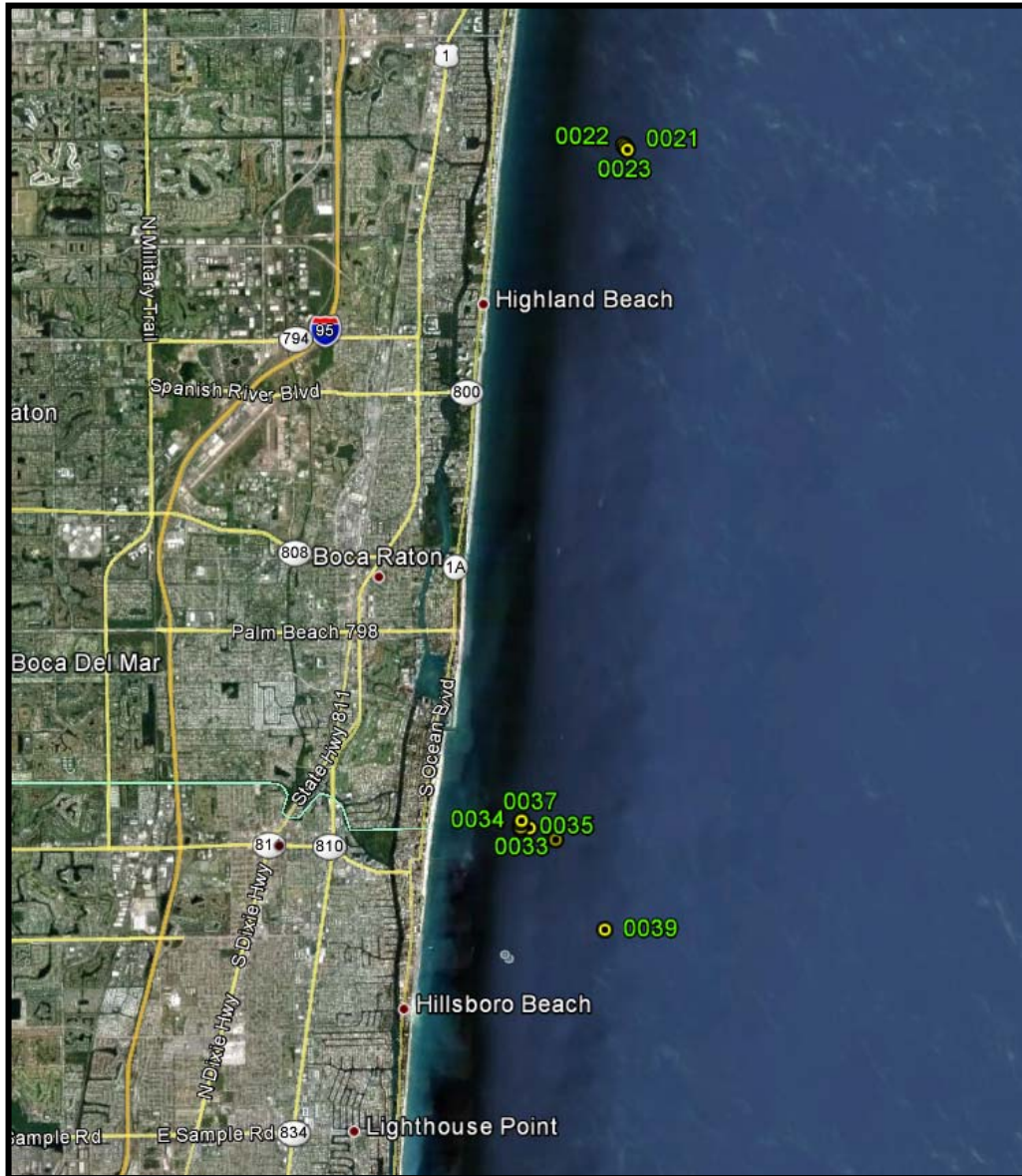
# Google Earth view of Waypoints

# Google Earth view of Waypoints near