

Report v3

LUC Analysis Verification Result Document

RSPO

For Palmeras La Carolina SA, Colombia

07/09/18

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Table 1. Company Information Summary

Palmeras La Carolina SA	
RSPO membership number	NA
Date of joining RSPO	NA
Date of first RSPO certification	NA
Total number of certified management units	0
Location of management unit	Department of Meta, western region of Colombia (Orinoquia Region).
Date of HCV assessment	Not included in documentation provided
Date of HCV report issue	Not included in documentation provided
Land clearing prior HCV assessment	-
Total area of management unit (ha)	3090.3
Total area of non-compliant land clearance (ha)	0
Total area of Final Conservation Liability (ha)	0
Method used for LUC Analysis	Visual analysis
Organization who conducted LUC Analysis	BioAp. Biología Aplicada S.A.S.
Date when data completely was received	-
Kappa Accuracy assessment result (If applicable)	-
Date when report was prepared	19-10-2017
Result of LUC Analysis methodology review	PASS

1. Assessment Methodology

This is a review of data submitted by Palmeras La Carolina SA in Colombia (The company) as part of a Land Use Change Analysis (LUCA) under the guidelines of the RSPO for remediation and compensation on land cleared prior to HCV assessments. The company provided satellite imagery (Landsat, 30 m resolution) for the years 2005, 2006, 2008, 2010, 2014 and 2017 as a proxy for the RSPO non-compliance periods as follows:

- 25/11/2005 and 13/02/2006 as proxy for November 2005 to November 2007
- 18/01/2008 as a proxy for November 2007 to 31 December 2009
- 23/01/2010 and 31/03/2014 as a proxy for 1 January 2010 to 9 May 2014
- 14/08/2017 as proxy for post 9 May 2014

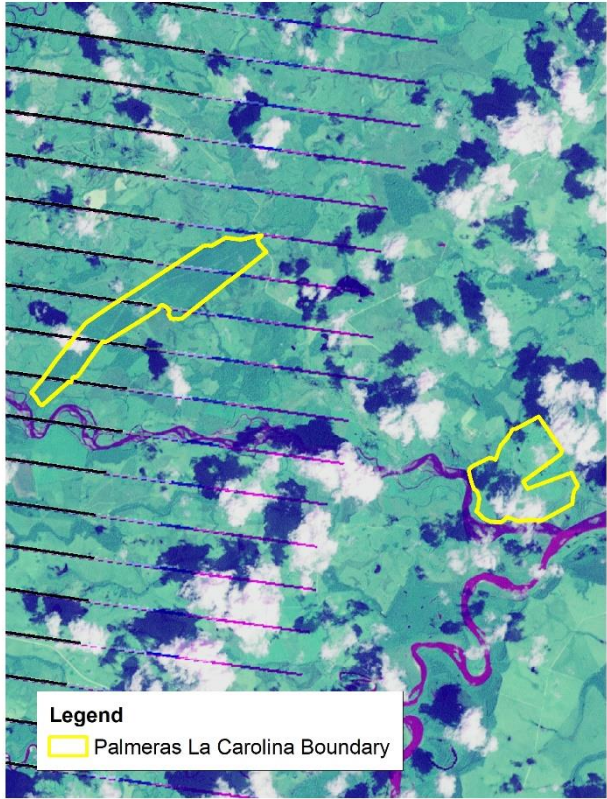
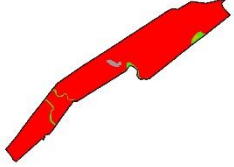

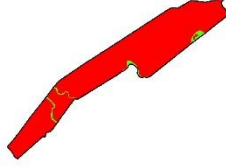

The process consisted first of a review of completeness of the data provided and a visual assessment of the geocoded satellite imagery provided.

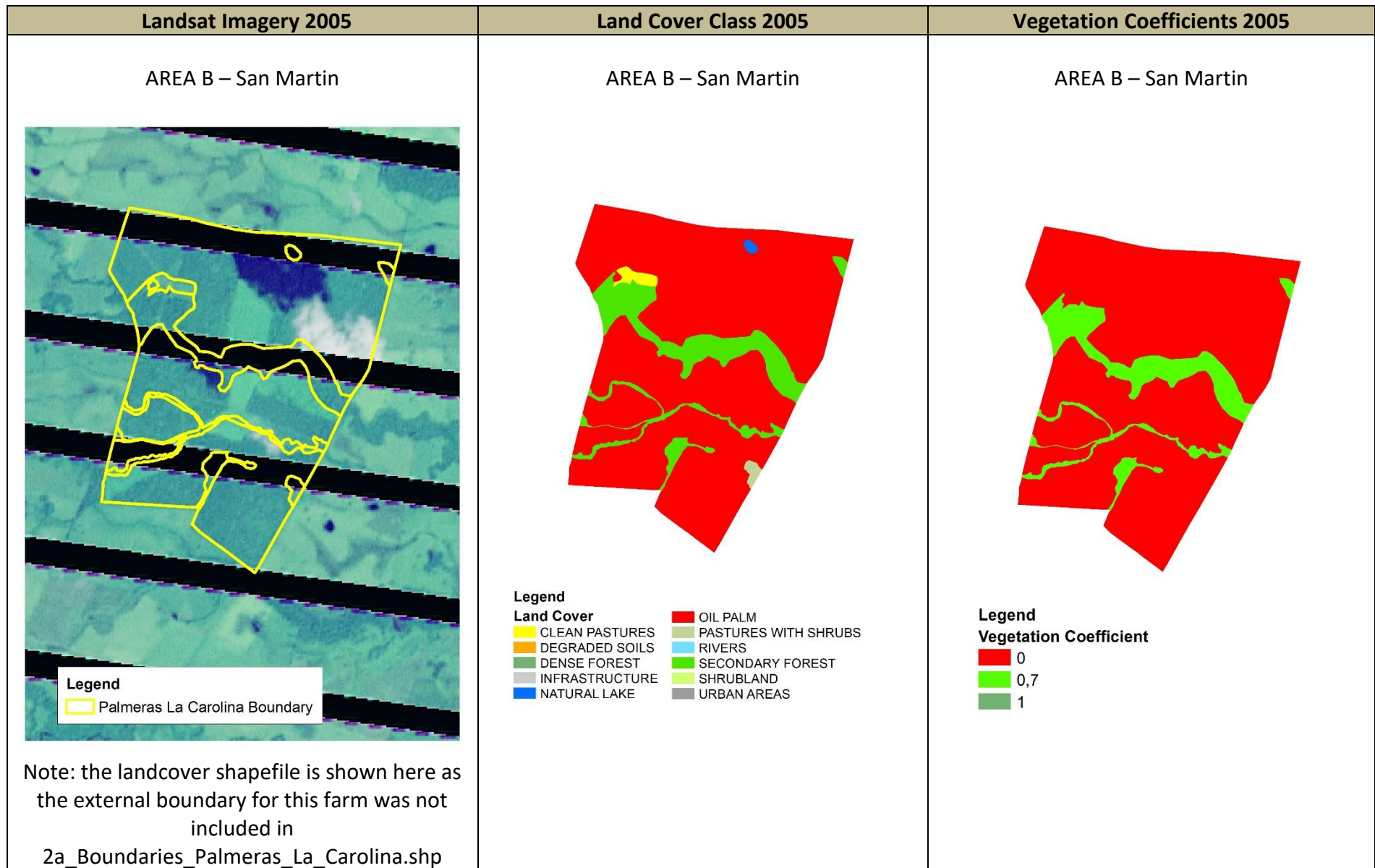
The next step in the process was a comparison of each one of these images against vegetation coefficients and land cover to detect irregularities. The final step in the process was area calculations (Ha) for both land use change and prohibited areas.

