



**Coastal Services Center  
National Oceanic and Atmospheric Administration  
U.S. Department of Commerce**

**Aerial Acquisition Report for  
Coastal California  
LiDAR**



NOAA Coastal Services Center  
Contract: EA133C-05-CQ-1051 / Task Order: 21  
Contract: EA133C-11-CQ-0008 / Task Order: 01  
August 25, 2011

COASTAL CALIFORNIA LIDAR  
AERIAL ACQUISITION REPORT



## **1 OVERVIEW**

### **1.1 NOAA CSC**

Fugro EarthData is responsible for collecting, processing, and delivering light detection and ranging (LiDAR) data to NOAA CSC for Coastal California. The resulting data will be delivered to NOAA CSC in partnership with the California State Coastal Conservancy (SCC) and is intended for use in coastal management decision making, including applications such as sea level rise.

### **1.2 JALBTCX**

Fugro EarthData is responsible for collection, processing, and delivering airborne light detection and ranging (LiDAR) data in support of the Joint Airborne LiDAR Bathymetry Technical Center of Expertise (JALBTCX) under the direction of the National Coastal Mapping Program (NCMP). The data collected within this task order will be used in conjunction with bathymetric LiDAR, RGB imagery, and hyperspectral imagery to provide the client with topographic elevation and bathymetric soundings tied seamlessly along the ocean-facing coastlines of California.

The Fugro EarthData team consists of two professional firms with a long history of working together as well as expertise in land surveying and airborne LiDAR acquisition and processing. The following team member firms participated in this effort and their roles include:

- **Fugro EarthData** – Overall project management, quality control, LiDAR acquisition plan, survey control plan, acquisition of LiDAR, processing of LiDAR deliverables, and accuracy assessment of data.
- **TerraSurv, Inc. (TerraSurv)** – TerraSurv provided the necessary ground control surveys to assure accuracy on all deliverables and supported the aerial acquisition.



**Graphic 1:** Combined flight plan with boundary

## 2 DATA ACQUISITION

### 2.1 NOAA CSC

In order to meet the required survey and accuracy specifications for this project, the planned parameters for data capture were as follows:

| Flight Parameters |         |              |               |             |                 |                |
|-------------------|---------|--------------|---------------|-------------|-----------------|----------------|
| # of Lines        | # Lifts | Altitude (m) | Field of View | Speed (kts) | Pulse Rate (Hz) | Scan Rate (Hz) |
| 611               | 33      | 1900         | 30°           | 130         | 121,300         | 41             |

**Table 1:** Planned Flight Parameters

The actual flight results for planned data capture are as follows, please note the difference in flight lines is a result of partial lines, calibration lines, unplanned crossties, and re-flights.

| Flight Results |         |              |               |             |                 |                |
|----------------|---------|--------------|---------------|-------------|-----------------|----------------|
| # of Lines     | # Lifts | Altitude (m) | Field of View | Speed (kts) | Pulse Rate (Hz) | Scan Rate (Hz) |
| 765            | 57      | 1900         | 30°           | 130         | 121,300         | 41             |

**Table 2:** Actual Flight Results

Fugro EarthData started acquiring data for the Coastal California LiDAR project on September 5<sup>th</sup>, 2010; and collection finished on December 7<sup>th</sup>, 2010. Aircraft operations were undertaken from twelve airports starting at Montgomery Field Airport, San Diego (KMYF) up to Crescent City Airport (KCEC). All collections were flown with two Navajo twin engine aircrafts (N62912 and N76JN).

| Collection ID       | Aircraft | Date      | Primary Airport | Secondary Airport |
|---------------------|----------|-----------|-----------------|-------------------|
| 248_142_10004101_01 | N76JN    | 9/5/2010  | KMYF            |                   |
| 252_142_10004101_02 | N76JN    | 9/9/2010  | KMYF            |                   |
| 253_142_10004101_03 | N76JN    | 9/10/2010 | KMYF            |                   |
| 255_142_10004101_04 | N76JN    | 9/12/2010 | KHWD            | KSTS              |
| 257_113_10004101_01 | N62912   | 9/14/2010 | KSTS            |                   |
| 257_142_10004101_05 | N76JN    | 9/14/2010 | KHWD            |                   |
| 258_142_10004101_06 | N76JN    | 9/15/2010 | KHWD            |                   |
| 259_142_10004101_07 | N76JN    | 9/16/2010 | KHWD            |                   |
| 262_142_10004101_08 | N76JN    | 9/19/2010 | KTOA            |                   |
| 263_113_10004101_02 | N62912   | 9/20/2010 | KSTS            |                   |
| 263_142_10004101_09 | N76JN    | 9/20/2010 | KTOA            |                   |
| 265_113_10004101_03 | N62912   | 9/22/2010 | KSTS            | KUKI              |
| 265_113_10004101_04 | N62912   | 9/22/2010 | KUKI            |                   |
| 266_113_10004101_05 | N62912   | 9/23/2010 | KACV            |                   |
| 266_113_10004101_06 | N62912   | 9/23/2010 | KACV            |                   |
| 266_113_10004101_07 | N62912   | 9/23/2010 | OQ5             |                   |
| 266_142_10004101_10 | N76JN    | 9/23/2010 | KSBA            |                   |
| 266_142_10004101_11 | N76JN    | 9/23/2010 | KTOA            |                   |
| 266_142_10004101_12 | N76JN    | 9/23/2010 | KTOA            |                   |
| 267_142_10004101_13 | N76JN    | 9/24/2010 | KOXR            |                   |
| 267_142_10004101_14 | N76JN    | 9/24/2010 | KTOA            |                   |
| 268_142_10004101_15 | N76JN    | 9/25/2010 | KTOA            |                   |



|                     |        |            |      |      |
|---------------------|--------|------------|------|------|
| 269_113_10004101_08 | N62912 | 9/26/2010  | KHWD |      |
| 269_113_10004101_09 | N62912 | 9/26/2010  | KHWD |      |
| 269_142_10004101_16 | N76JN  | 9/26/2010  | KTOA |      |
| 270_113_10004101_10 | N62912 | 9/27/2010  | KSTS |      |
| 270_113_10004101_11 | N62912 | 9/27/2010  | KHWD |      |
| 272_113_10004101_12 | N62912 | 9/29/2010  | KHWD |      |
| 272_142_10004101_17 | N76JN  | 9/29/2010  | KMRY |      |
| 273_113_10004101_13 | N62912 | 9/30/2010  | KUKI |      |
| 275_113_10004101_14 | N62912 | 10/2/2010  | KHWD |      |
| 278_113_10004101_15 | N62912 | 10/5/2010  | KHWD |      |
| 279_142_10004101_18 | N76JN  | 10/6/2010  | KSTS |      |
| 280_142_10004101_19 | N76JN  | 10/7/2010  | KSTS |      |
| 280_142_10004101_20 | N76JN  | 10/7/2010  | KSTS |      |
| 281_113_10004101_16 | N62912 | 10/8/2010  | KSTS |      |
| 281_113_10004101_17 | N62912 | 10/8/2010  | KUKI |      |
| 281_142_10004101_21 | N76JN  | 10/8/2010  | KSTS | KSBA |
| 282_142_10004101_22 | N76JN  | 10/9/2010  | KCRQ |      |
| 283_113_10004101_18 | N62912 | 10/12/2010 | KMRY |      |
| 283_142_10004101_23 | N76JN  | 10/10/2010 | KCRQ |      |
| 285_113_10004101_19 | N62912 | 10/12/2010 | KMRY |      |
| 287_113_10004101_20 | N62912 | 10/14/2010 | KUKI |      |
| 293_113_10004101_21 | N62912 | 10/20/2010 | KHWD |      |
| 298_113_10004101_22 | N62912 | 10/25/2010 | KSTS | KHWD |
| 298_142_10004101_24 | N76JN  | 10/25/2010 | KOXR |      |
| 299_142_10004101_25 | N76JN  | 10/26/2010 | KCRQ | KMYF |
| 300_142_10004101_26 | N76JN  | 10/27/2010 | KMYF |      |
| 301_142_10004101_27 | N76JN  | 10/28/2010 | KOXR |      |
| 306_113_10004101_23 | N62912 | 11/2/2010  | KSTS |      |
| 312_113_10004101_24 | N62912 | 11/8/2010  | KCEC |      |
| 312_142_10004101_28 | N76JN  | 11/8/2010  | KACV |      |
| 320_113_10004101_25 | N62912 | 11/16/2010 | KCEC |      |
| 329_113_10004101_26 | N62912 | 11/25/2010 | KCEC |      |
| 330_113_10004101_27 | N62912 | 11/26/2010 | KACV |      |
| 330_142_10004101_29 | N76JN  | 11/26/2010 | KACV | 0Q5  |
| 341_113_10004101_28 | N62912 | 12/7/2010  | KACV | KCEC |

**Table 3:** Data Acquisition List**2.1.1 Acquisition Blocks**

The flight plan for this project consisted of 611 flight lines divided into 22 acquisition blocks (AA through VV), see Table 3 below. Flights along coastal areas occurred during time/tide windows for +/- 1.5 hours of MLLW; please see Attachment A, *AttachmentA\_Acquisition\_Tide\_Windows.xls*, for the times of the time/tide windows and the times of the data acquisition. The following attachments are also included with this report:

- Attachment B, *AttachmentB\_PDOP\_Charts*; contains the PDOP charts for each of the 57 lifts.
- Attachment C, *AttachmentC\_Flight\_Logs*; contains the flight logs for each of the 57 lifts.

| Acquisition Block | Collection          | Acquisition Block | Collection          |
|-------------------|---------------------|-------------------|---------------------|
| AA                | 266_113_10004101_05 | MM                | 281_142_10004101_21 |
|                   | 266_113_10004101_06 | NN                | 280_142_10004101_20 |
|                   | 312_113_10004101_24 |                   | 281_142_10004101_21 |
|                   | 320_113_10004101_25 | OO                | 280_142_10004101_19 |
|                   | 329_113_10004101_26 |                   | 280_142_10004101_20 |
| BB                | 266_113_10004101_05 |                   | 281_142_10004101_21 |
|                   | 266_113_10004101_06 | QQ                | 266_142_10004101_10 |
|                   | 312_142_10004101_28 | RR                | 267_142_10004101_13 |
|                   | 330_113_10004101_27 |                   | 298_142_10004101_24 |
|                   | 330_142_10004101_29 |                   | 301_142_10004101_27 |
| CC                | 266_113_10004101_05 | SF2               | 257_113_10004101_01 |
|                   | 266_113_10004101_07 |                   | 257_142_10004101_05 |
| DD                | 266_113_10004101_07 |                   | 258_142_10004101_06 |
|                   | 273_113_10004101_13 |                   | 259_142_10004101_07 |
|                   | 281_113_10004101_17 |                   | 263_113_10004101_02 |
|                   | 287_113_10004101_20 |                   | 269_113_10004101_08 |
|                   | 330_142_10004101_29 |                   | 269_113_10004101_09 |
|                   | 341_113_10004101_28 |                   | 270_113_10004101_10 |
| EE                | 265_113_10004101_04 |                   | 270_113_10004101_11 |
|                   | 273_113_10004101_13 |                   | 275_113_10004101_14 |
|                   | 281_113_10004101_17 |                   | 278_113_10004101_15 |
|                   | 287_113_10004101_20 |                   | 279_142_10004101_18 |
| FF                | 255_142_10004101_04 |                   | 281_113_10004101_16 |
|                   | 263_113_10004101_02 |                   | 293_113_10004101_21 |
|                   | 270_113_10004101_10 |                   | 298_113_10004101_22 |
|                   | 279_142_10004101_18 | SS                | 263_142_10004101_09 |
|                   | 281_113_10004101_16 |                   | 266_142_10004101_11 |
| GG                | 257_113_10004101_01 |                   | 268_142_10004101_15 |
|                   | 263_113_10004101_02 | TT                | 262_142_10004101_08 |
|                   | 265_113_10004101_03 |                   | 266_142_10004101_12 |
|                   | 269_113_10004101_08 |                   | 267_142_10004101_14 |
|                   | 269_113_10004101_09 |                   | 268_142_10004101_15 |
|                   | 281_113_10004101_16 |                   | 269_142_10004101_16 |
|                   | 298_113_10004101_22 |                   | 299_142_10004101_25 |
|                   | 306_113_10004101_23 | UU                | 252_142_10004101_02 |
| HH                | 255_142_10004101_04 |                   | 282_142_10004101_22 |
|                   | 269_113_10004101_09 |                   | 283_142_10004101_23 |
| II                | 272_113_10004101_12 | VV                | 248_142_10004101_01 |
| JJ                | 272_142_10004101_17 |                   | 252_142_10004101_02 |
|                   | 283_113_10004101_18 |                   | 253_142_10004101_03 |
|                   | 285_113_10004101_19 |                   | 282_142_10004101_22 |
| KK                | 283_113_10004101_18 |                   | 299_142_10004101_25 |
| LL                | 283_113_10004101_18 |                   | 300_142_10004101_26 |

**Table 4:** Lift Acquired by Block ID

## 2.2 JALBTCX

In order to meet the required survey and accuracy specifications for this project, the planned parameters for data capture were as follows:

| Flight Parameters |         |              |               |             |                 |                |
|-------------------|---------|--------------|---------------|-------------|-----------------|----------------|
| # of Lines        | # Lifts | Altitude (m) | Field of View | Speed (kts) | Pulse Rate (Hz) | Scan Rate (Hz) |
| 578               | 62      | 1900         | 30°           | 130         | 121,300         | 41             |

**Table 5:** Planned Flight Parameters

The actual flight results for planned data capture are as follows, please note the difference in flight lines is a result of partial lines, calibration lines, re-flight lines.

| Flight Results |         |              |               |             |                 |                |
|----------------|---------|--------------|---------------|-------------|-----------------|----------------|
| # of Lines     | # Lifts | Altitude (m) | Field of View | Speed (kts) | Pulse Rate (Hz) | Scan Rate (Hz) |
| 781            | 51      | 1900         | 30°           | 130         | 121,300         | 41             |

**Table 6:** Actual Flight Results

Fugro EarthData started acquiring data for the Coastal California LiDAR project on October 15<sup>th</sup>, 2009; and collection finished on August 2<sup>nd</sup>, 2011. Aircraft operations were undertaken from thirteen airports starting at Montgomery Field Airport, San Diego (KMYF) up to Crescent City Airport (KCEC). All collections were flown with two Navajo twin engine aircrafts (N62912 and N76JN).

| Collection ID       | Aircraft | Date       | Primary Airport | Secondary Airport |
|---------------------|----------|------------|-----------------|-------------------|
| 28811309004901      | N76JN    | 10/15/2009 | KTOA            |                   |
| 28911309004902      | N76JN    | 10/16/2009 | KTOA            |                   |
| 29011309004903      | N76JN    | 10/17/2009 | KTOA            |                   |
| 29411309004904      | N76JN    | 10/21/2009 | KTOA            |                   |
| 30211309004905      | N76JN    | 10/29/2009 | KTOA            |                   |
| 30311309004906      | N76JN    | 10/30/2009 | KTOA            |                   |
| 30411309004907      | N76JN    | 10/31/2009 | KTOA            |                   |
| 30511309004908      | N76JN    | 11/1/2009  | KMYF            |                   |
| 30611309004909      | N76JN    | 11/2/2009  | KMYF            |                   |
| 30711309004910      | N76JN    | 11/3/2009  | KMYF            |                   |
| 31011309004911      | N76JN    | 11/6/2009  | KOXR            |                   |
| 31511309004912      | N76JN    | 11/11/2009 | KOXR            |                   |
| 31811309004913      | N76JN    | 11/14/2009 | KOXR            |                   |
| 31911309004914      | N76JN    | 11/15/2009 | KOXR            |                   |
| 32011309004915      | N76JN    | 11/16/2009 | KSMX            | KOXR              |
| 32111309004916      | N76JN    | 11/17/2009 | KSMX            | KOXR              |
| 32211309004917      | N76JN    | 11/18/2009 | KSBP            | KOXR              |
| 32311309004918      | N76JN    | 11/19/2009 | KSBP            | KOXR              |
| 33311309004919      | N76JN    | 11/29/2009 | KMRV            |                   |
| 33411309004920      | N76JN    | 11/30/2009 | KMRV            |                   |
| 149_113_09004901_23 | N62912   | 5/29/2010  | KMRV            |                   |
| 150_113_09004901_24 | N62912   | 5/30/2010  | KSBP            |                   |
| 163_113_09004901_25 | N62912   | 6/12/2010  | KMRV            | KHAF              |

|                     |        |            |      |      |
|---------------------|--------|------------|------|------|
| 164_113_09004901_26 | N62912 | 6/13/2010  | KHAF |      |
| 168_113_09004901_28 | N62912 | 6/17/2010  | KHAF |      |
| 249_113_09004901_29 | N62912 | 9/6/2010   | KSTS |      |
| 249_113_09004901_30 | N62912 | 9/6/2010   | KSTS |      |
| 252_113_09004901_31 | N62912 | 9/9/2010   | KSTS |      |
| 253_113_09004901_32 | N62912 | 9/10/2010  | KSTS |      |
| 263_113_09004901_33 | N62912 | 9/20/2010  | KSTS |      |
| 265_113_09004901_34 | N62912 | 9/22/2010  | KUKI | KSTS |
| 266_113_09004901_35 | N62912 | 9/23/2010  | KACV |      |
| 269_113_09004901_36 | N62912 | 9/26/2010  | KHWD | KACV |
| 278_113_09004901_37 | N62912 | 10/5/2010  | KHWD |      |
| 281_113_09004901_38 | N62912 | 10/8/2010  | KUKI |      |
| 283_113_09004901_39 | N62912 | 10/10/2010 | KMRY |      |
| 291_113_09004901_40 | N62912 | 10/18/2010 | KHWD |      |
| 305_113_09004901_41 | N62912 | 11/1/2010  | KHWD |      |
| 306_113_09004901_42 | N62912 | 11/2/2010  | KSTS | KHWD |
| 320_113_09004901_43 | N62912 | 11/16/2010 | KCEC |      |
| 337_113_09004901_44 | N62912 | 12/3/2010  | KCEC |      |
| 139_113_09004901_46 | N62912 | 5/19/2011  | KACV |      |
| 141_113_09004901_47 | N62912 | 5/21/2011  | KUKI | KACV |
| 144_113_09004901_48 | N62912 | 5/24/2011  | KACV |      |
| 158_113_09004901_51 | N62912 | 6/7/2011   | KACV |      |
| 159_113_09004901_52 | N62912 | 6/8/2011   | KACV | KRDD |
| 167_113_09004901_53 | N62912 | 6/16/2011  | KACV |      |
| 168_113_09004901_54 | N62912 | 6/17/2011  | KCEC | KACV |
| 187_113_09004901_55 | N62912 | 7/6/2011   | KCEC | KACV |
| 196_113_09004901_56 | N62912 | 7/15/2011  | KACV |      |
| 214_113_09004901_58 | N62912 | 8/2/2011   | KACV |      |