Gun Cay
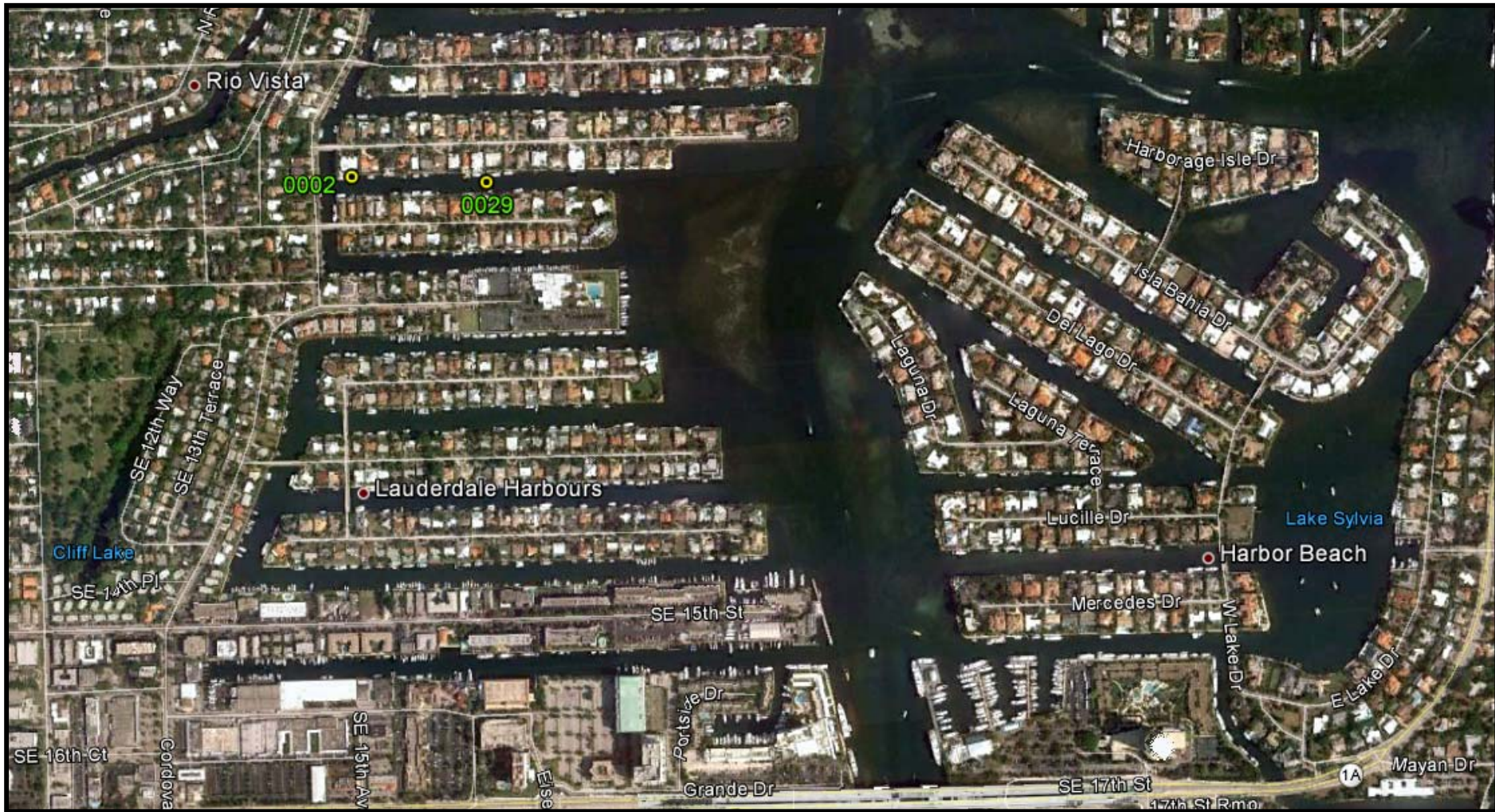
# Google Earth view of Waypoints near Gun Cay
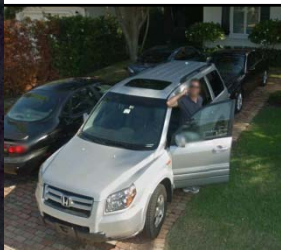