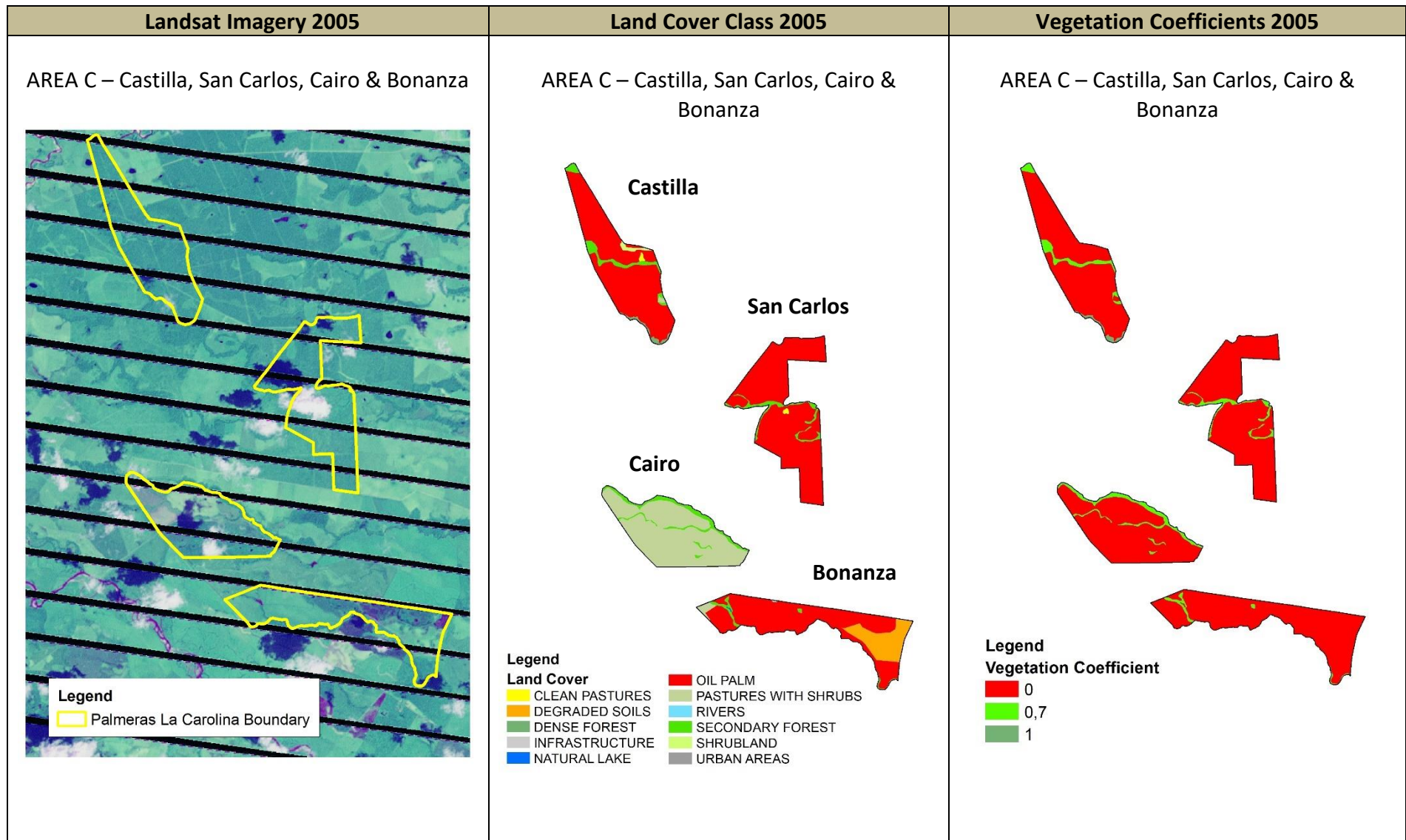
2. Data Comparison Table

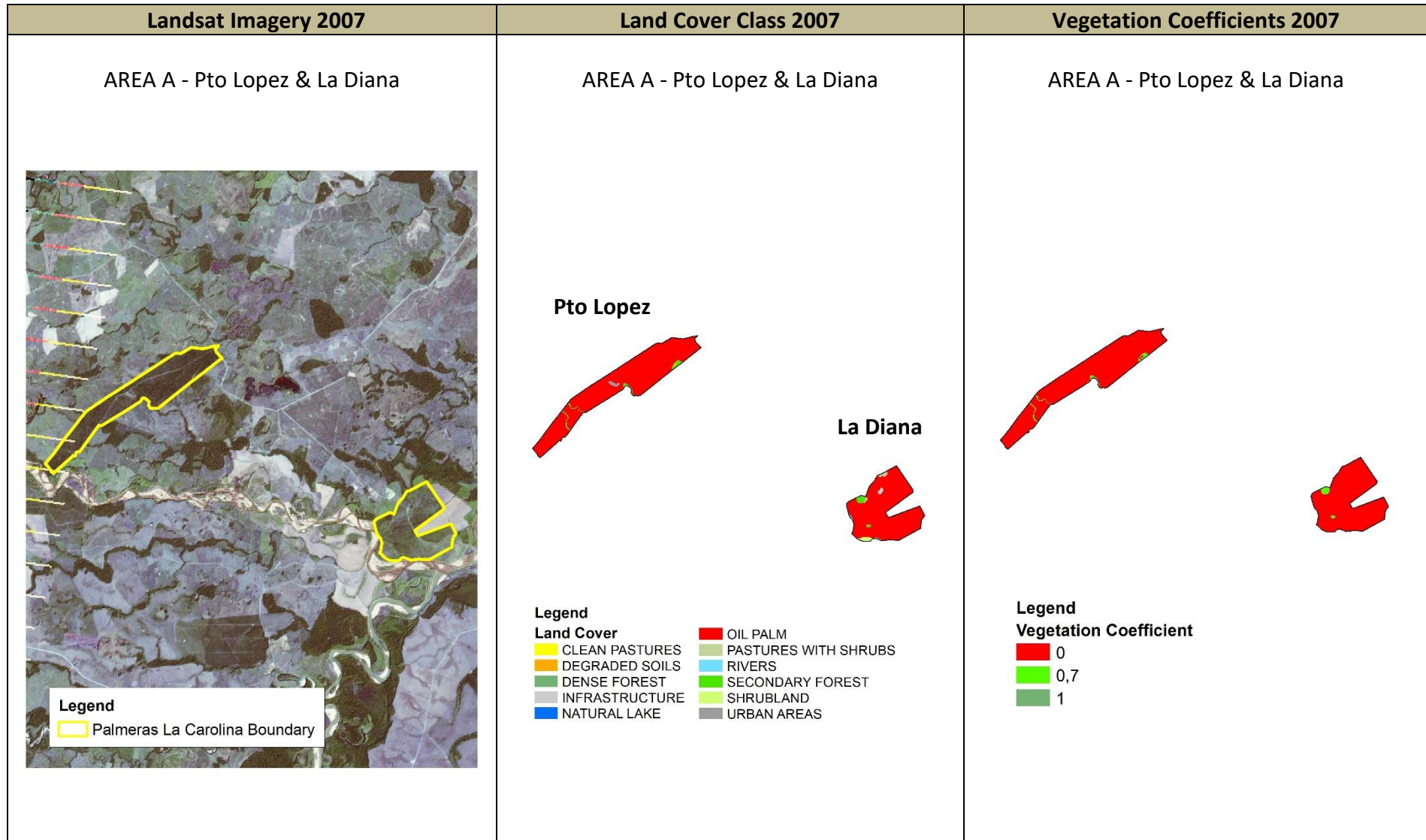
Table 2 shows the imagery and spatial data submitted by the company. It compares the imagery (Landsat, 30 m resolution) for the years 2005, 2007, 2009, 2014 and 2017 by