**Table 7:** Data Acquisition List**2.2.1 Acquisition Blocks**

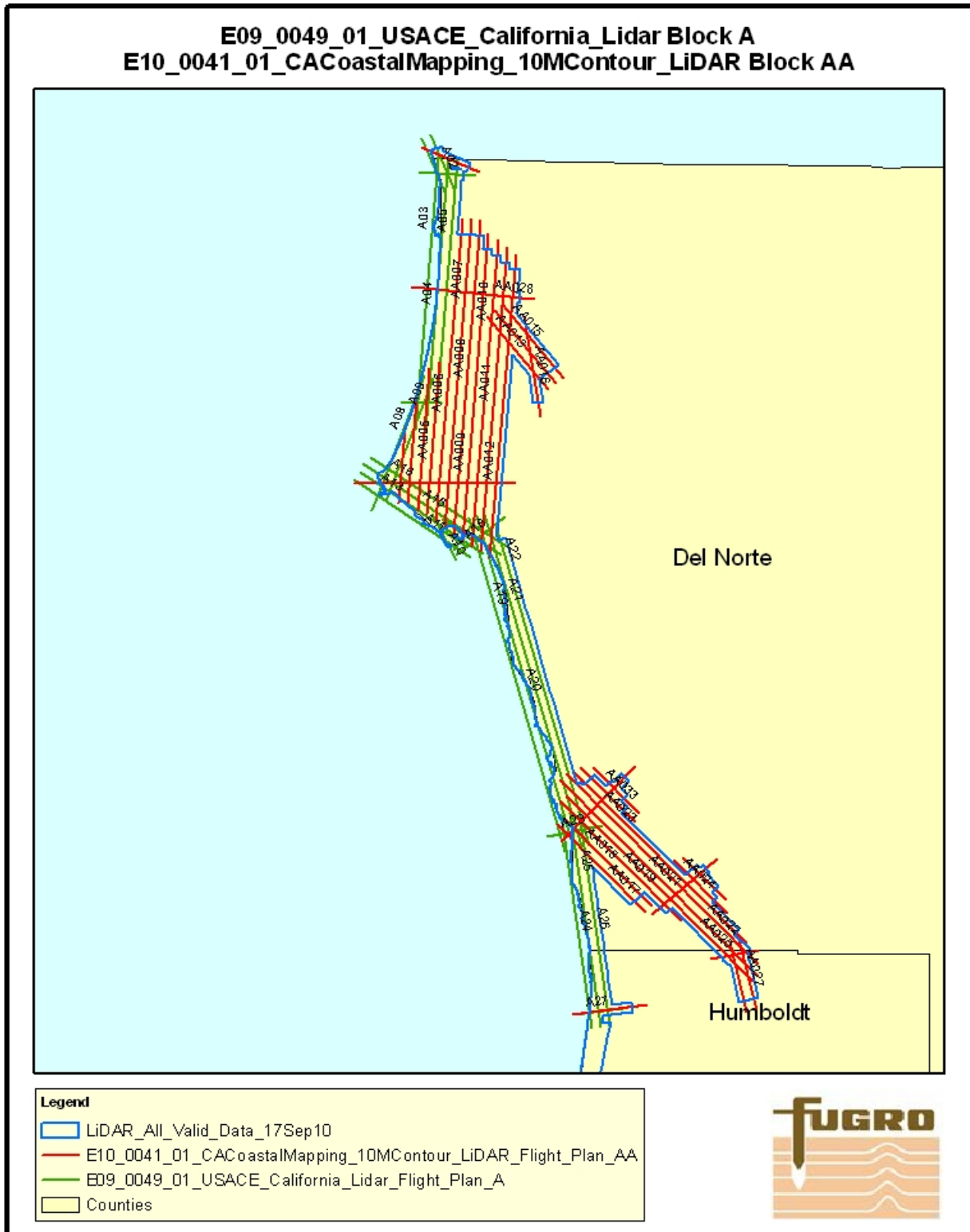
The flight plan for this project consisted of 578 flight lines divided into 22 acquisition blocks (A through V), see Table 8 below. Flights along coastal areas occurred during time/tide windows for +/- 1.5 hours of MLLW with exception of the portions of the acquisition that have been approved using MLW. The following attachments are included with this report:

- Attachment D, *AttachmentD-JALBTCX\_PDOP\_Charts*; contains the PDOP charts for each of the 51 LiDAR lifts.
- Attachment E, *AttachmentE-JALBTCX\_Flight\_Logs*; contains the flight logs for each of the 51 LiDAR lifts.

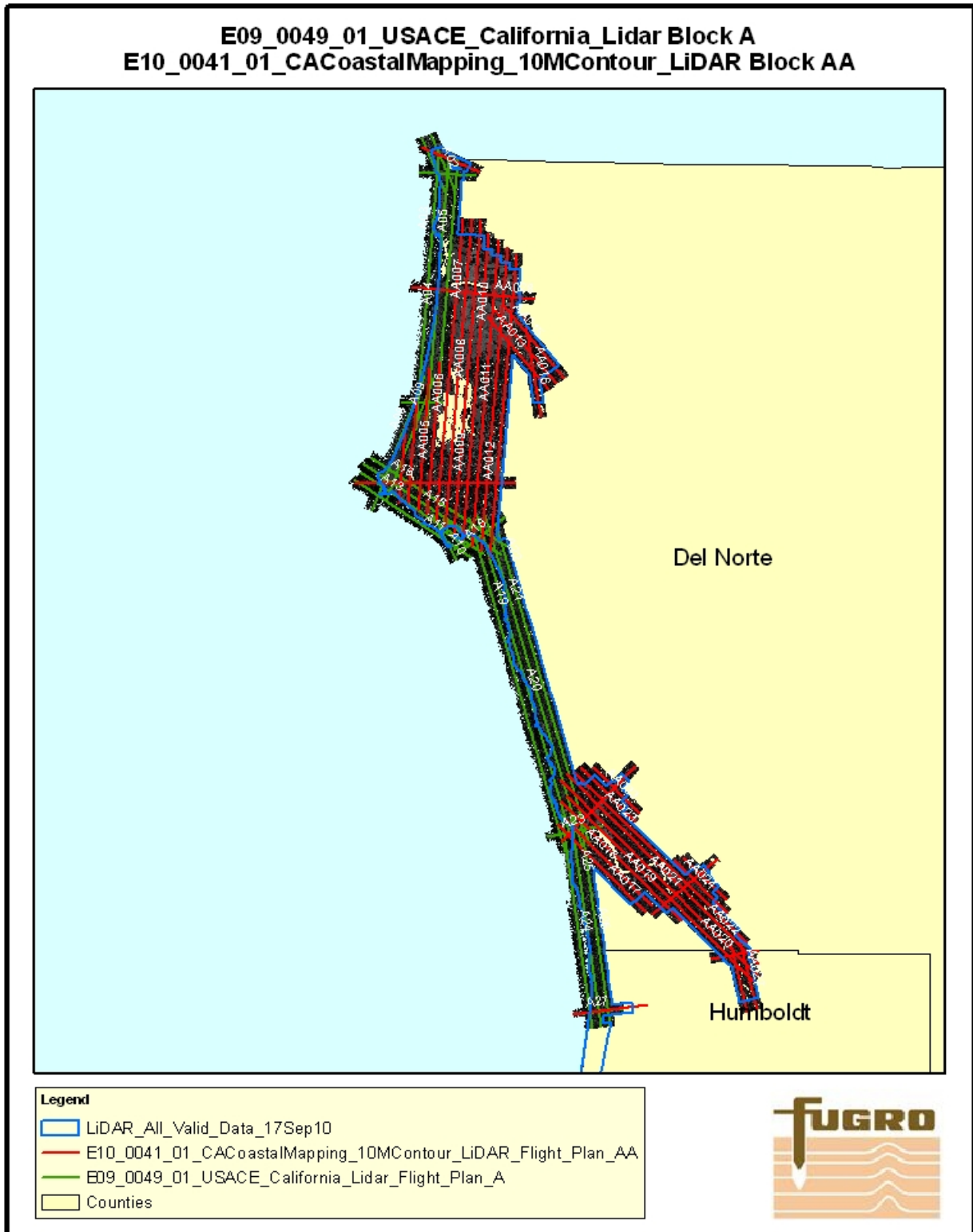
| Acquisition Block | Collection          | Acquisition Block | Collection          |
|-------------------|---------------------|-------------------|---------------------|
| A                 | 266_113_09004901_35 | I                 | 164_113_09004901_26 |
|                   | 320_113_09004901_43 |                   | 168_113_09004901_28 |
|                   | 337_113_09004901_44 |                   | 269_113_09004901_36 |
|                   | 168_113_09004901_54 |                   | 305_113_09004901_41 |
|                   | 187_113_09004901_55 | J                 | 168_113_09004901_28 |
| B                 | 266_113_09004901_35 |                   | 269_113_09004901_36 |
|                   | 144_113_09004901_48 |                   | 283_113_09004901_39 |
|                   | 167_113_09004901_53 |                   | 291_113_09004901_40 |
|                   | 214_113_09004901_58 | K                 | 149_113_09004901_23 |
| C                 | 159_113_09004901_52 |                   | 163_113_09004901_25 |
|                   | 167_113_09004901_53 |                   | 291_113_09004901_40 |
|                   | 196_113_09004901_56 | L                 | 33311309004919      |
|                   | 214_113_09004901_58 |                   | 33411309004920      |
| D                 | 281_113_09004901_38 |                   | 149_113_09004901_23 |
|                   | 139_113_09004901_46 | M                 | 32311309004918      |
|                   | 141_113_09004901_47 |                   | 32211309004917      |
|                   | 158_113_09004901_51 | N                 | 32311309004918      |
| E                 | 265_113_09004901_34 |                   | 150_113_09004901_24 |
|                   | 281_113_09004901_38 | O                 | 32011309004915      |
|                   | 141_113_09004901_47 | P                 | 32111309004916      |
| F                 | 249_113_09004901_29 | Q                 | 31811309004913      |
|                   | 249_113_09004901_30 | R                 | 31011309004911      |
|                   | 252_113_09004901_31 |                   | 31511309004912      |
|                   | 306_113_09004901_42 |                   | 28911309004902      |
| G                 | 253_113_09004901_32 | S                 | 29011309004903      |
|                   | 263_113_09004901_33 |                   | 30411309004907      |
|                   | 278_113_09004901_37 |                   | 28811309004901      |
|                   | 305_113_09004901_41 | T                 | 28911309004902      |
| H                 | 164_113_09004901_26 |                   | 29411309004904      |
|                   | 278_113_09004901_37 | V                 | 30211309004905      |
|                   | 305_113_09004901_41 |                   | 30511309004908      |
|                   |                     |                   | 30611309004909      |
|                   |                     |                   | 30711309004910      |