## Google Earth view of Waypoints
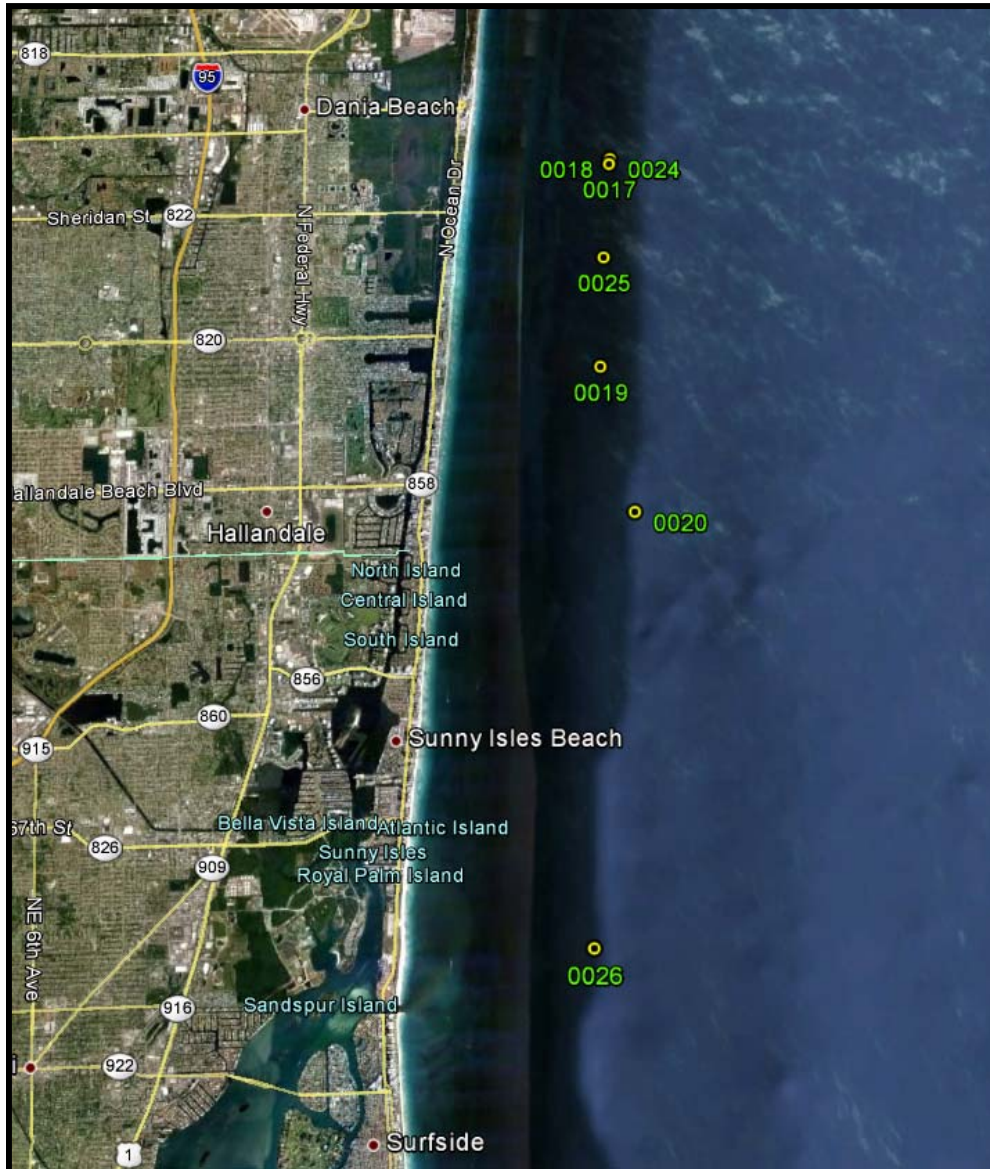
## ANALYSIS SUMMARY