overlaying the boundary provided by the company. The middle section shows the land cover classes while the right section shows the vegetation coefficients provided by the company for each year.

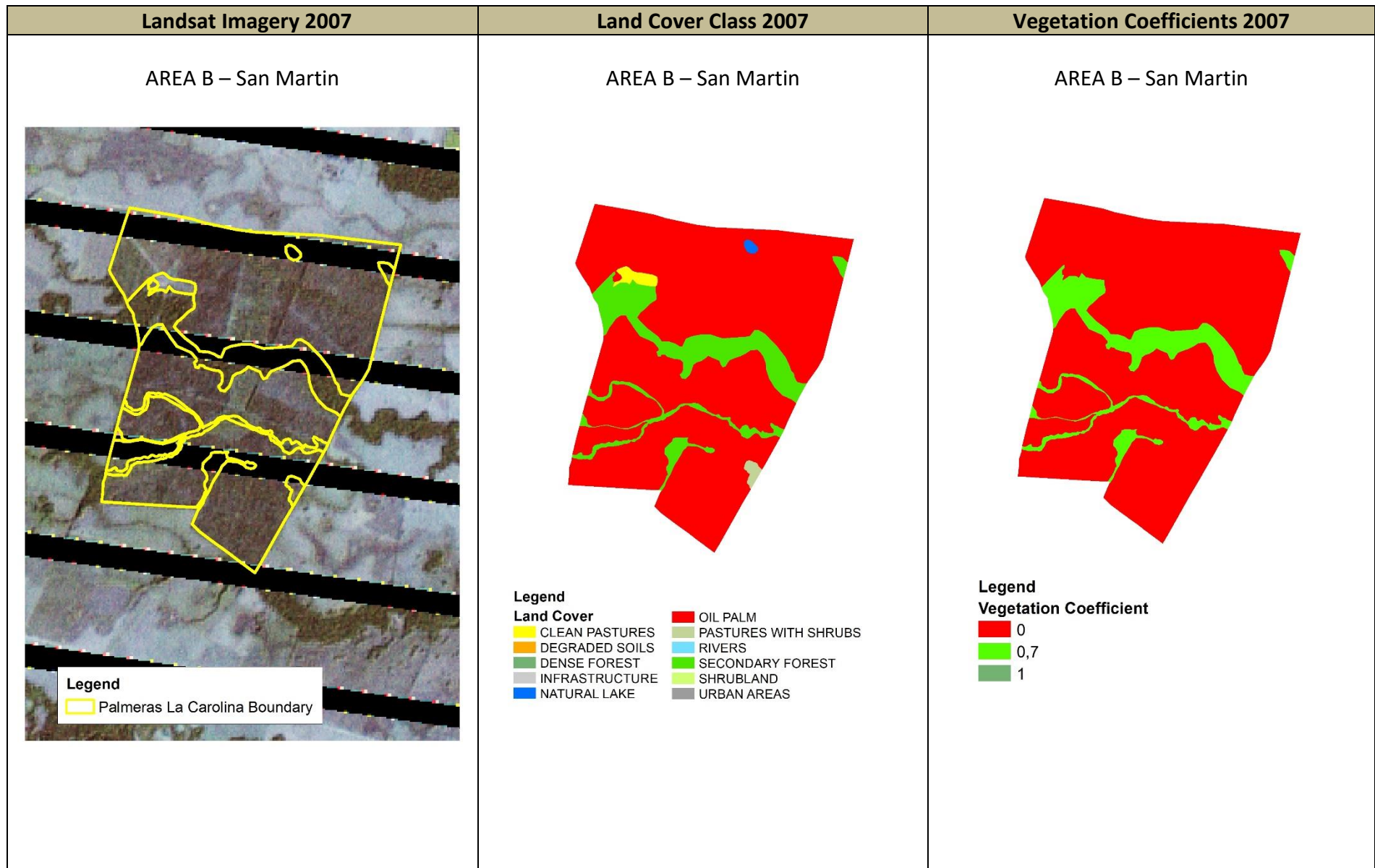
Table 2. Spatial data submitted by the company