Table 8: Lift Acquired by Block ID



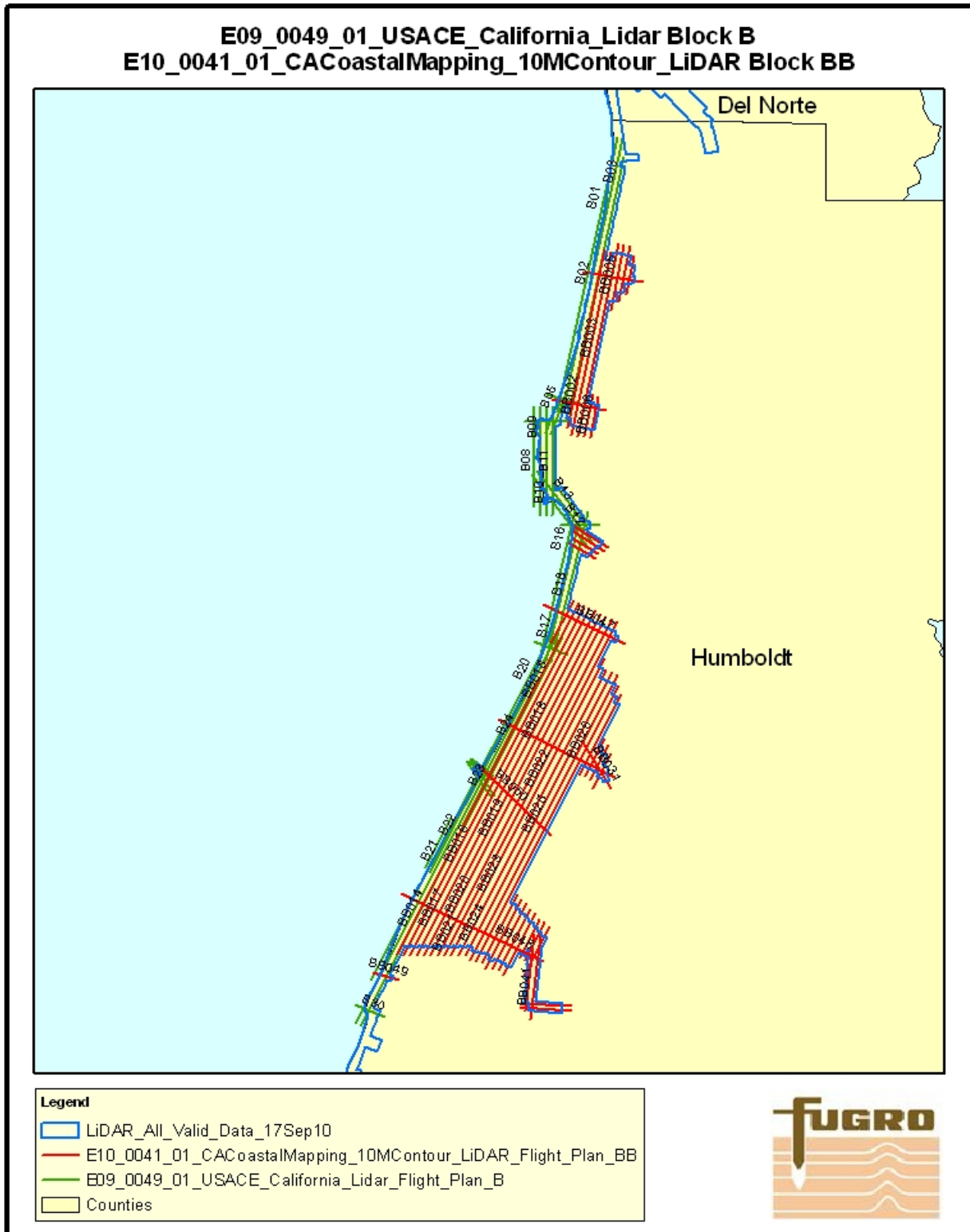


**Graphic 2: Block A and Block AA Flight Plan**

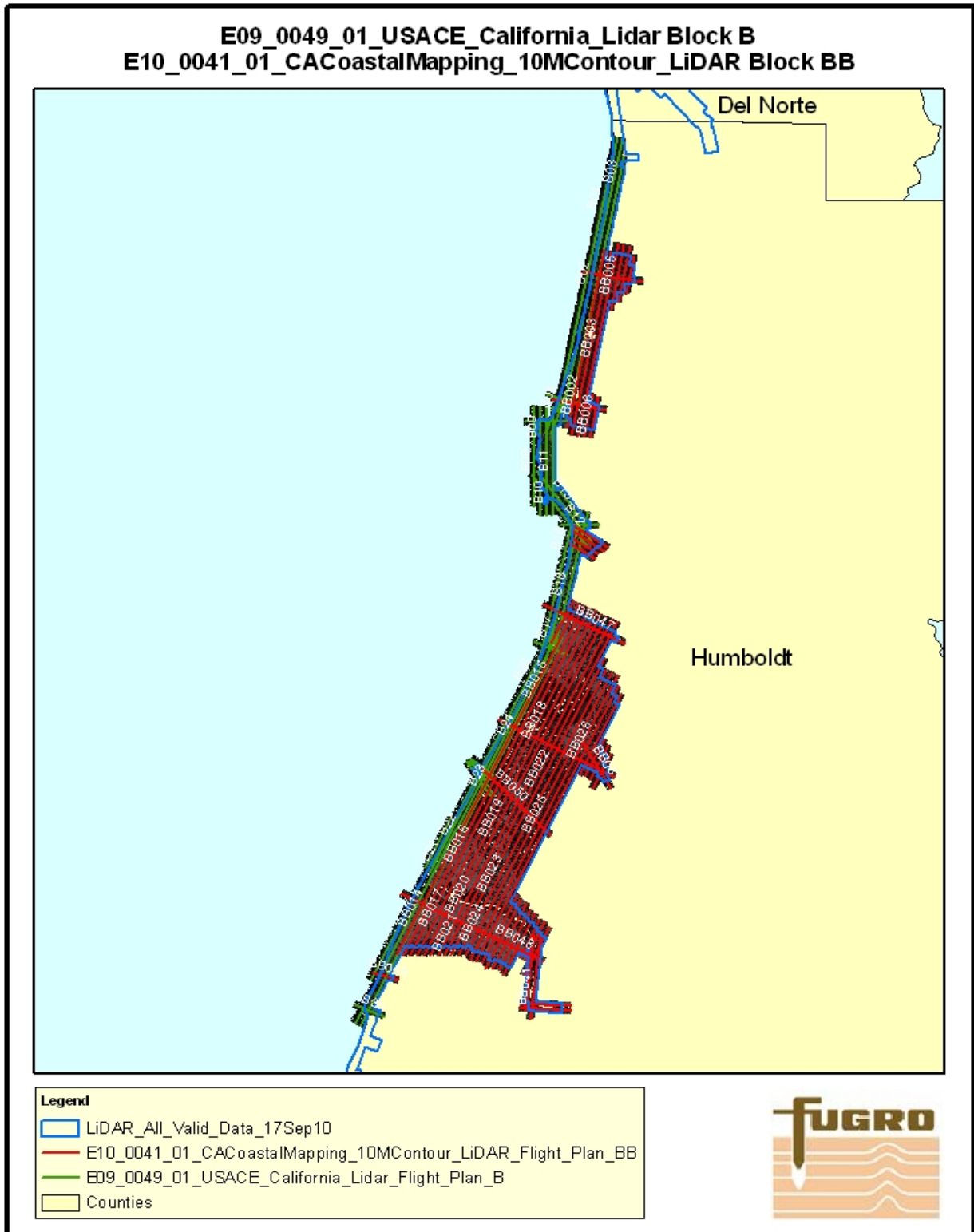


**Graphic 3:** Block A and Block AA Intensity

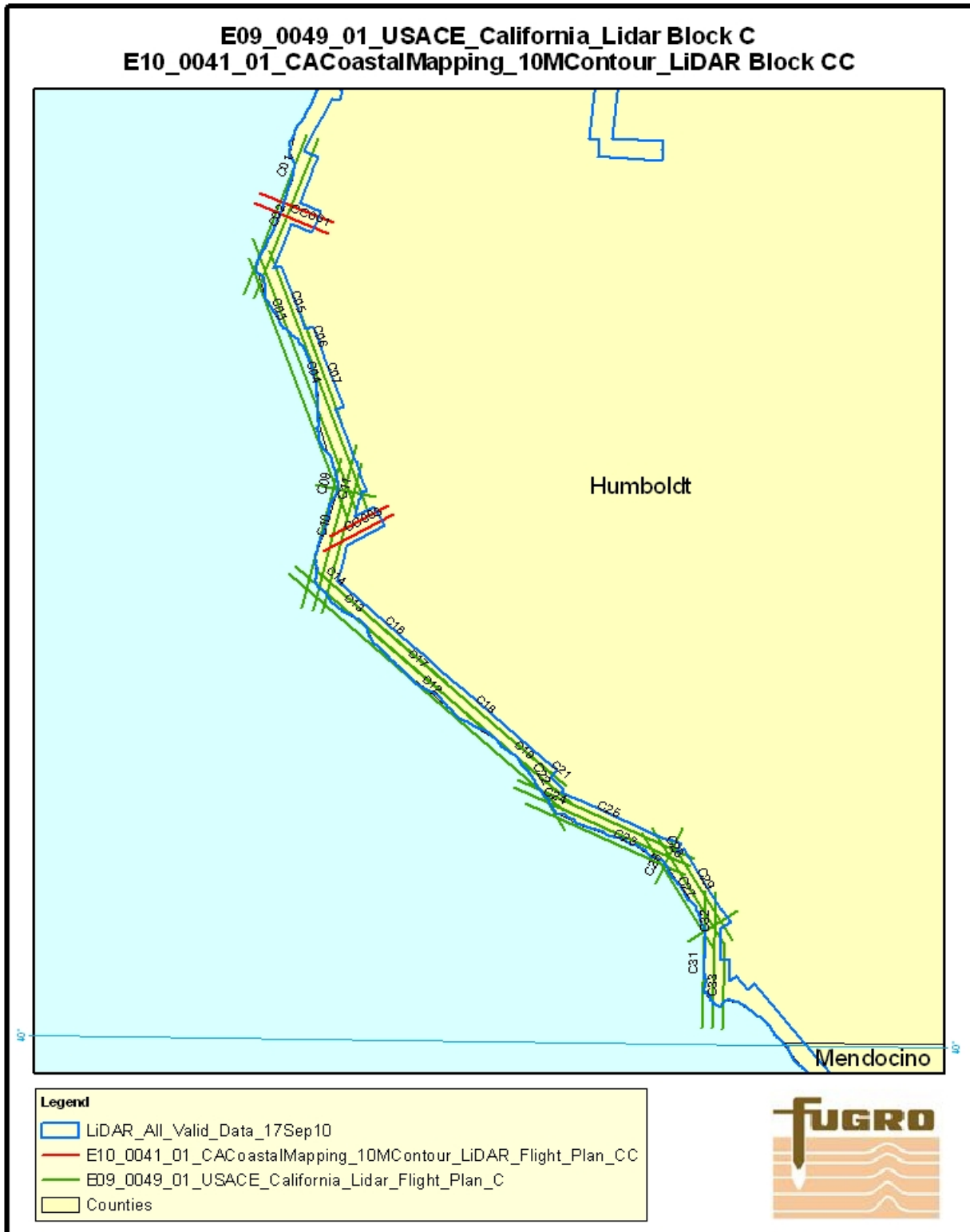




**Graphic 4:** Block B and Block BB Flight Plan



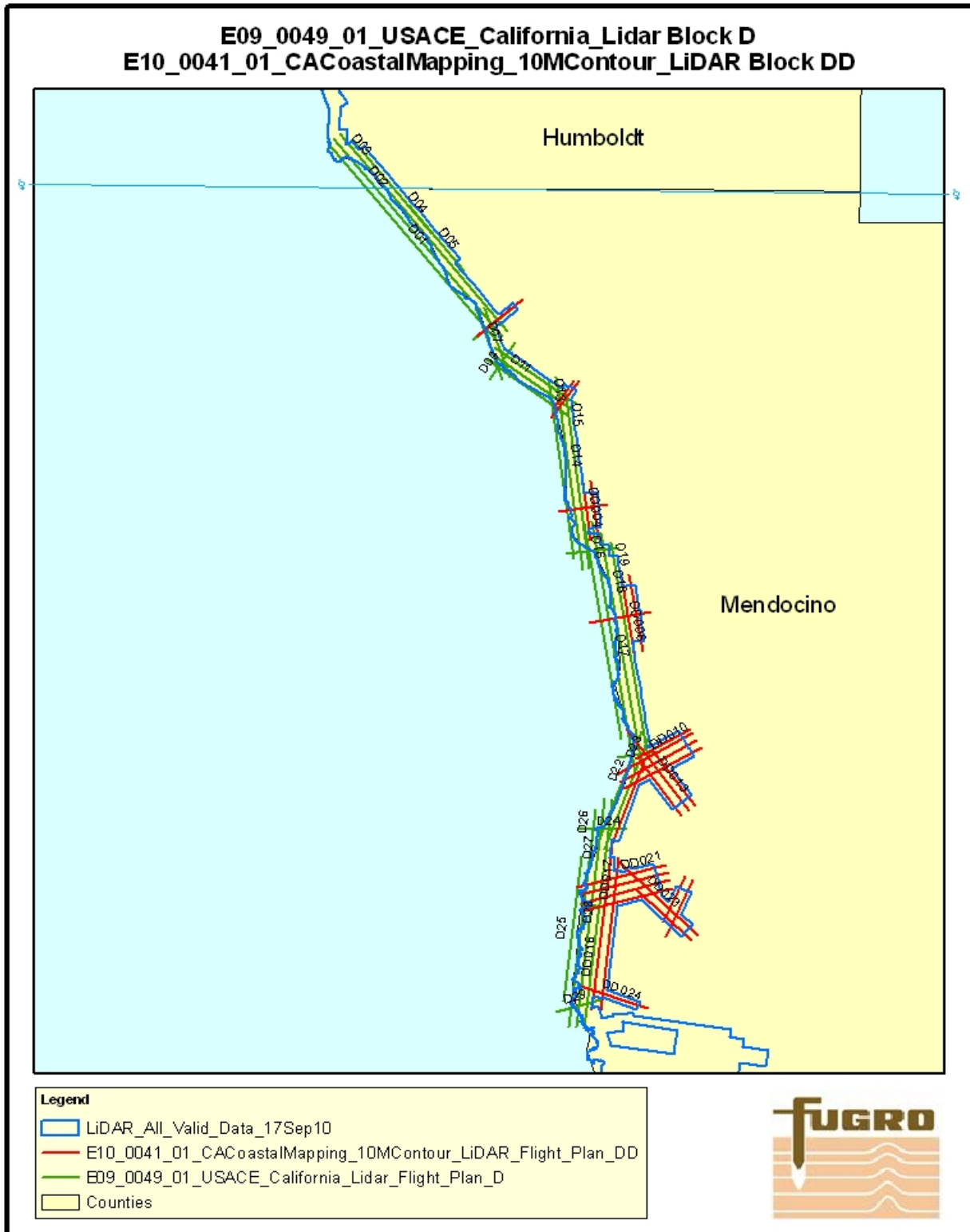
**Graphic 5:** Block B and Block BB Intensity



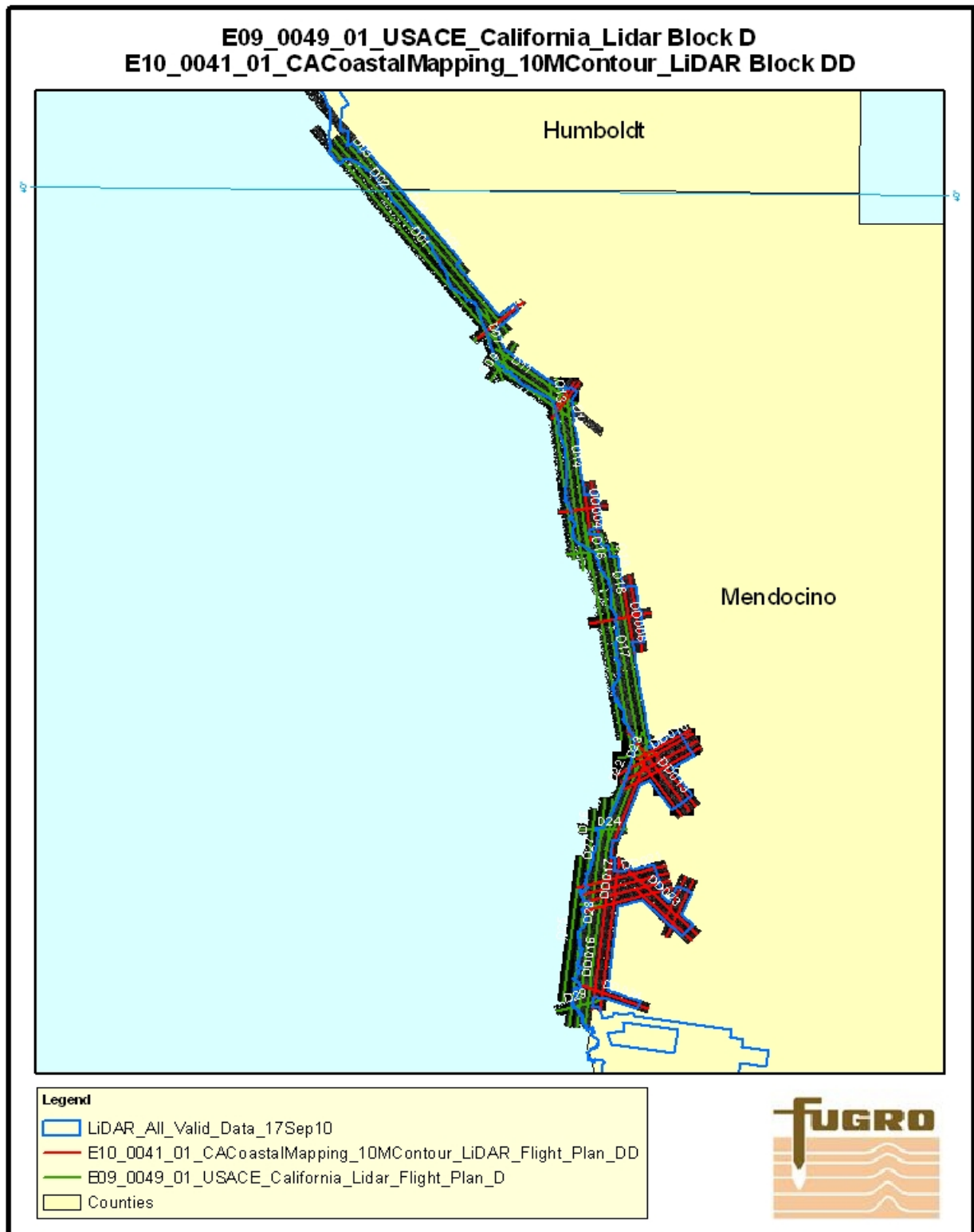
**Graphic 6:** Block C and Block CC Flight Plan



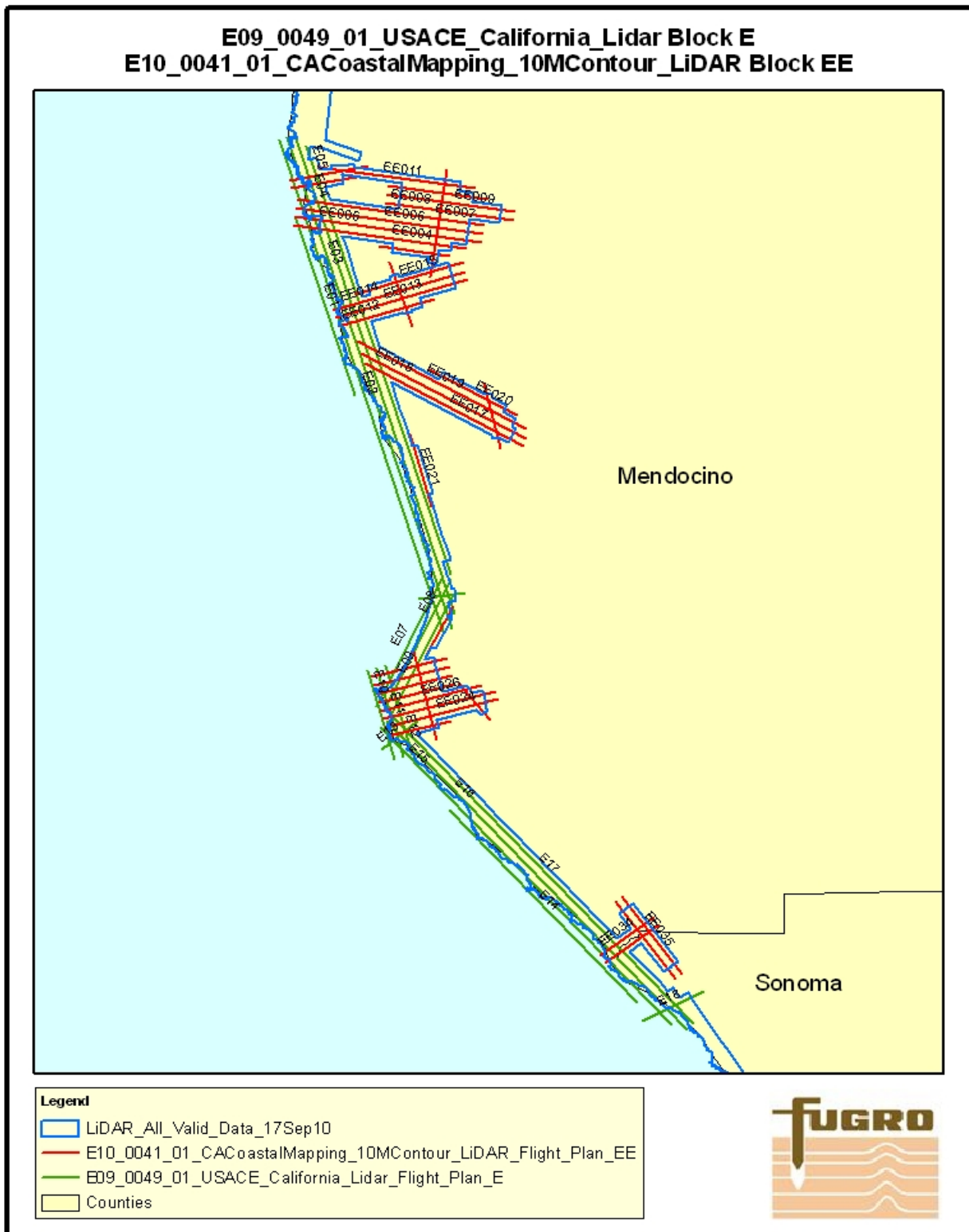
**Graphic 7: Block C and Block CC Intensity**



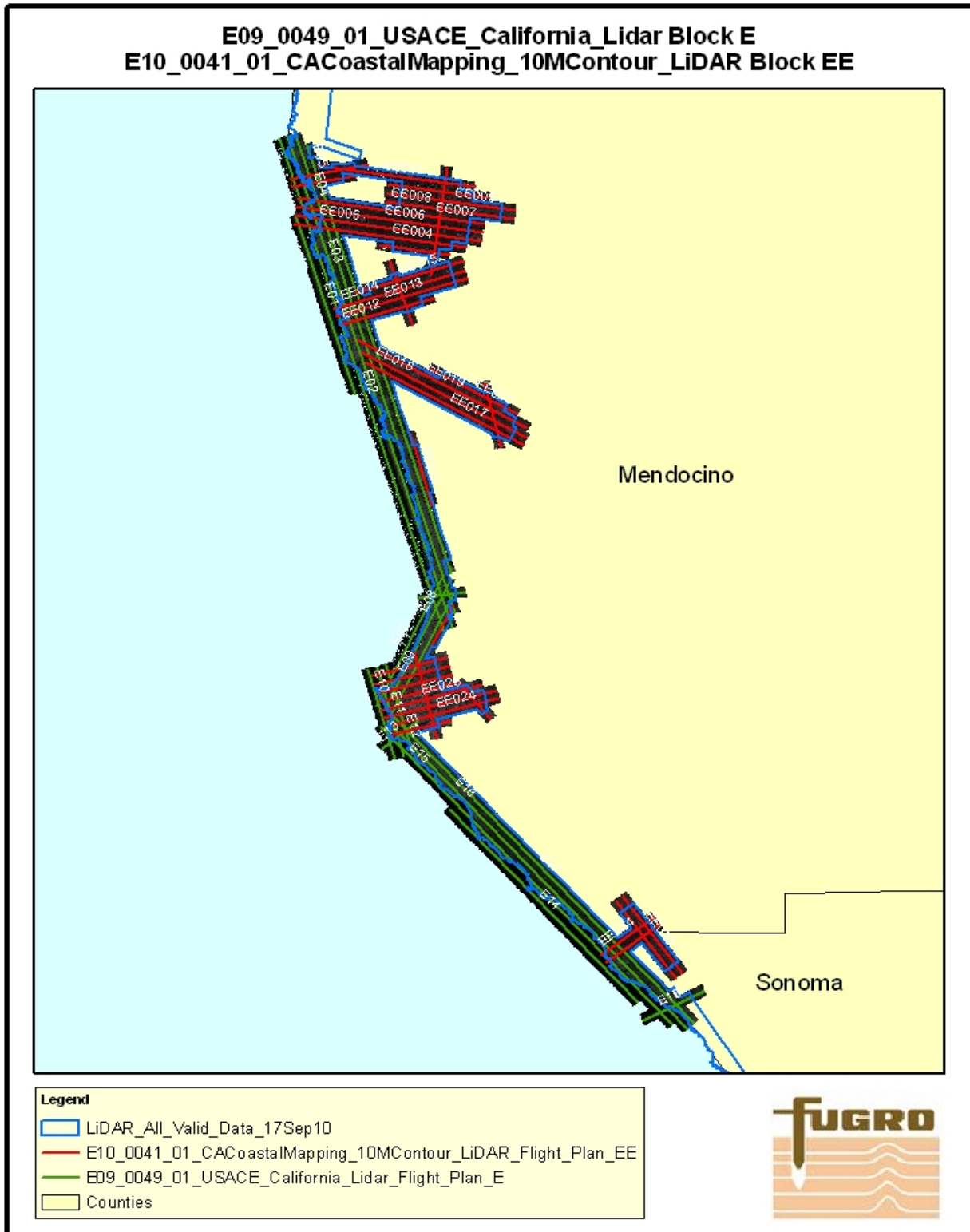
**Graphic 8:** Block D and Block DD Flight Plan