The Garmin GPSmap 5212 will be referred to as the "device" from this point. The data from this device was extracted by DOMEX at Seatow in Fort Lauderdale. It was anticipated that any data extracted from device would assist in the investigation of a missing person.

## END OF ANALYSIS

Tania H. Reyes, ISC, US Coast Guard
Signature

The following slides are for use by case agent only. The following pages are an assessment made by the DOMEX team analyst and are only an opinion. These are not investigated and is not to be used in any court proceedings.

## First-Order-Analysis:

The contained GPS tracks for the day/time in question from June 19th, 2012 thru June 20th, 2012. The vessel track log 003 begins approximately 2.35 miles east of Fort Lauderdale Beach.
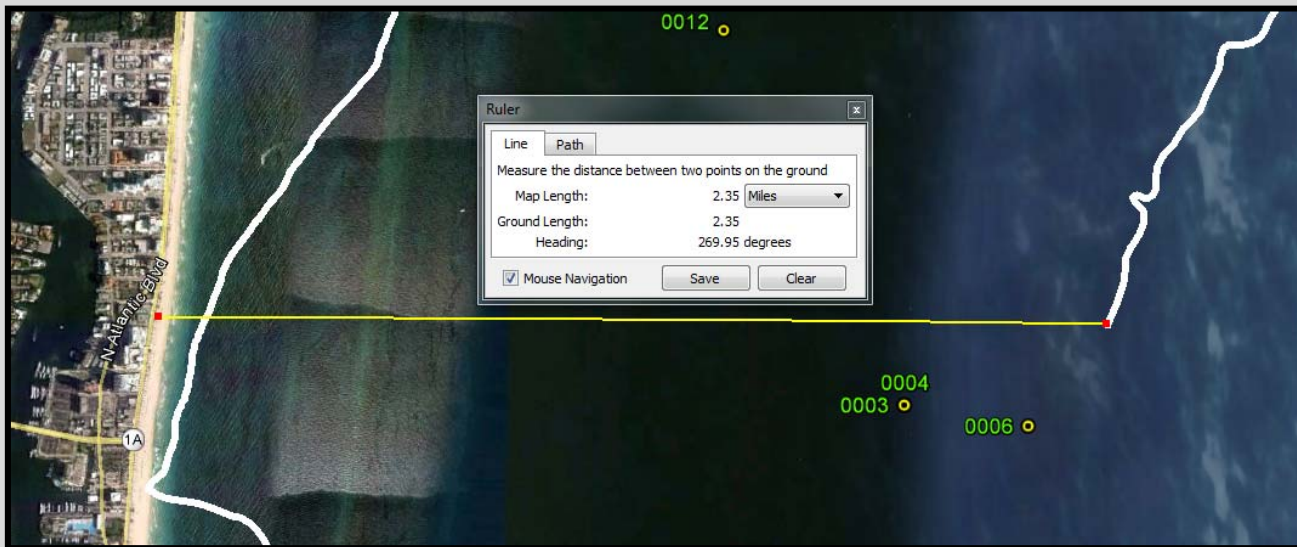


**(WARNING: THIS IS AN INFORMATION REPORT, NOT FINALLY EVALUATED INTELLIGENCE).**

## First-Order-Analysis:

At 7:56:07 PM speeds reduce to 4 MPH and at 7:56:16 PM vessel speeds drop to 0.6 MPH. From this point until the vessel beached in Fort Lauderdale the speeds remain below 3 MPH.
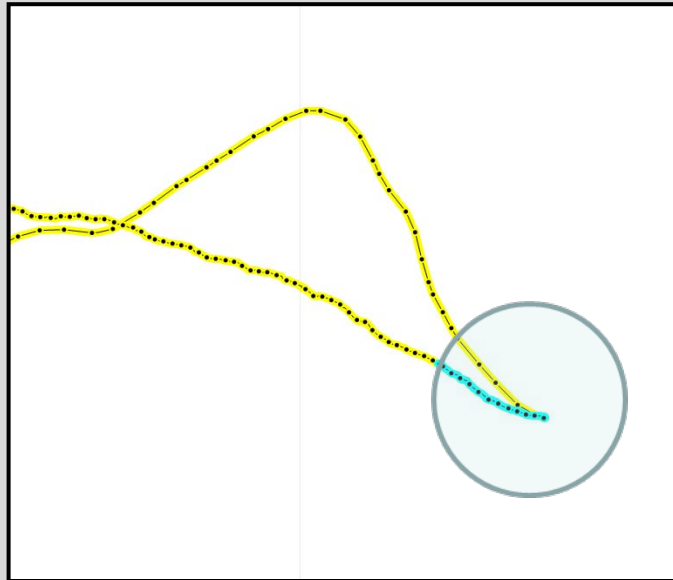


**(WARNING: THIS IS AN INFORMATION REPORT, NOT FINALLY EVALUATED INTELLIGENCE).**

**Technical Assessment and Notes**

Device data was retrieved on scene at the Seatow facility by the use of an SD card and power from the vessel. The device was analyzed through the use of the Map Source mapping software and Google Earth.

Garmin GPS 5212  Owners Manual
http://static.garmincdn.com/pumac/GPSMAP_4000-5000_Series_OM_EN.pdf