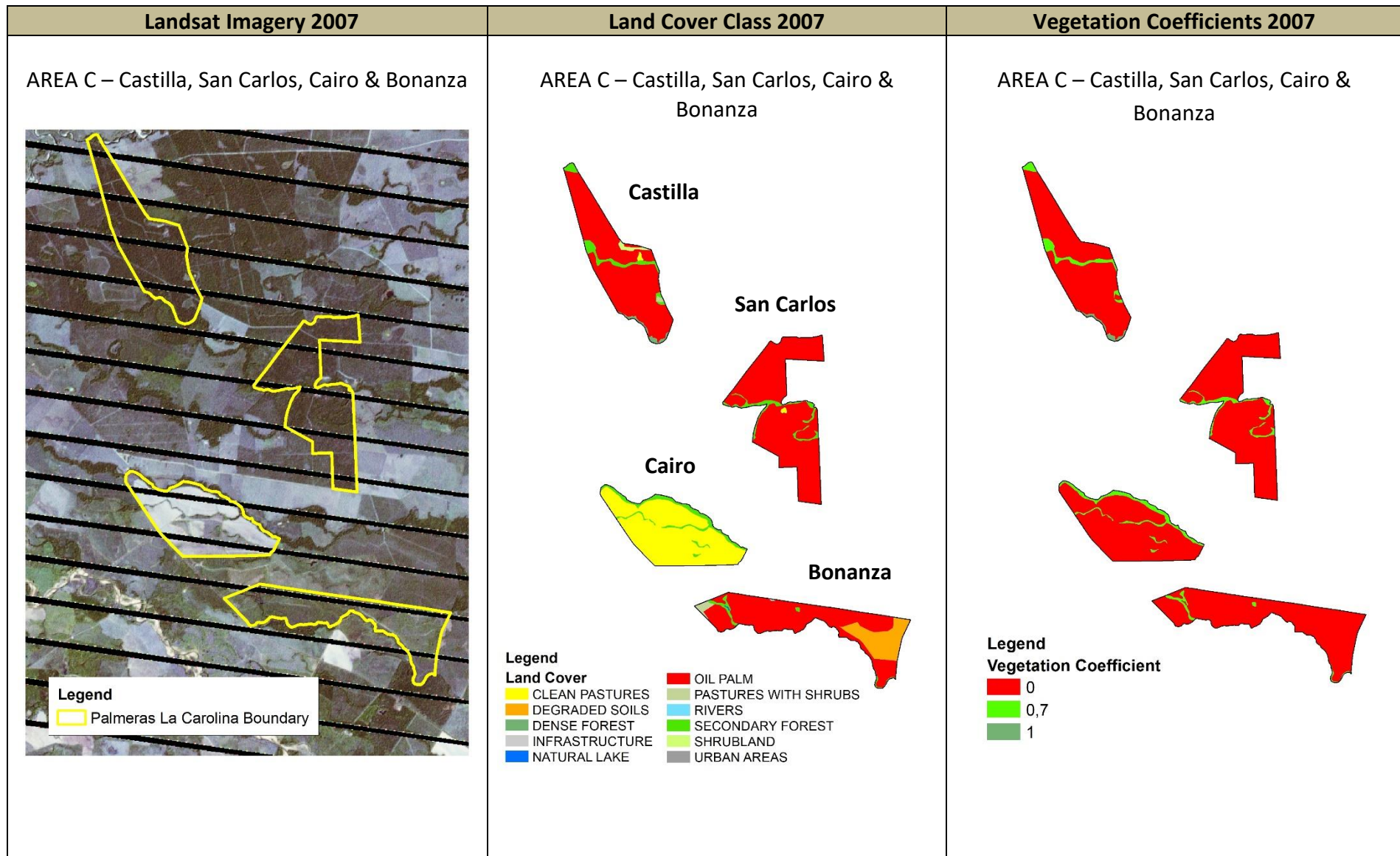
Landsat Imagery 2005	Land Cover Class 2005	Vegetation Coefficients 2005		
<p style="text-align: center;">AREA A – Pto Lopez & La Diana</p>  <p style="text-align: center;">Legend Palmeras La Carolina Boundary</p>	<p style="text-align: center;">AREA A – Pto Lopez & La Diana</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Pto Lopez</p>  </div> <div style="text-align: center;"> <p>La Diana</p>  </div> </div> <p>Legend</p> <table border="0" style="width: 100%; font-size: small;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Land Cover</p> <ul style="list-style-type: none"> CLEAN PASTURES DEGRADED SOILS DENSE FOREST INFRASTRUCTURE NATURAL LAKE </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> OIL PALM PASTURES WITH SHRUBS RIVERS SECONDARY FOREST SHRUBLAND URBAN AREAS </td> </tr> </table>	<p>Land Cover</p> <ul style="list-style-type: none"> CLEAN PASTURES DEGRADED SOILS DENSE FOREST INFRASTRUCTURE NATURAL LAKE 	<ul style="list-style-type: none"> OIL PALM PASTURES WITH SHRUBS RIVERS SECONDARY FOREST SHRUBLAND URBAN AREAS 	<p style="text-align: center;">AREA A – Pto Lopez & La Diana</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p>Legend</p> <p>Vegetation Coefficient</p> <ul style="list-style-type: none"> 0 0,7 1
<p>Land Cover</p> <ul style="list-style-type: none"> CLEAN PASTURES DEGRADED SOILS DENSE FOREST INFRASTRUCTURE NATURAL LAKE 	<ul style="list-style-type: none"> OIL PALM PASTURES WITH SHRUBS RIVERS SECONDARY FOREST SHRUBLAND URBAN AREAS 			