**Graphic 9: Block D and Block DD Intensity**

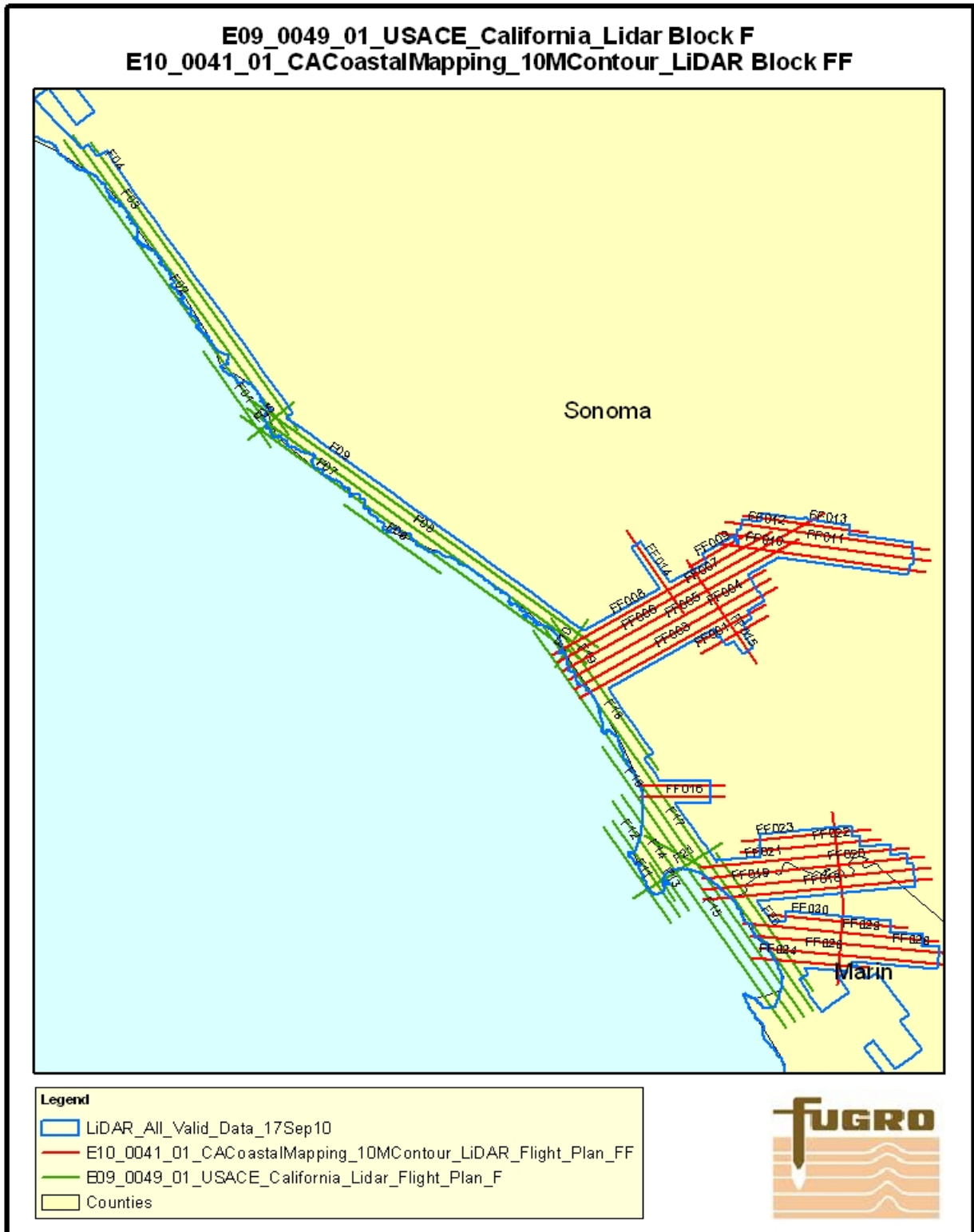


**Graphic 10: Block E and Block EE Flight Plan**

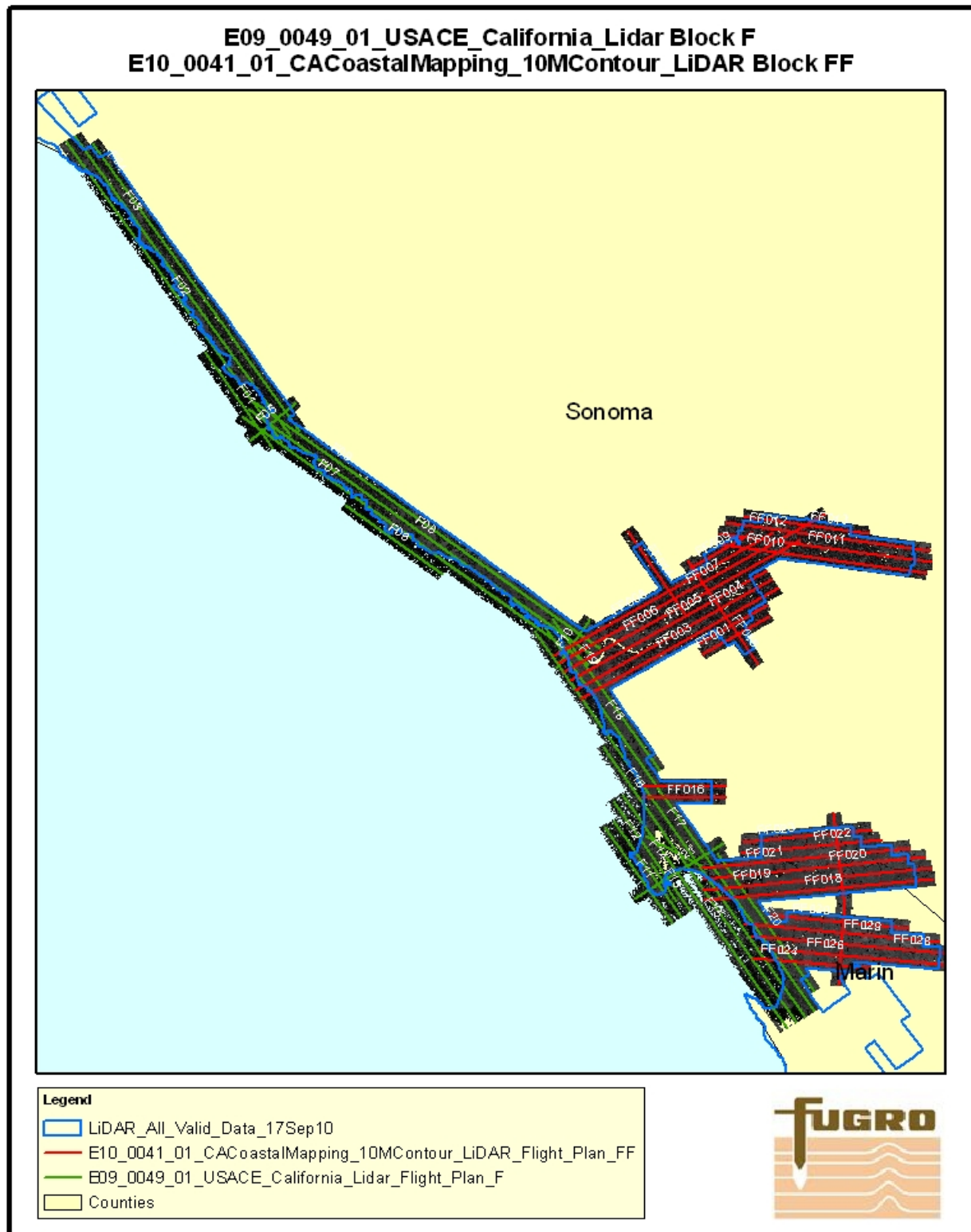


**Graphic 11: Block E and Block EE Intensity**

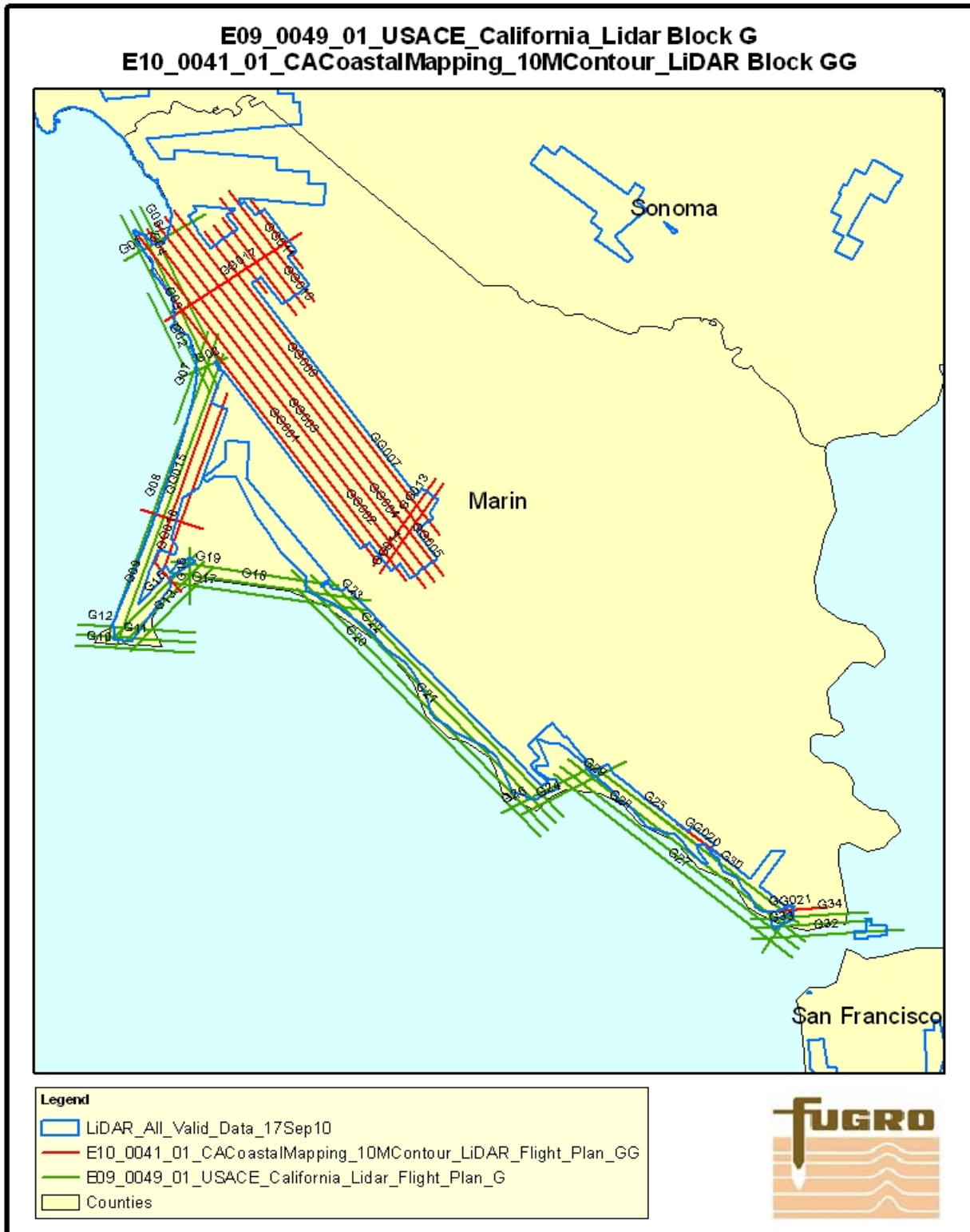




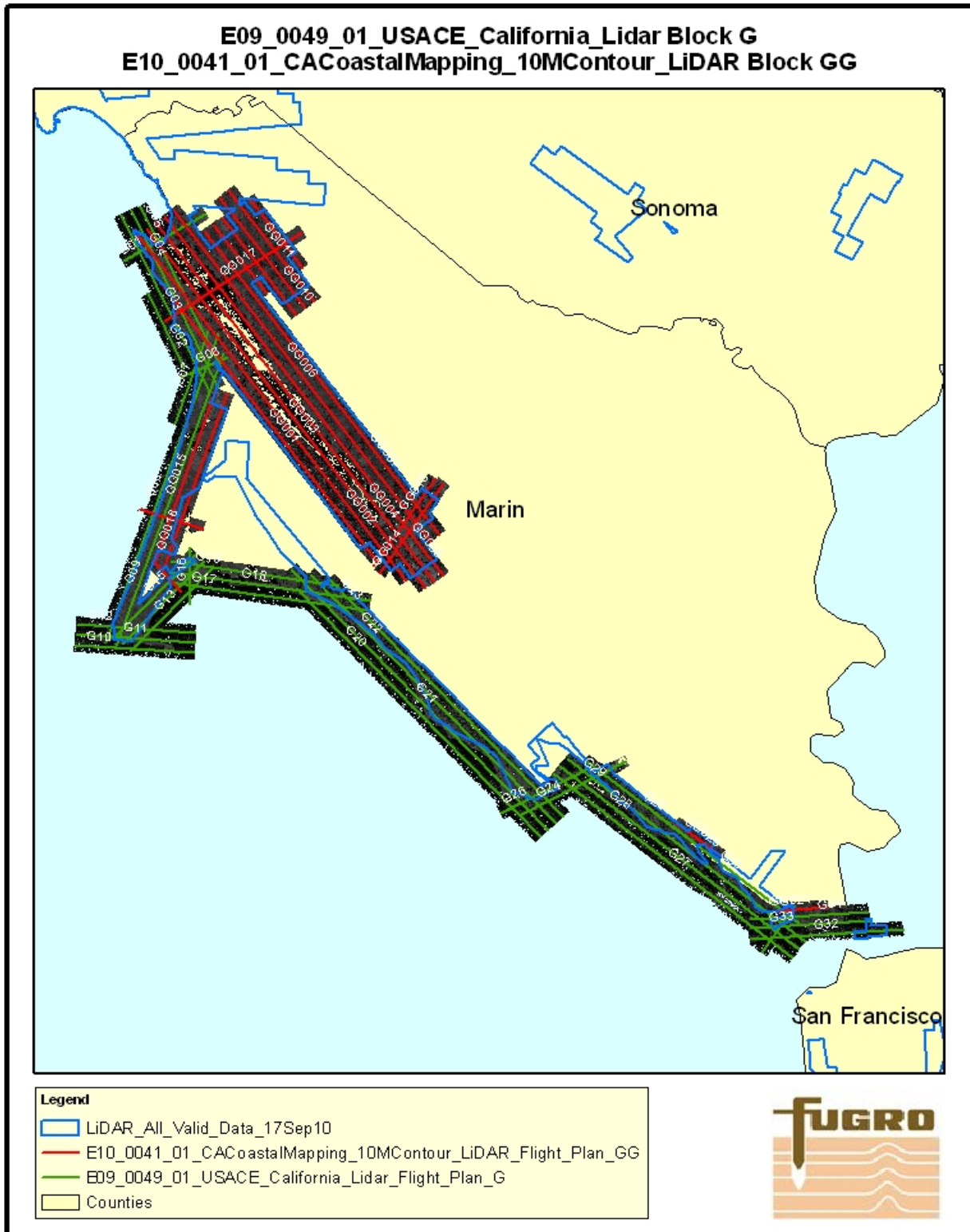
**Graphic 12: Block F and Block FF Flight Plan**



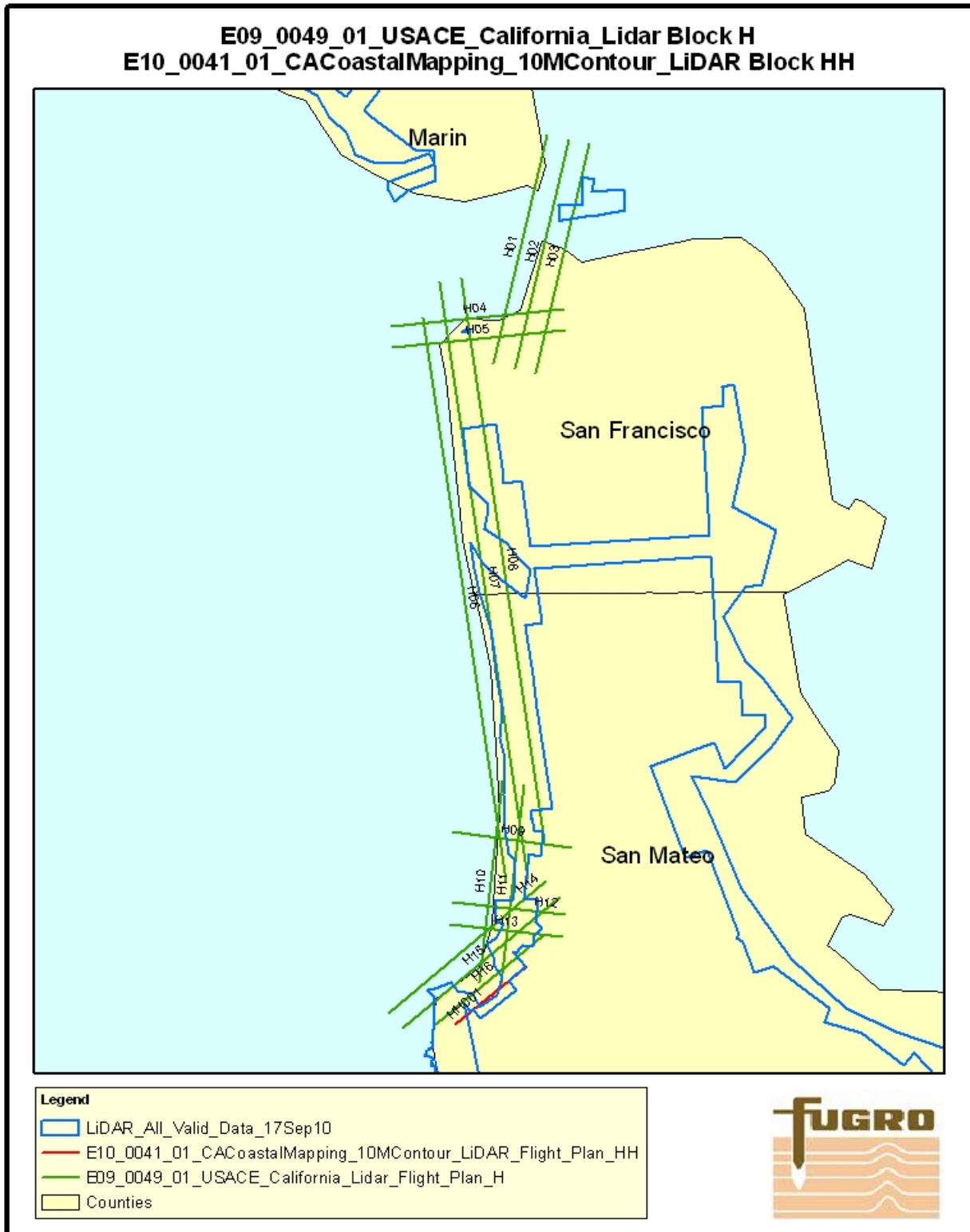
**Graphic 13: Block F and Block FF Intensity**



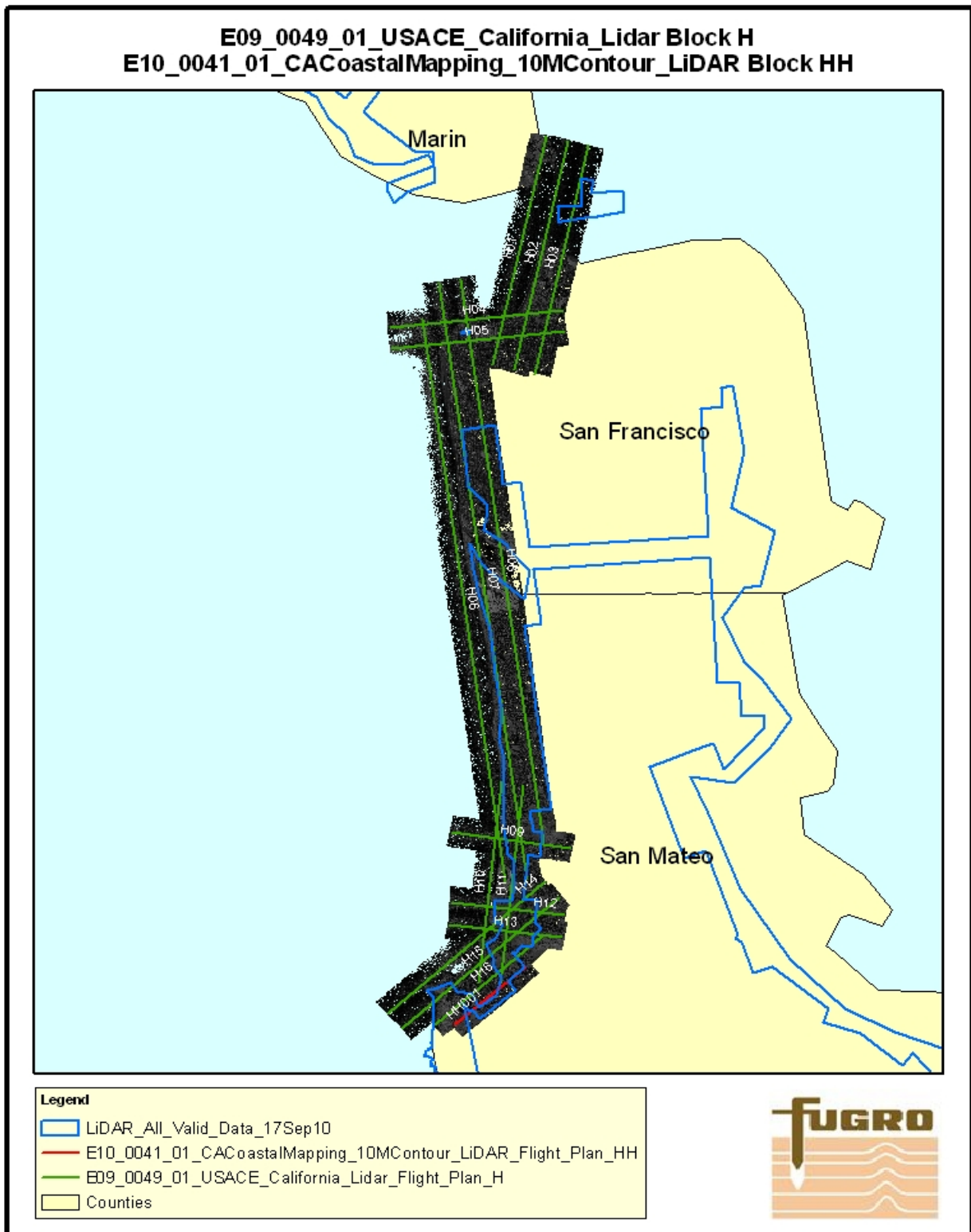
**Graphic 14: Block G and Block GG Flight Plan**