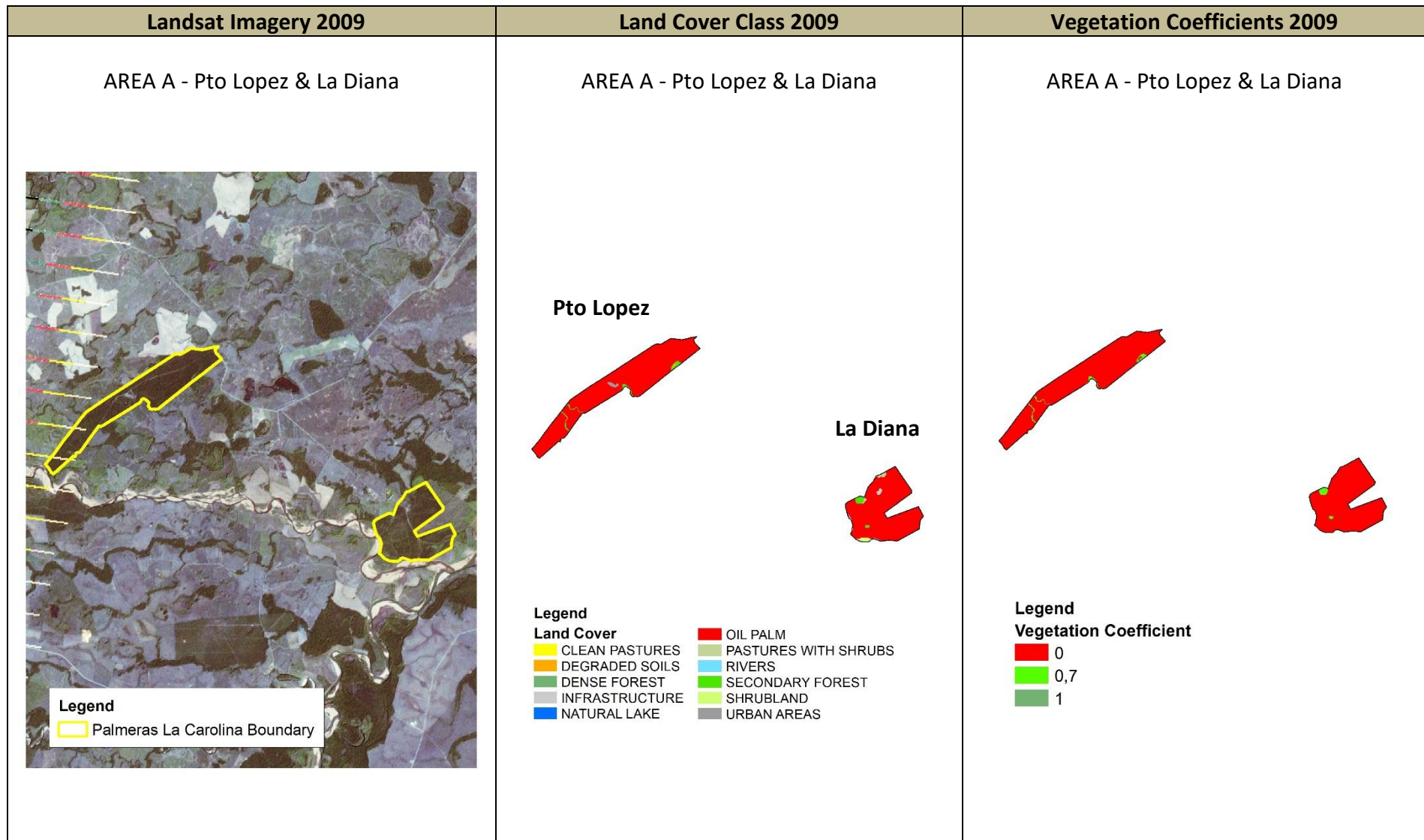


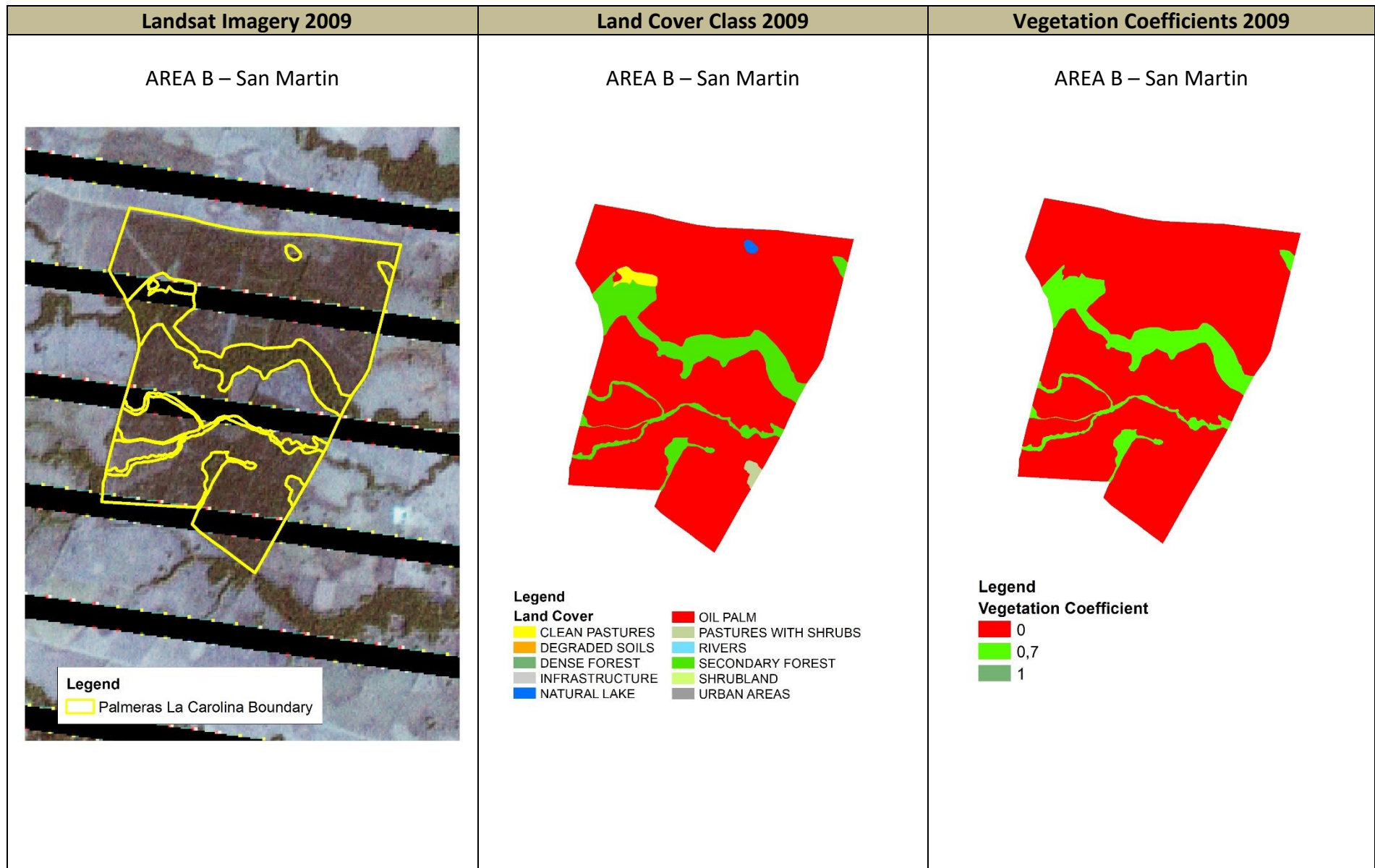