**Graphic 15: Block G and Block GG Intensity**

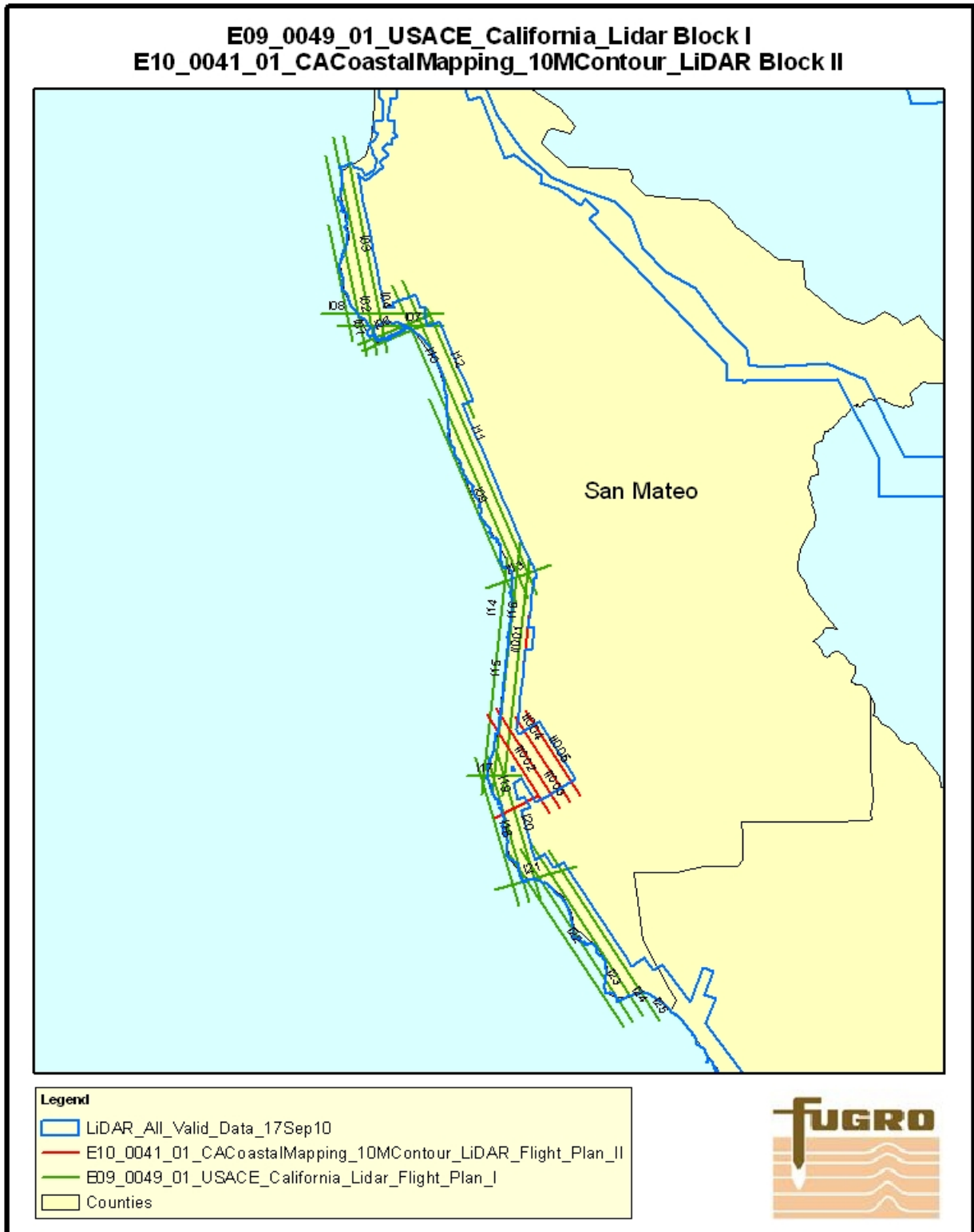


**Graphic 16: Block H and Block HH Flight Plan**

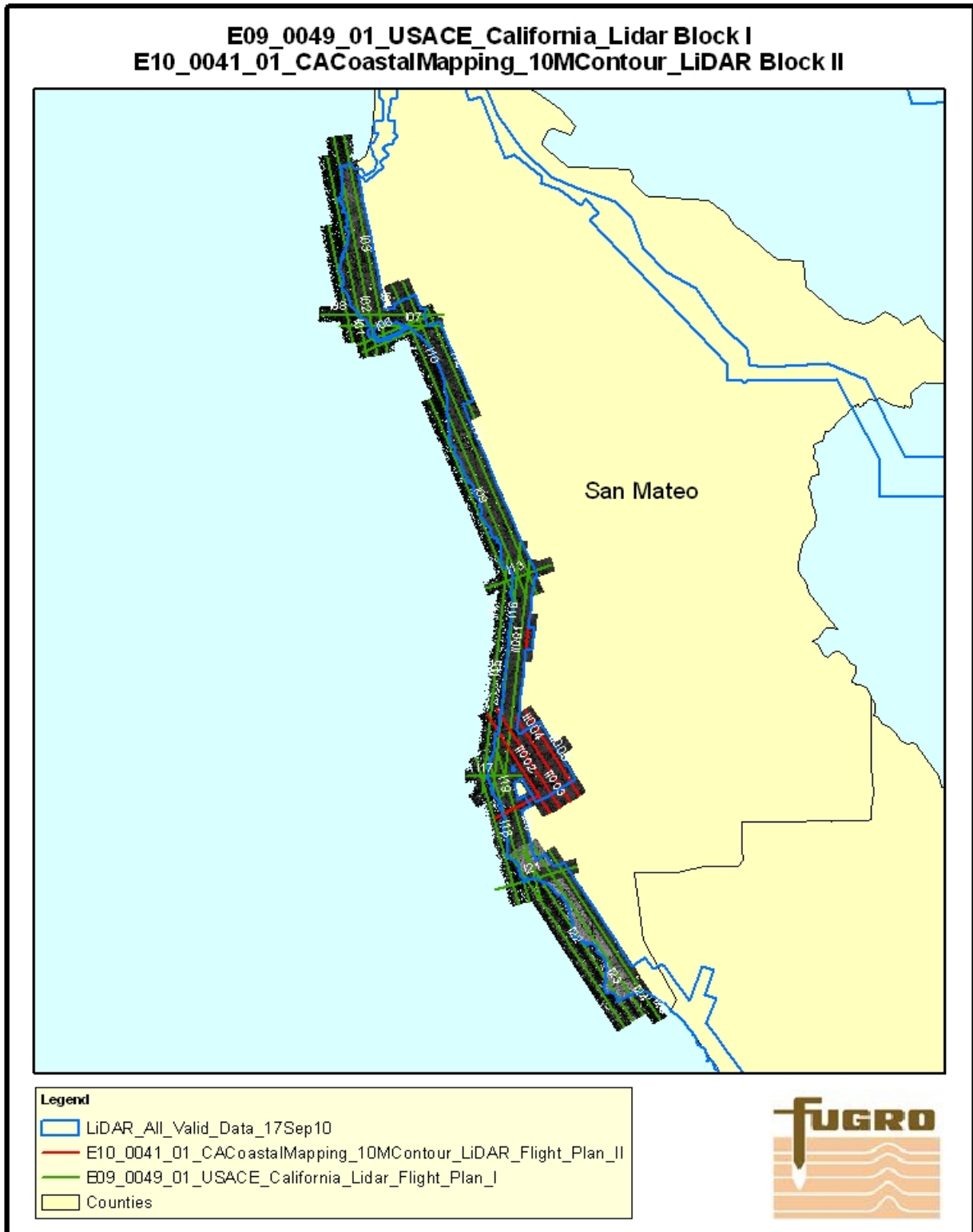


**Graphic 17: Block H and Block HH Intensity**



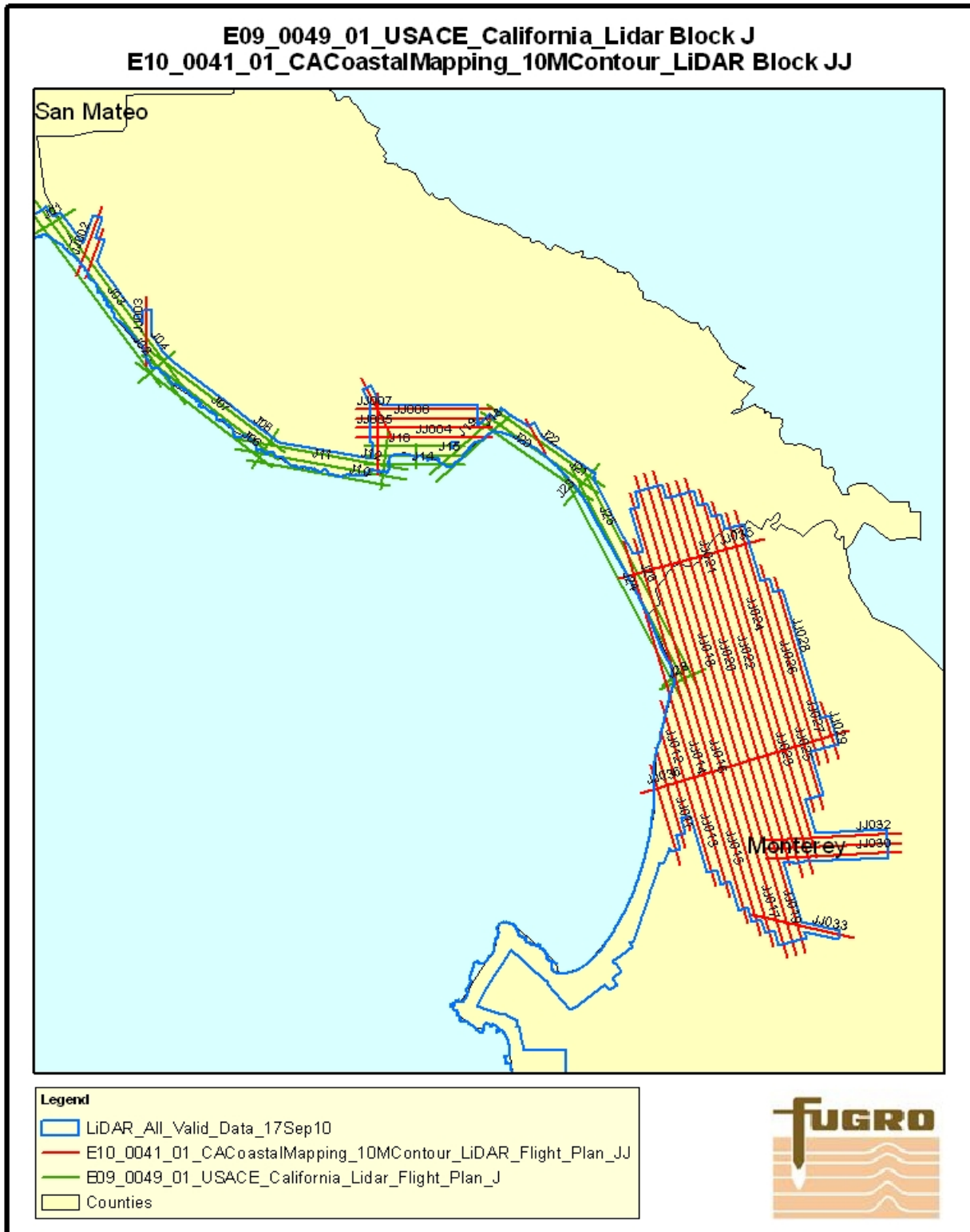


**Graphic 18:** Block I and Block II Flight Plan

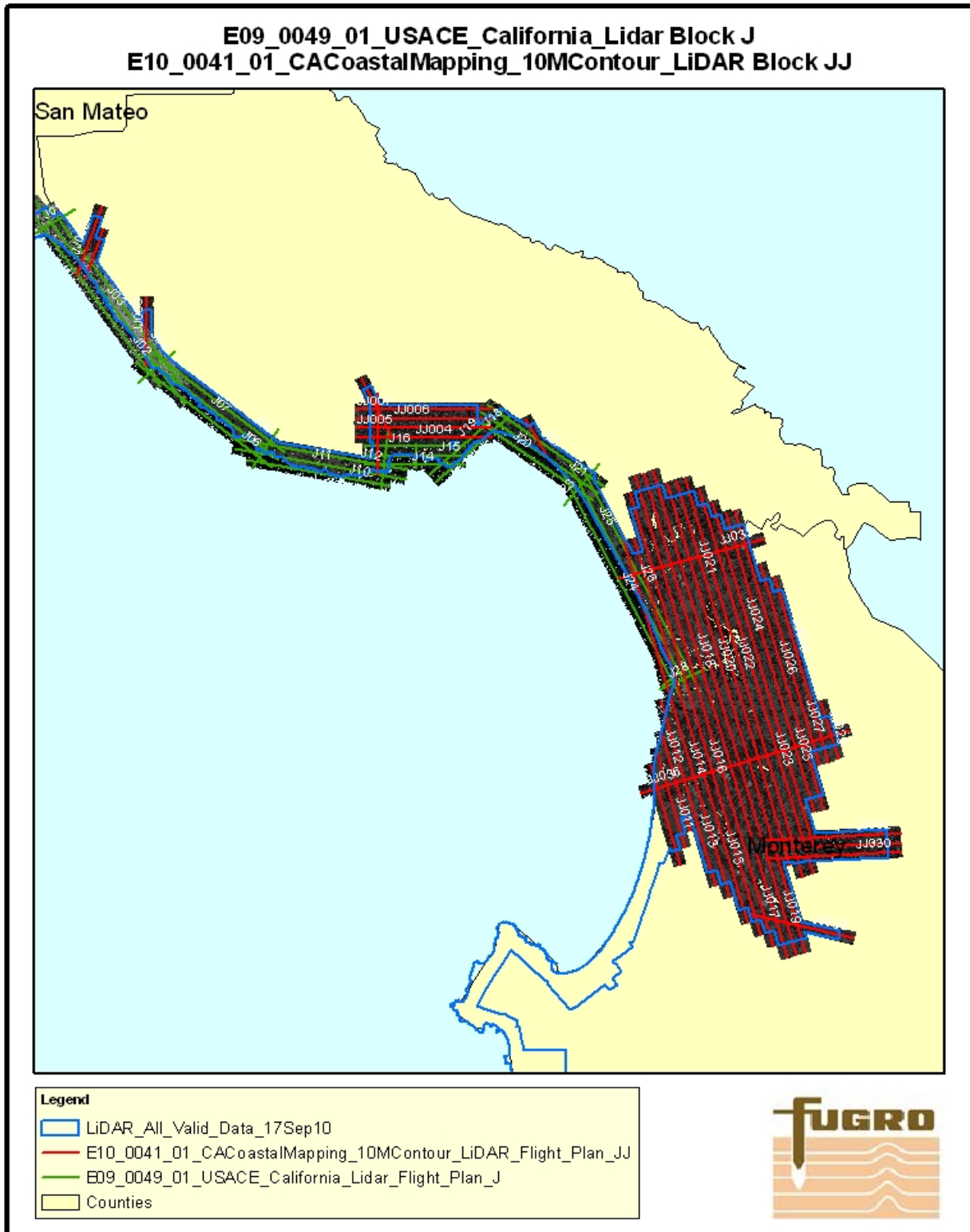


**Graphic 19: Block I and Block II Intensity**

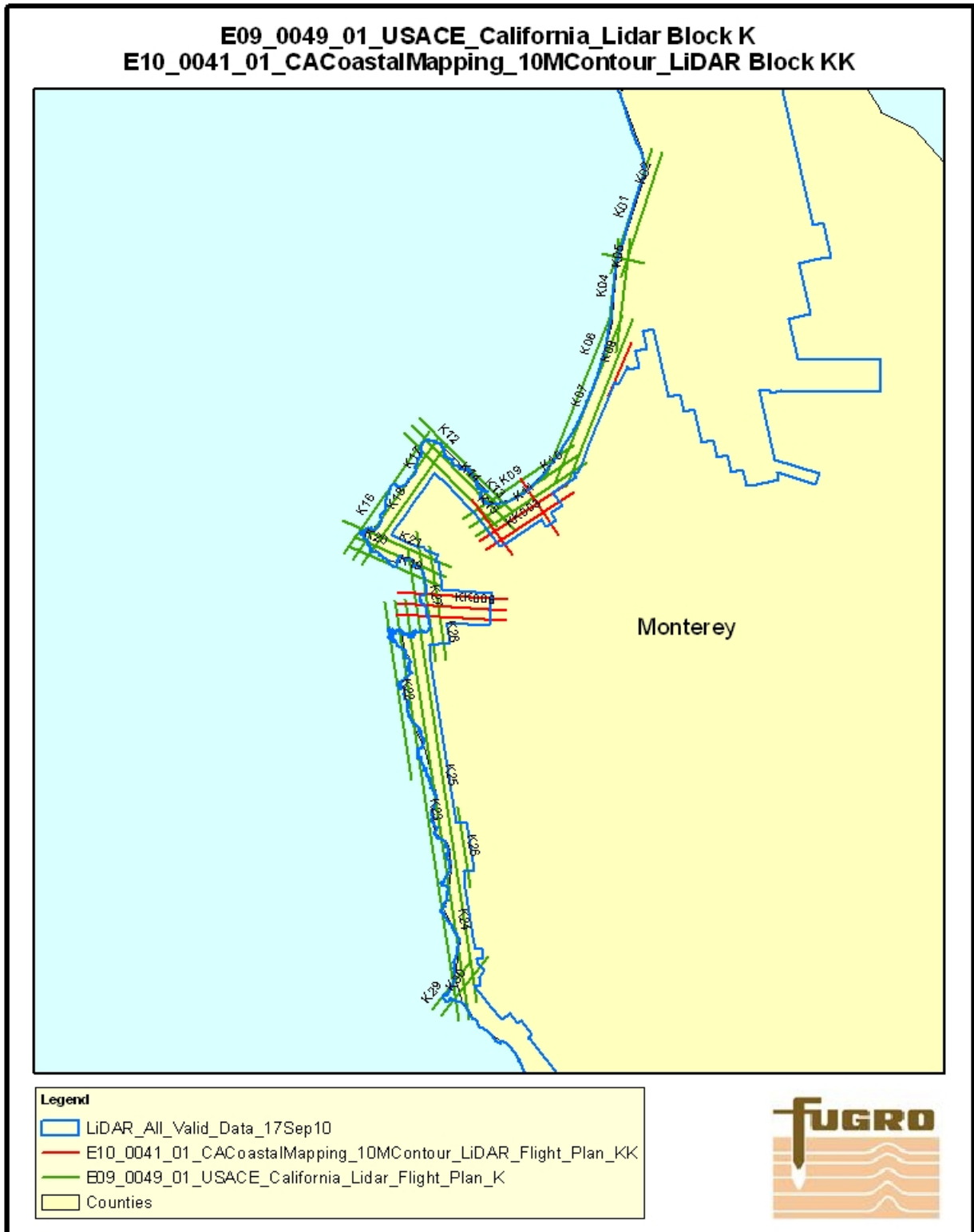




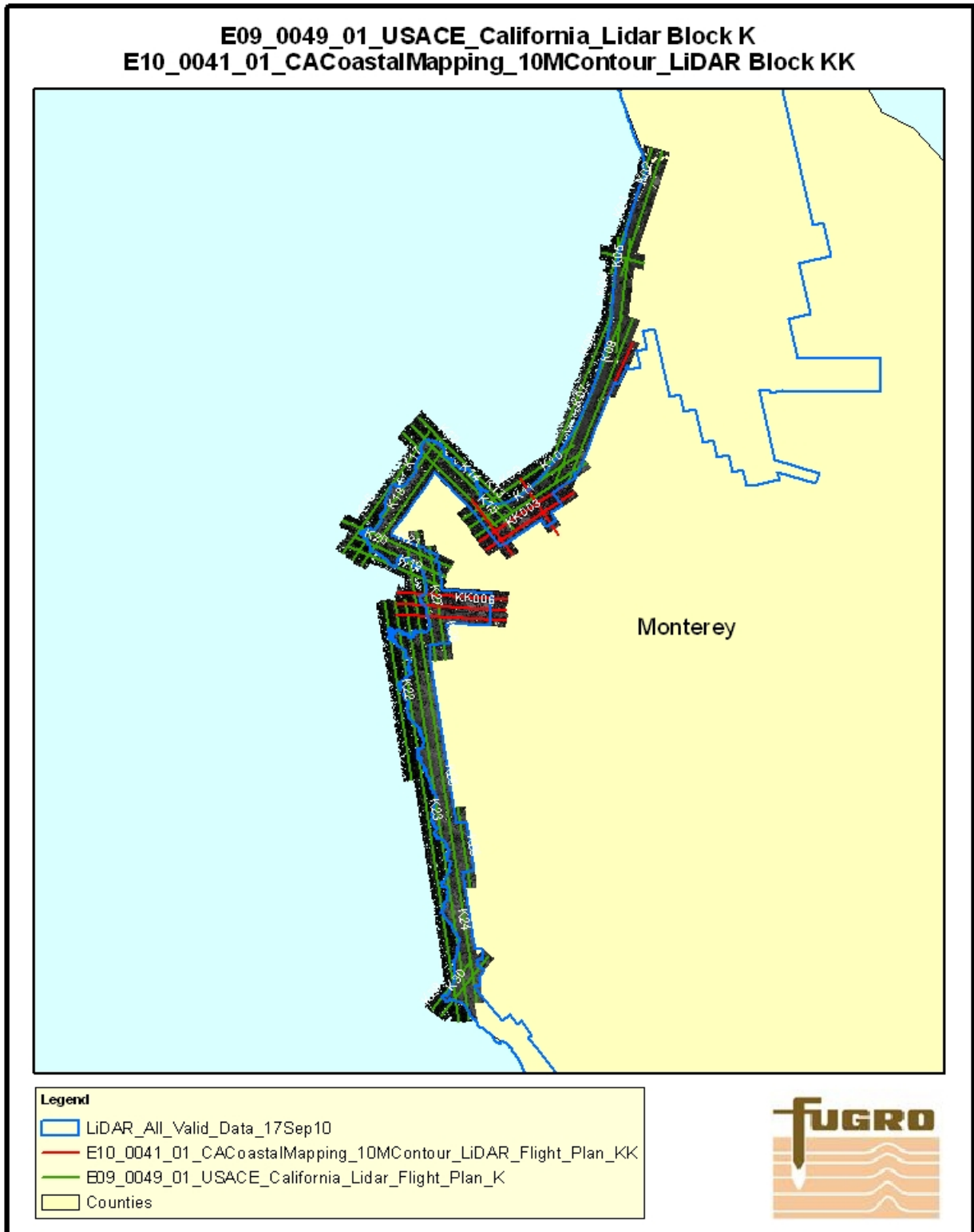
**Graphic 20: Block J and Block JJ Flight Plan**



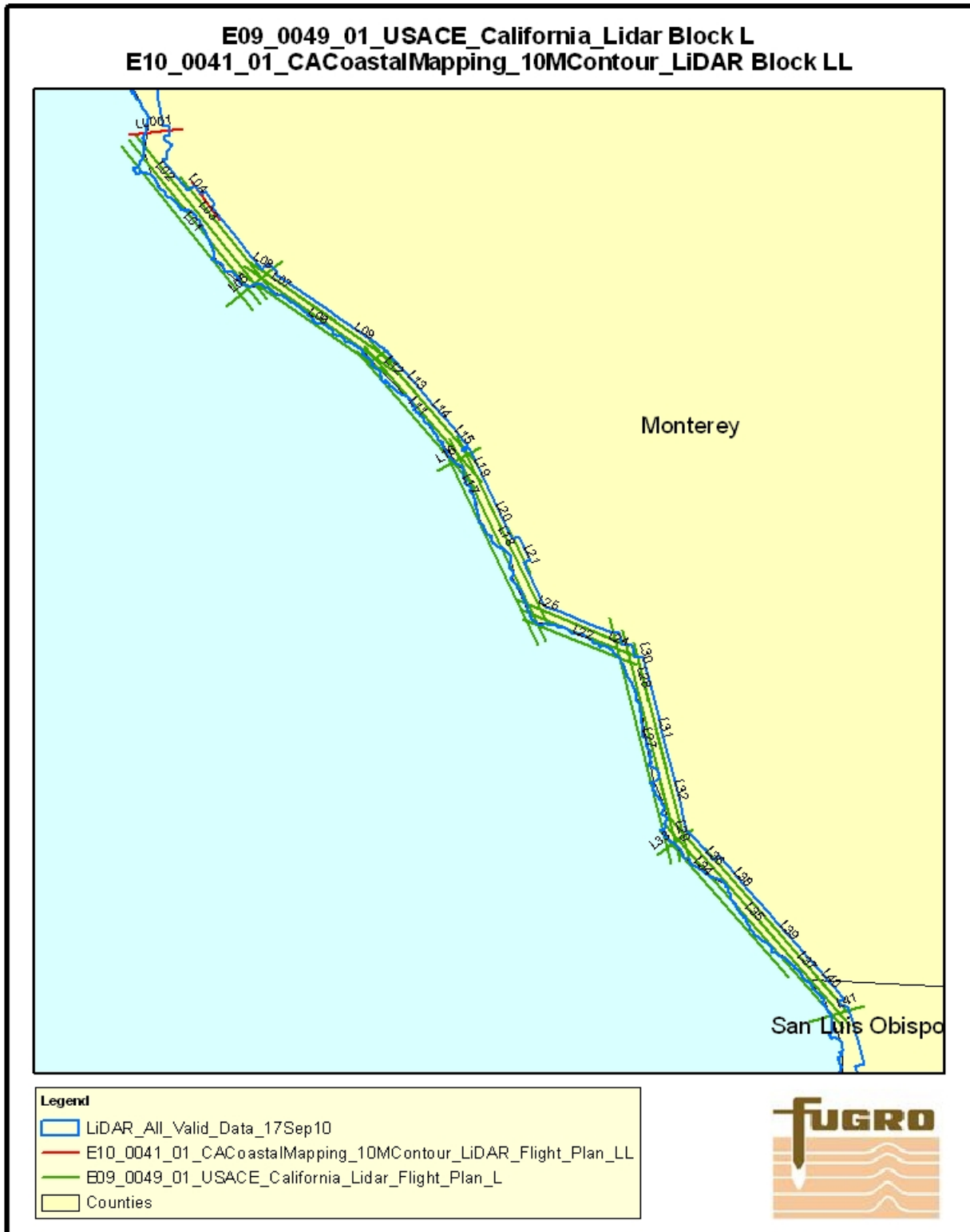
**Graphic 21: Block J and Block JJ Intensity**



**Graphic 22: Block K and Block KK Flight Plan**



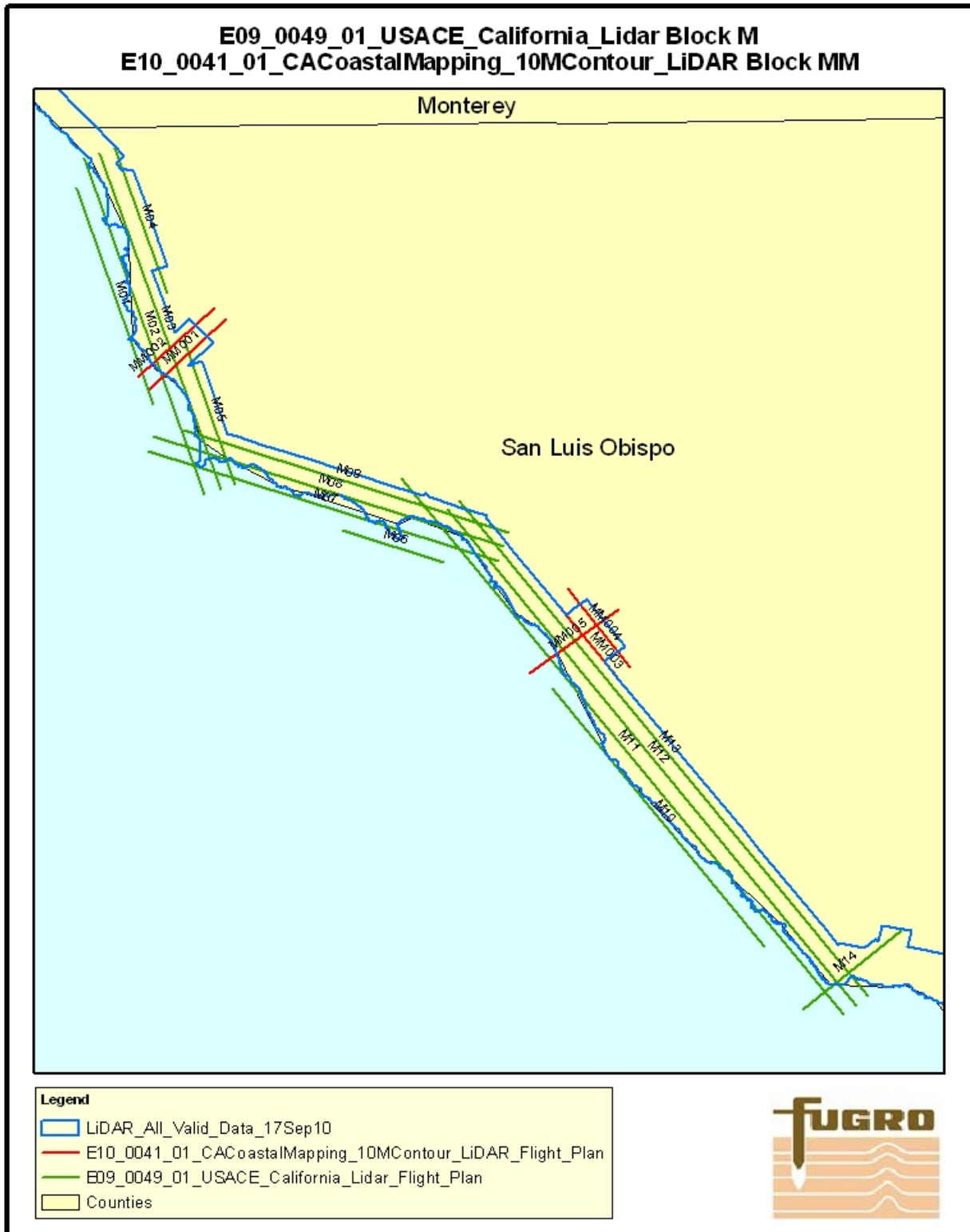
**Graphic 23: Block K and Block KK Intensity**



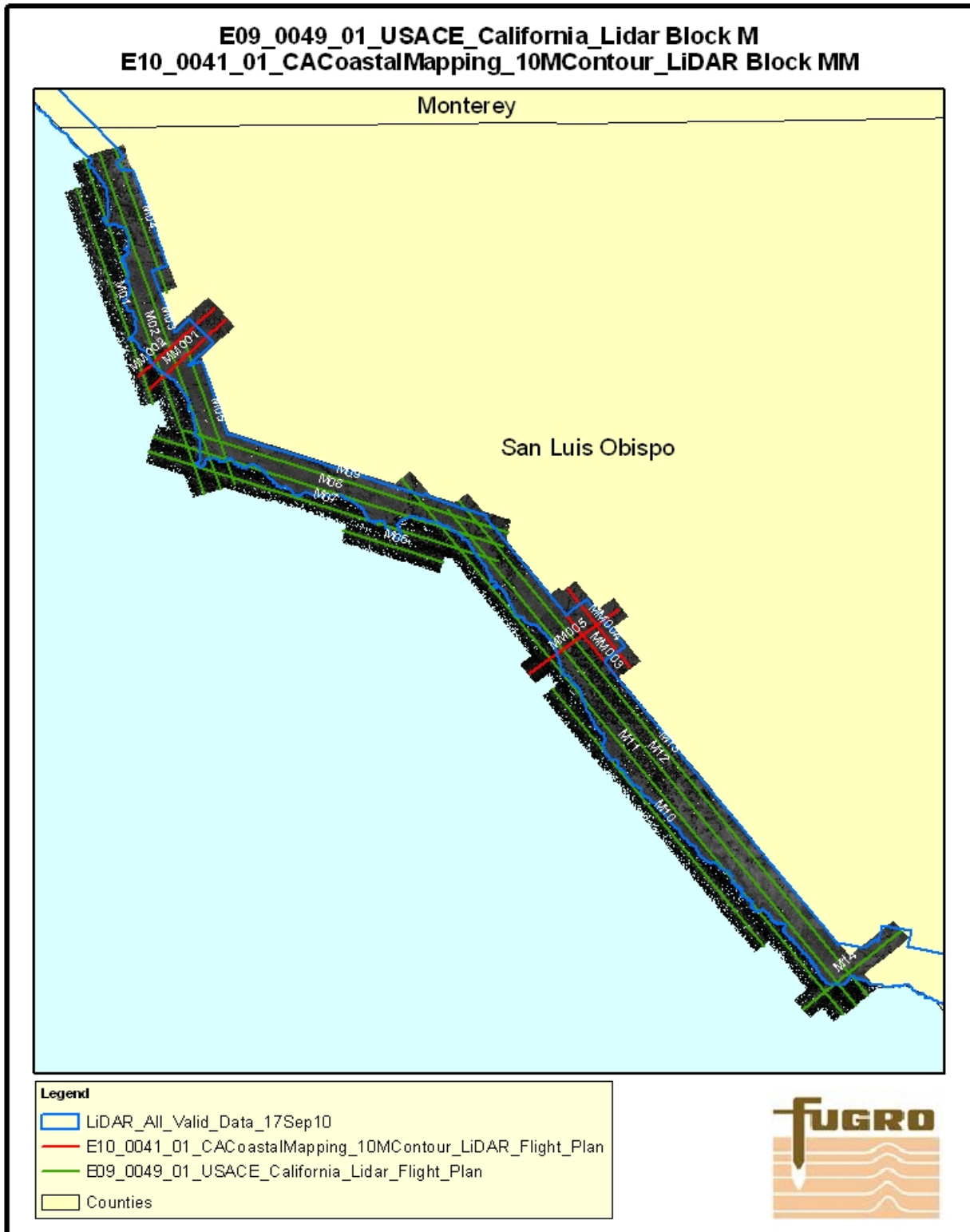
**Graphic 24:** Block L and Block LL Flight Plan