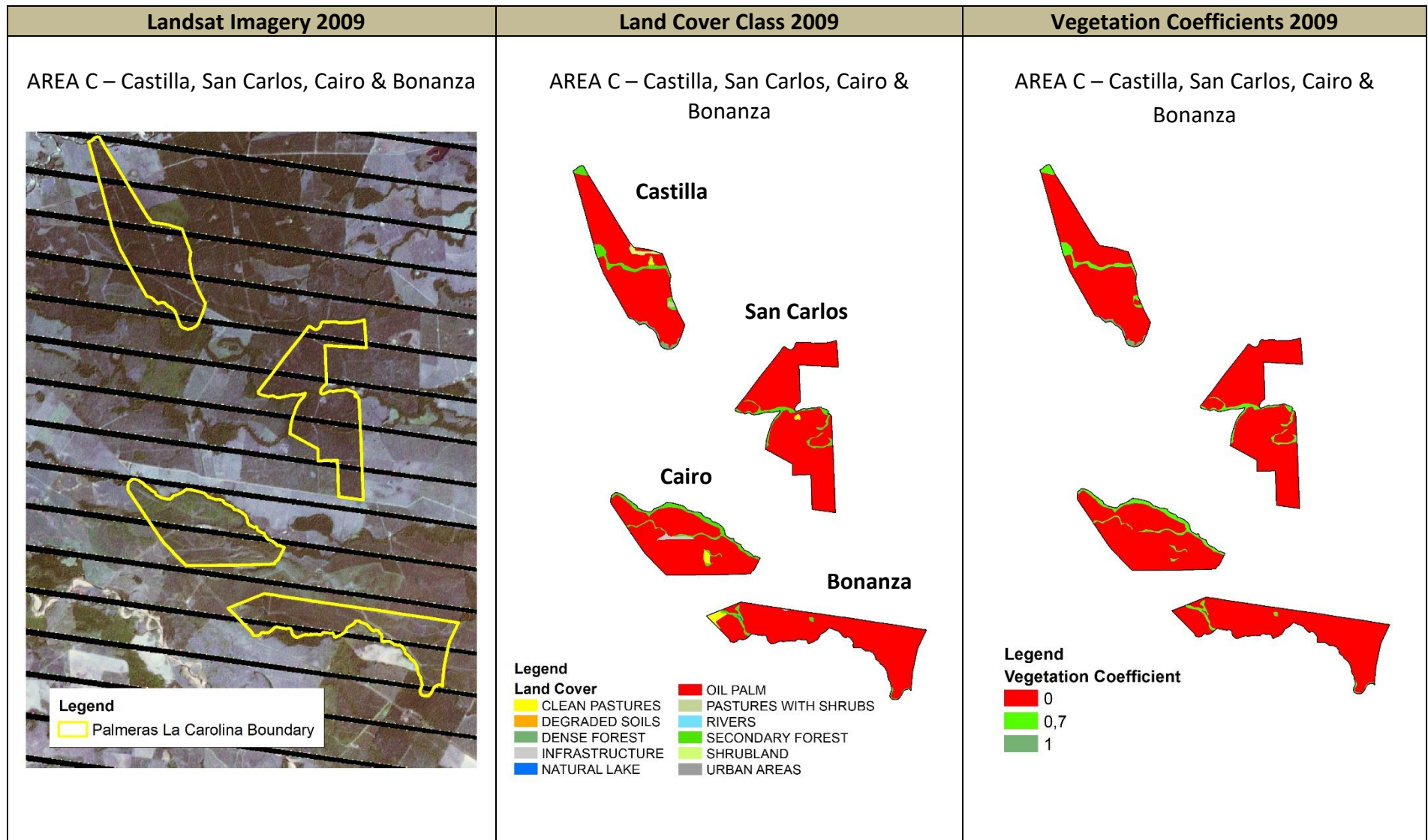


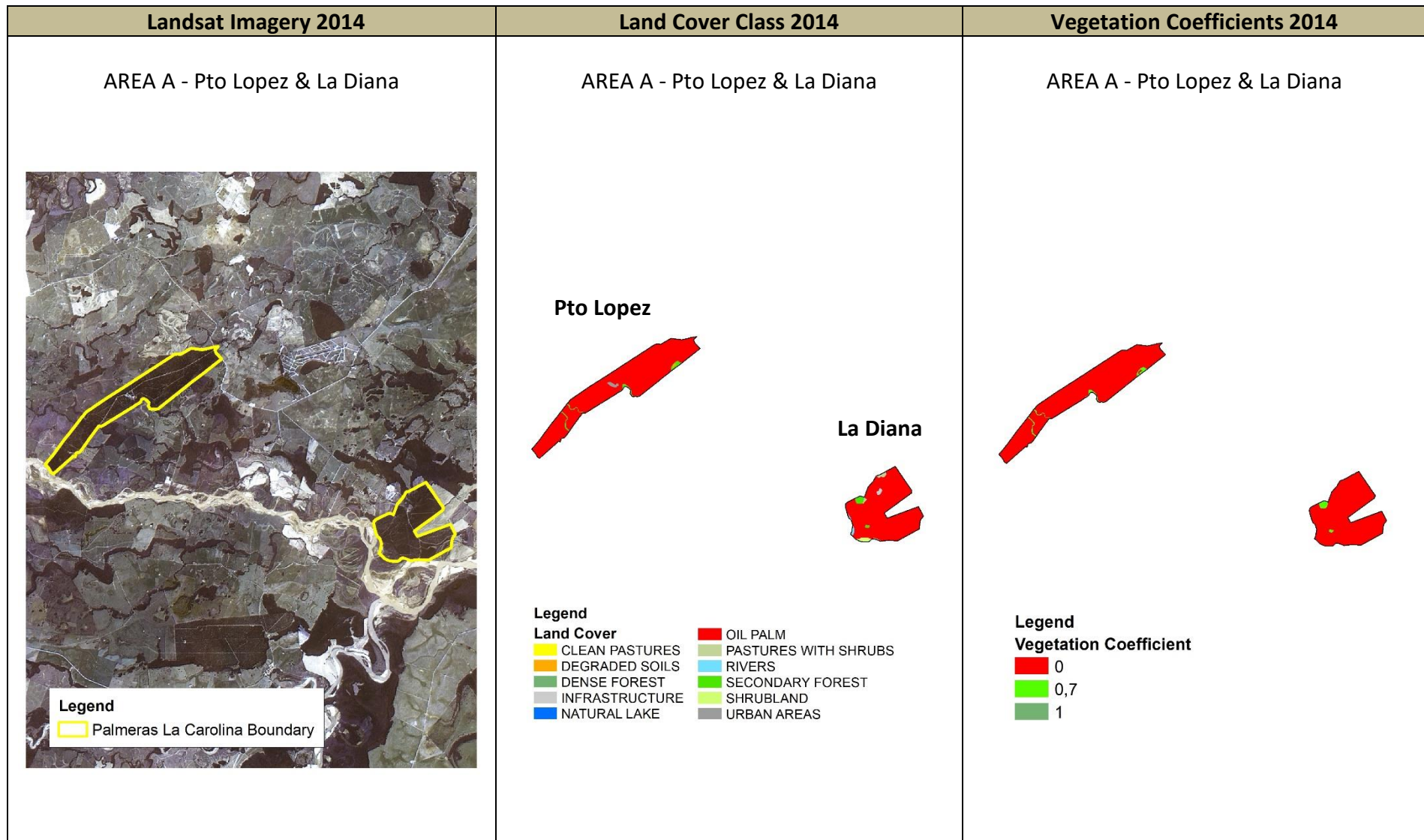


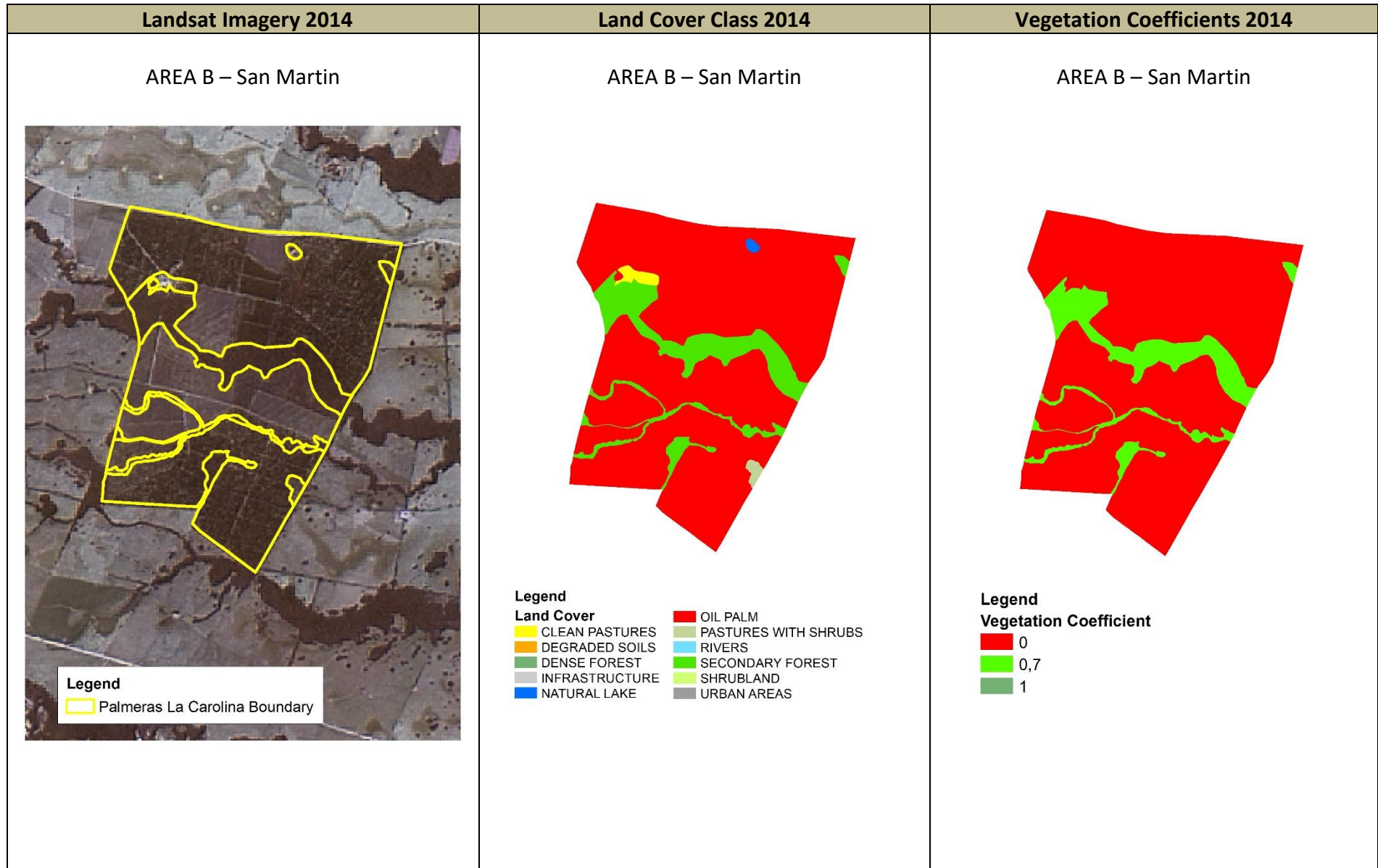