**Graphic 25: Block L and Block LL Intensity**

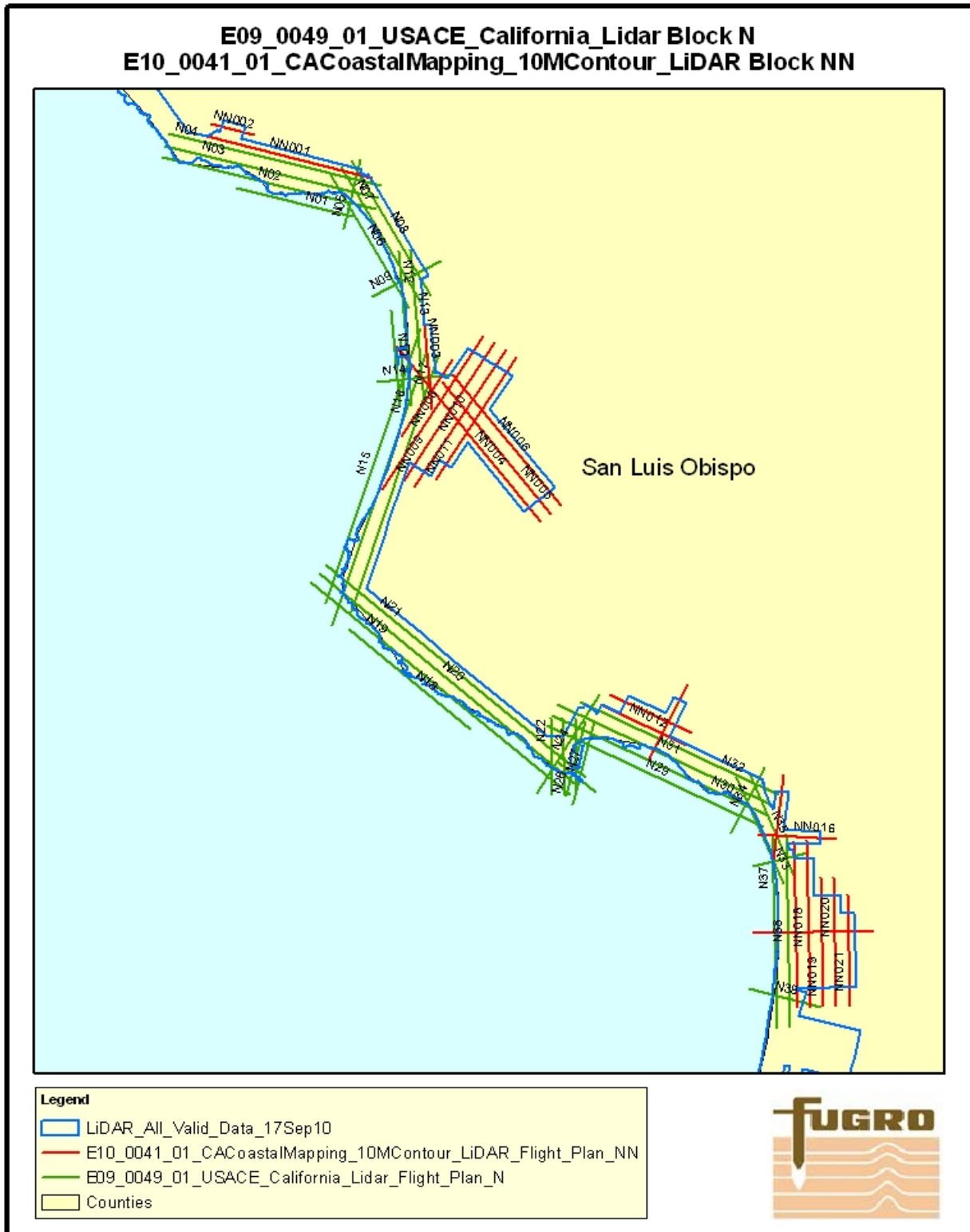


**Graphic 26: Block M and Block MM Flight Plan**



**Graphic 27: Block M and Block MM Intensity**

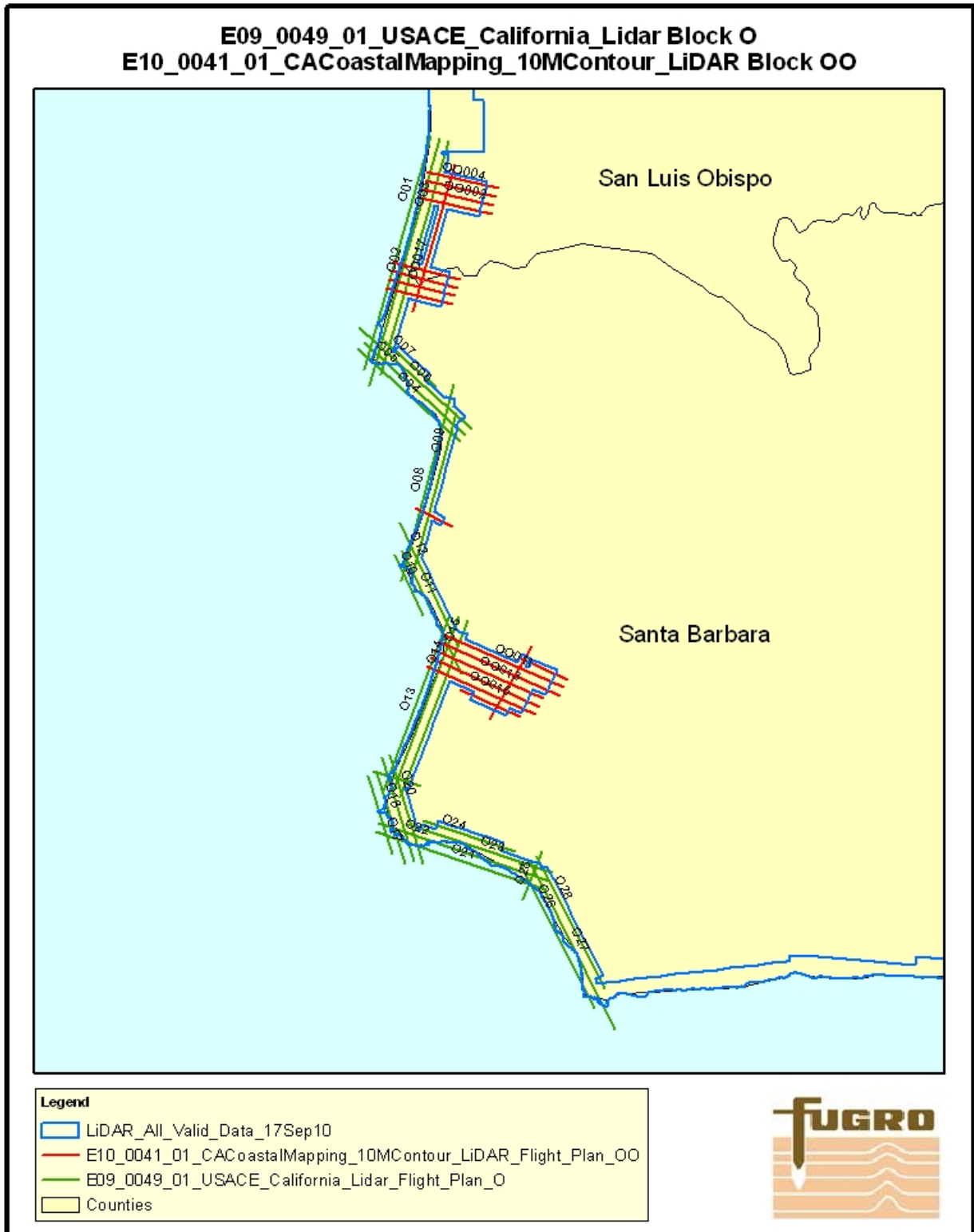




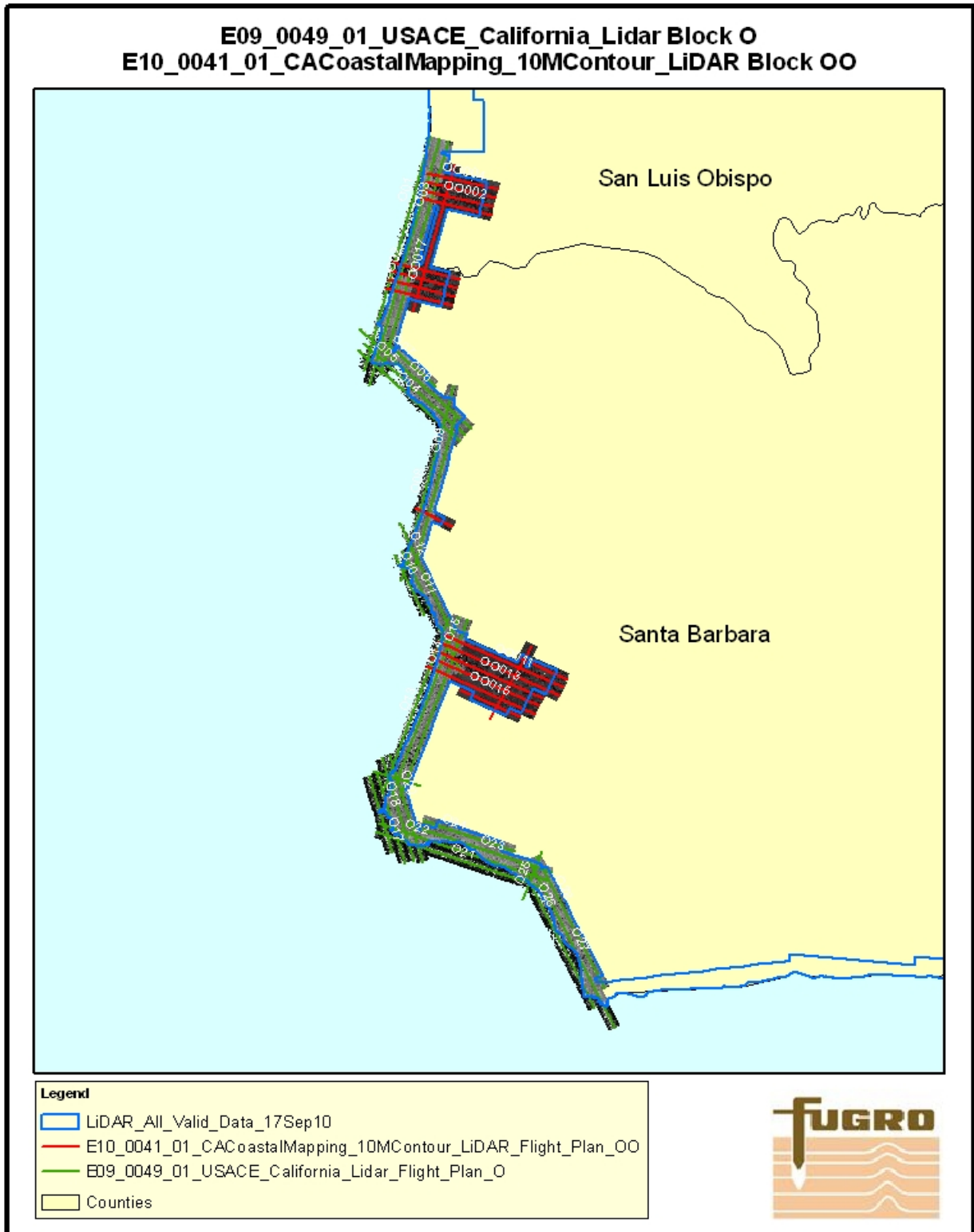
**Graphic 28: Block N and Block NN Flight Plan**



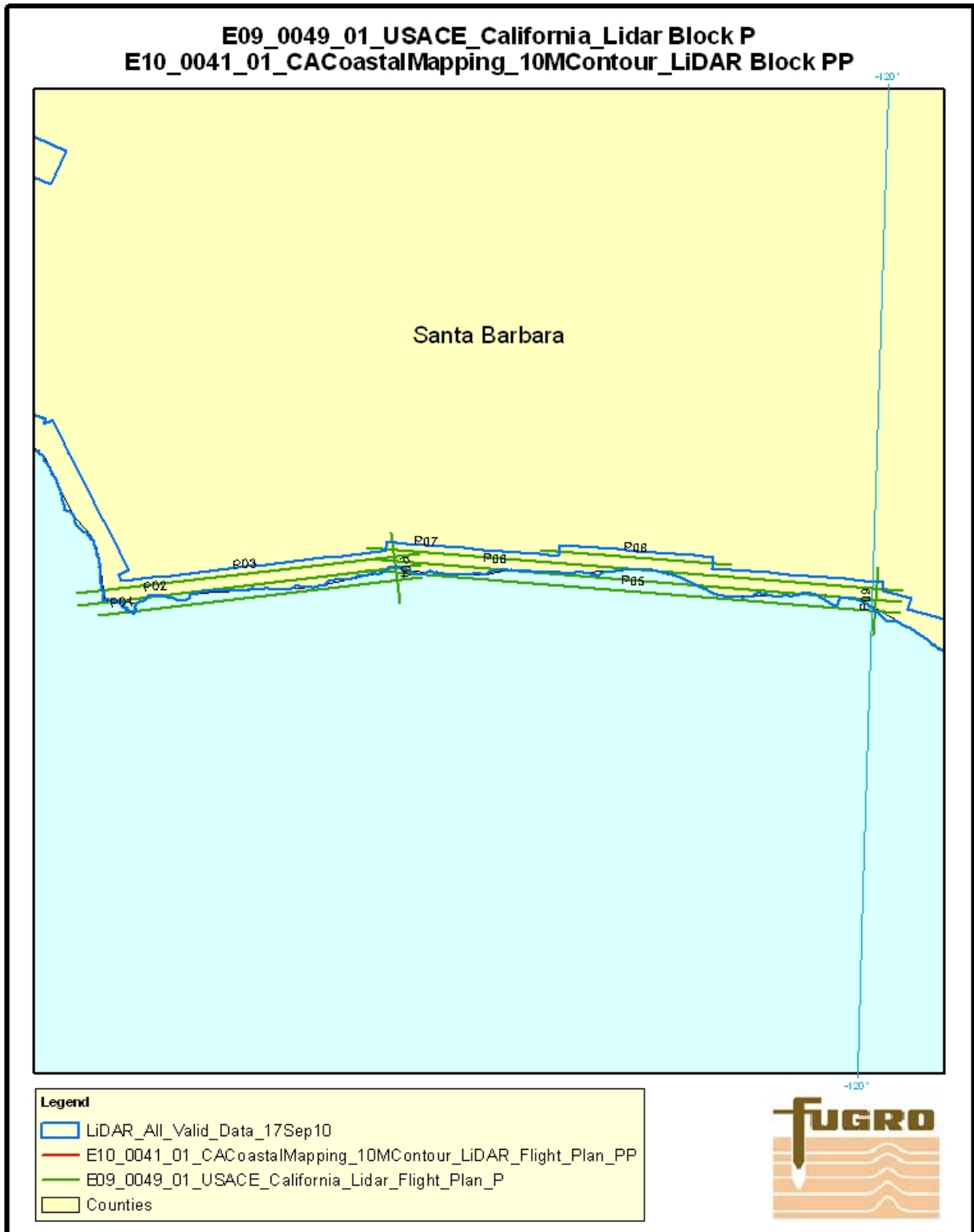
**Graphic 29: Block N and Block NN Intensity**



**Graphic 30: Block O and Block OO Flight Plan**



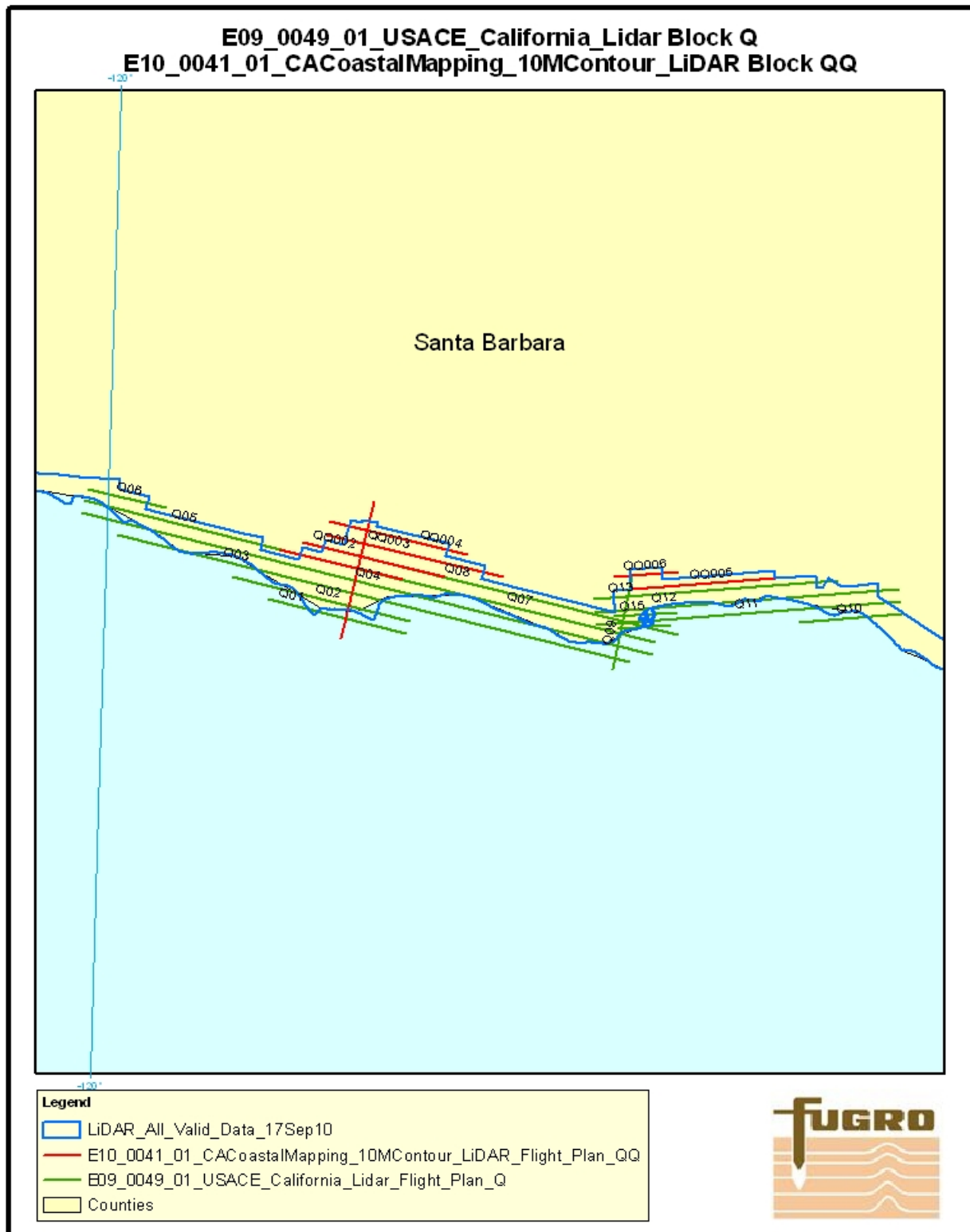
**Graphic 31: Block O and Block OO Intensity**



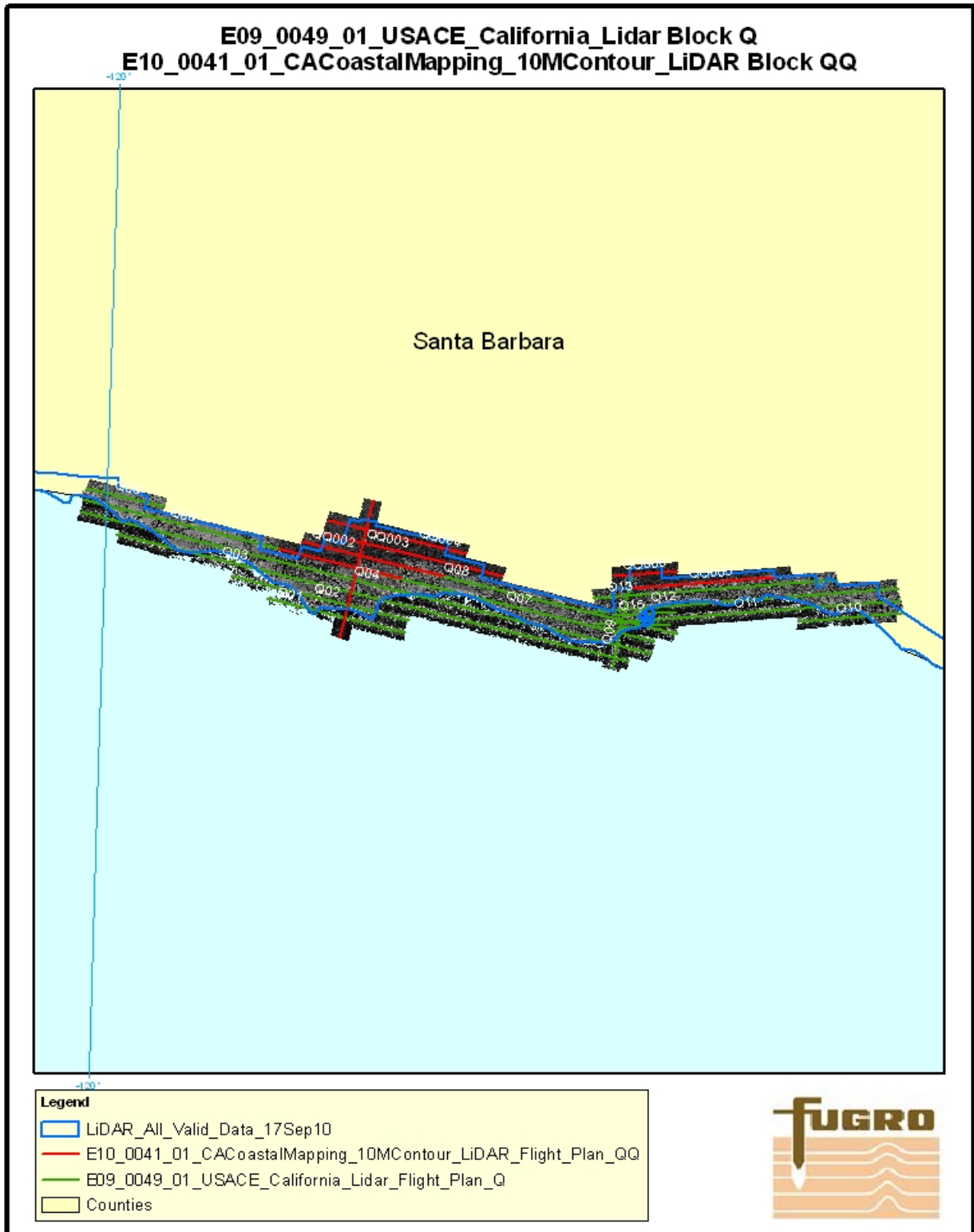
**Graphic 32: Block P and Block PP Flight Plan**



Graphic 33: Block P and Block PP Intensity



**Graphic 34: Block Q and Block QQ Flight Plan**

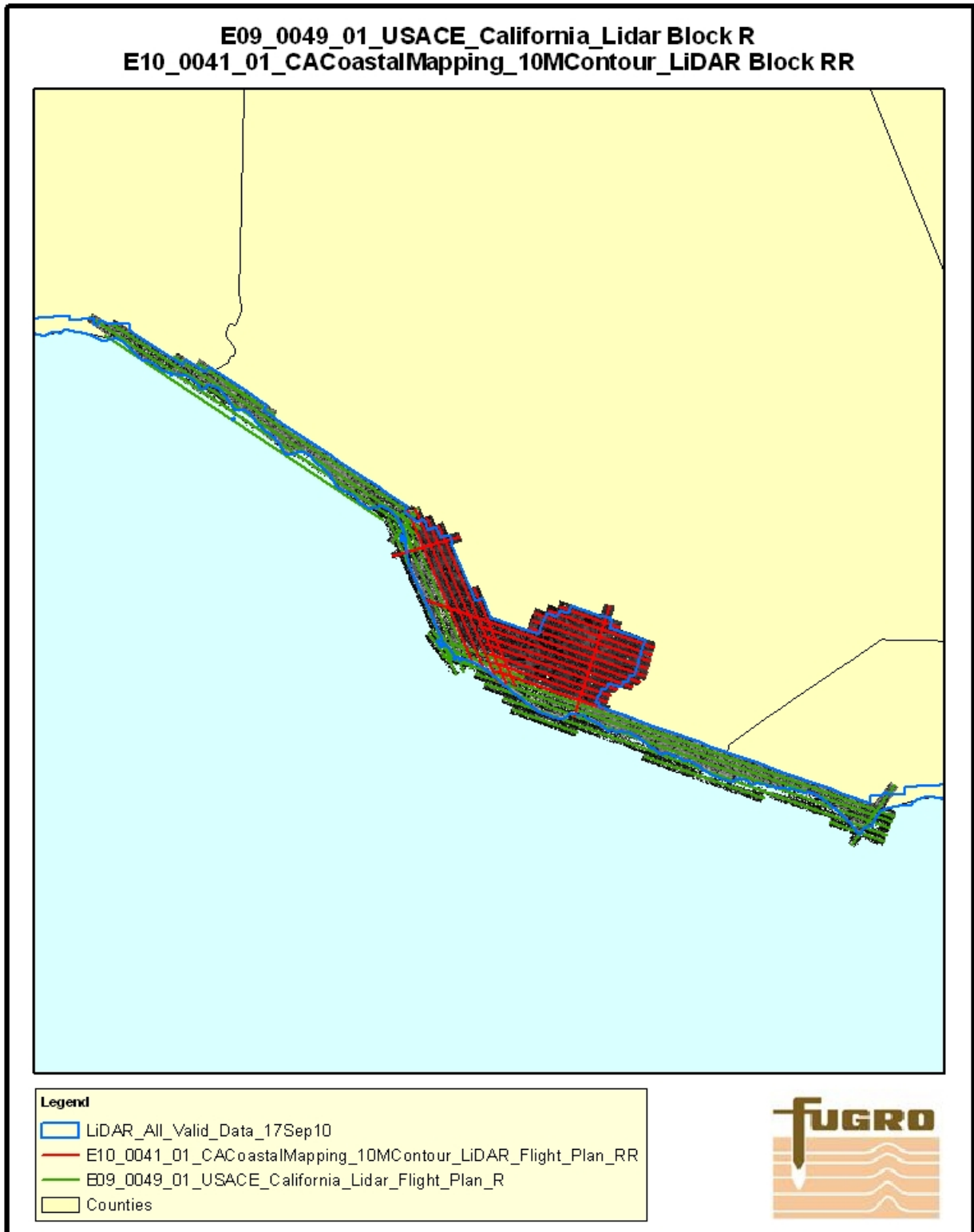


**Graphic 35: Block Q and Block QQ Intensity**





**Graphic 36: Block R and Block RR Flight Plan**



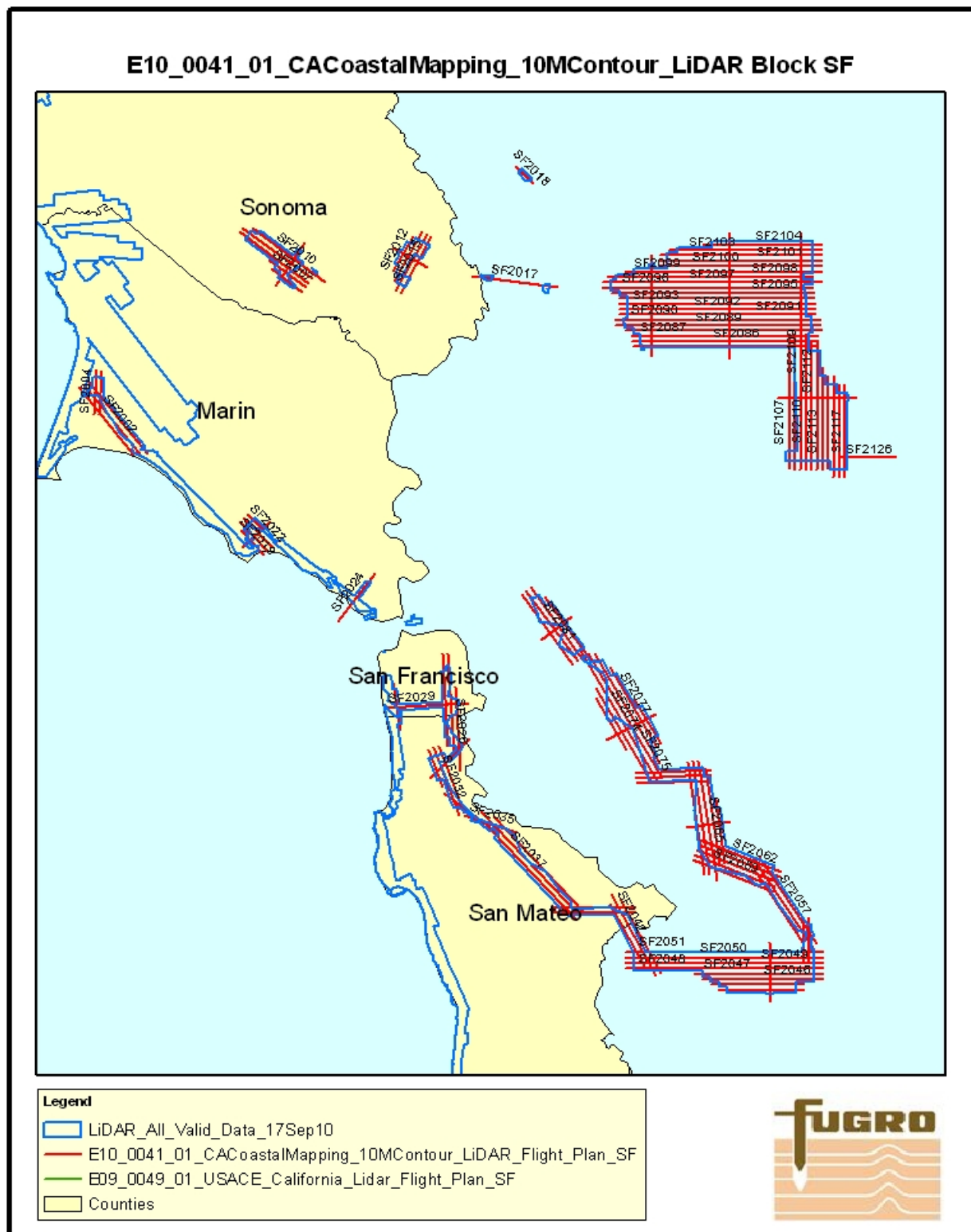
**Graphic 37: Block R and Block RR Intensity**



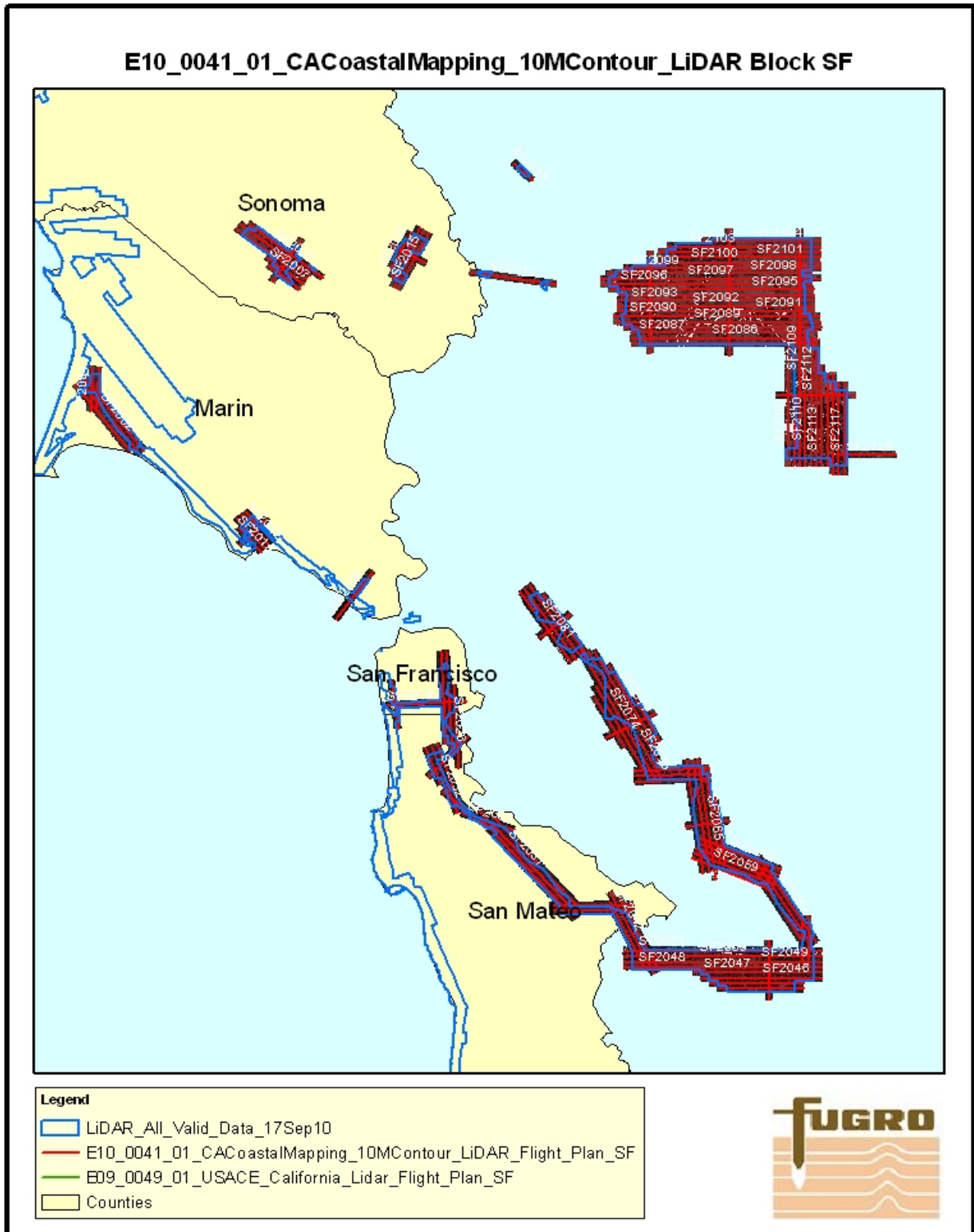
**Graphic 38: Block S and Block SS Flight Plan**



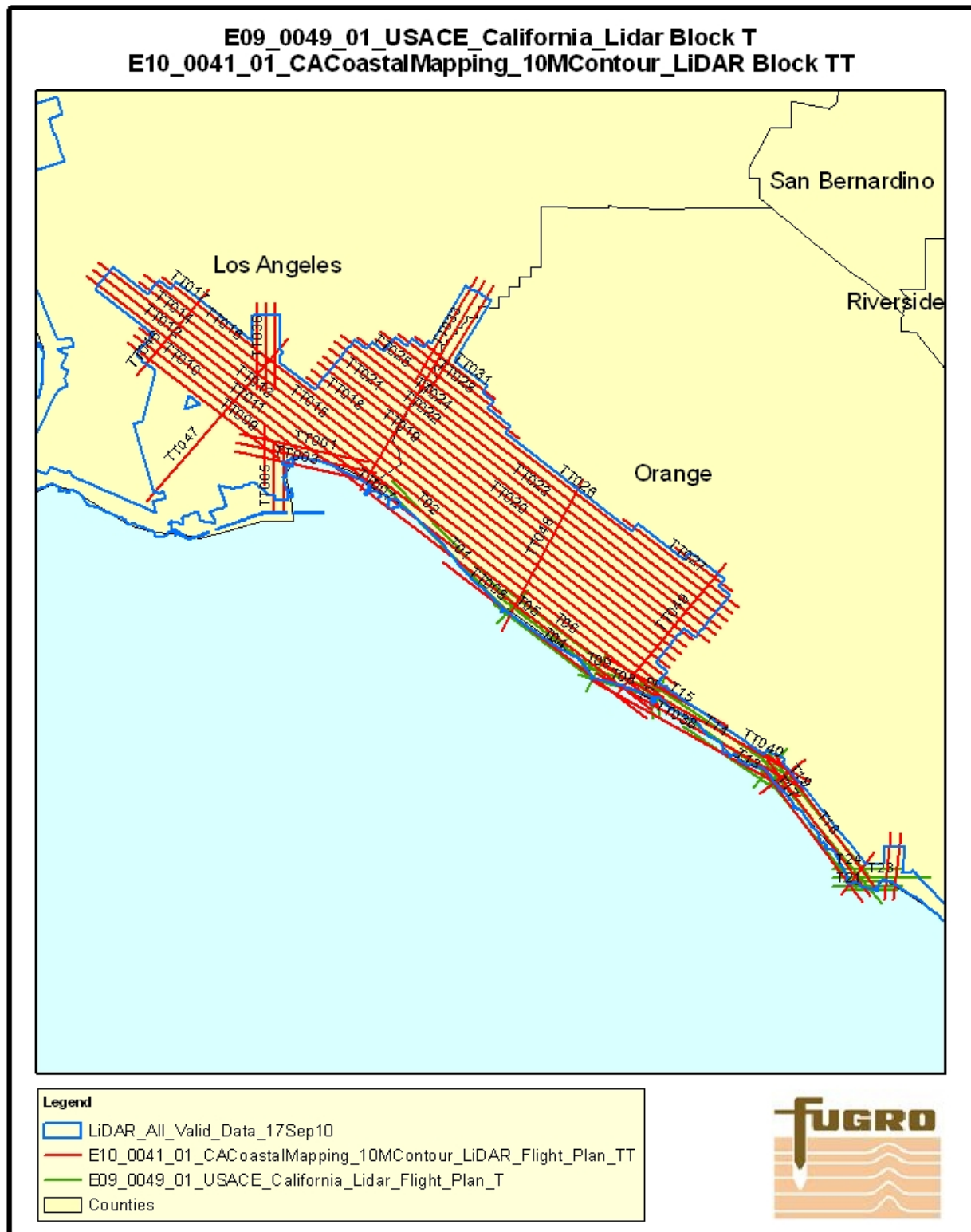
**Graphic 39: Block S and Block SS Intensity**



**Graphic 40: Block SF Flight Plan**



**Graphic 41: Block SF Intensity**



**Graphic 42: Block T and Block TT Flight Plan**





**Graphic 43: Block T and Block TT Intensity**

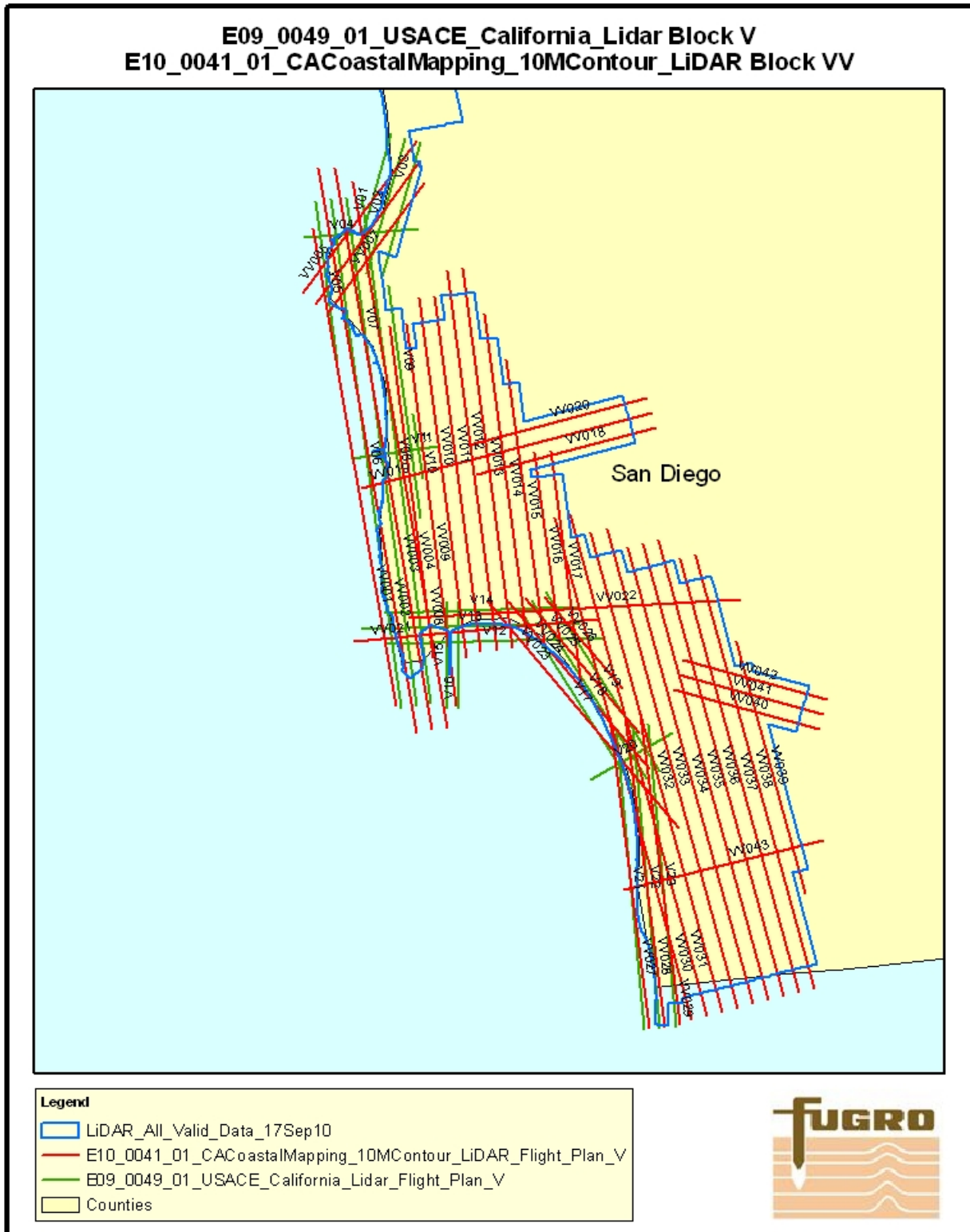




**Graphic 44: Block U and Block UU Flight Plan**



**Graphic 45: Block U and Block UU Intensity**



**Graphic 46: Block V and Block VV Flight Plan**



**Graphic 47: Block V and Block VV Intensity**