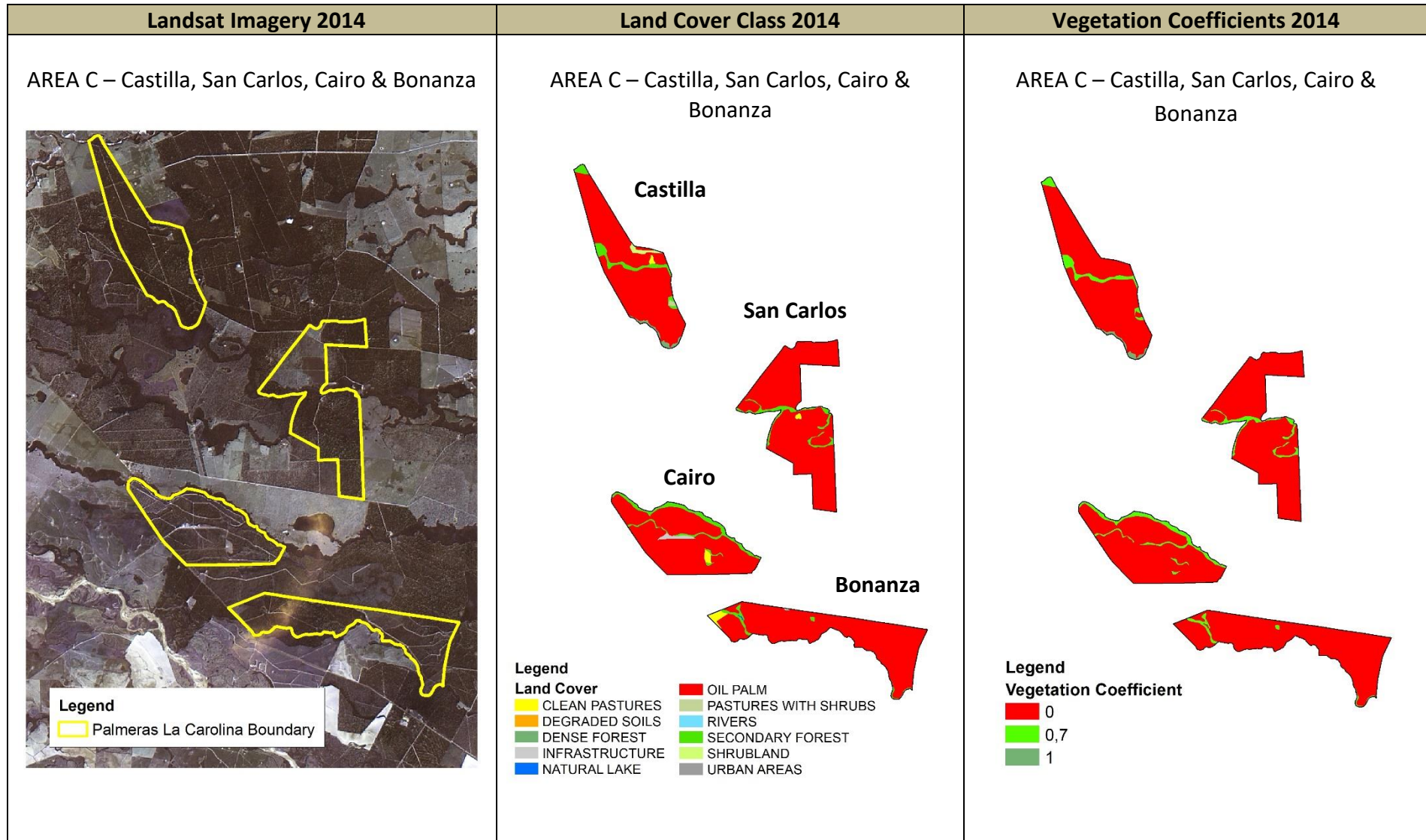


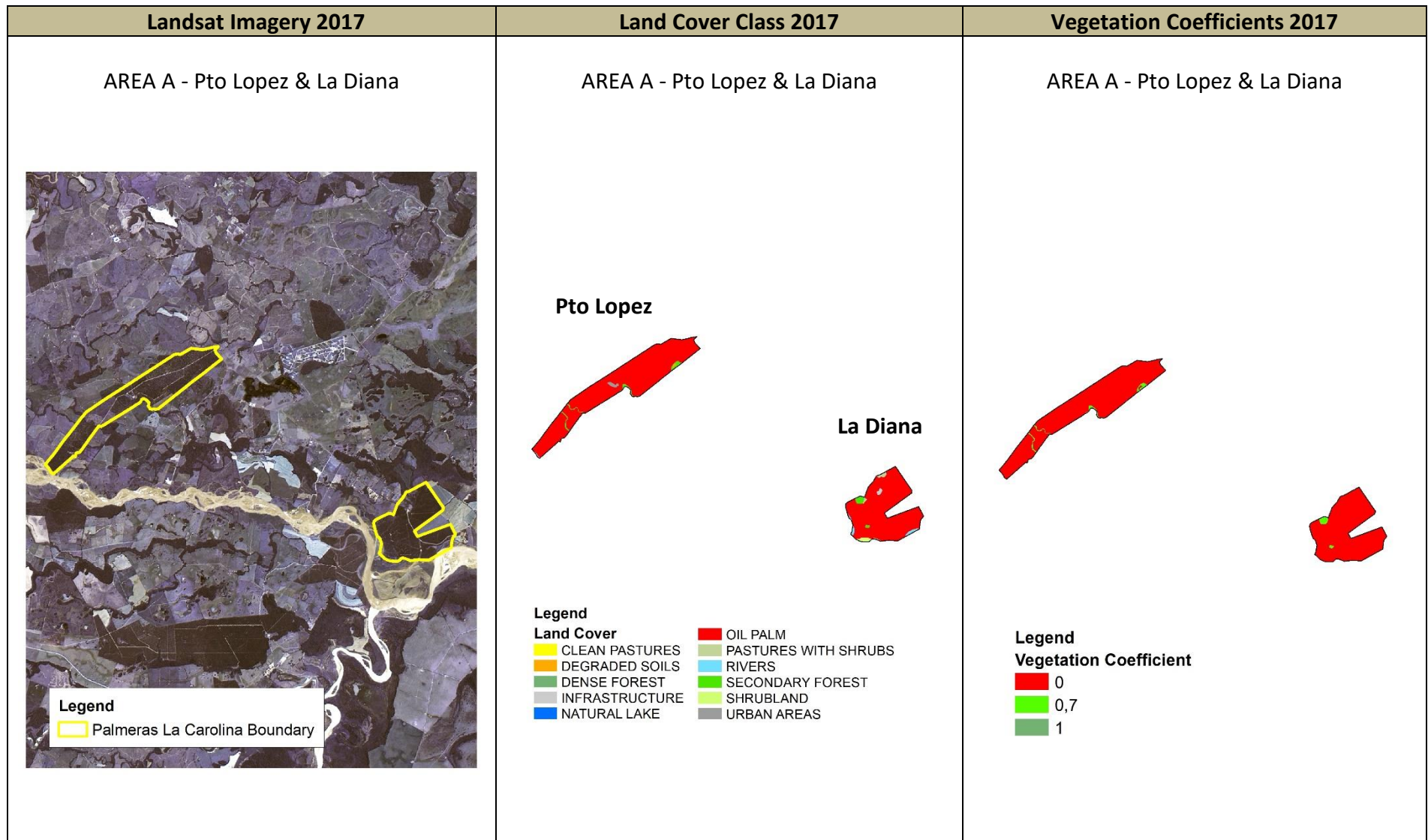


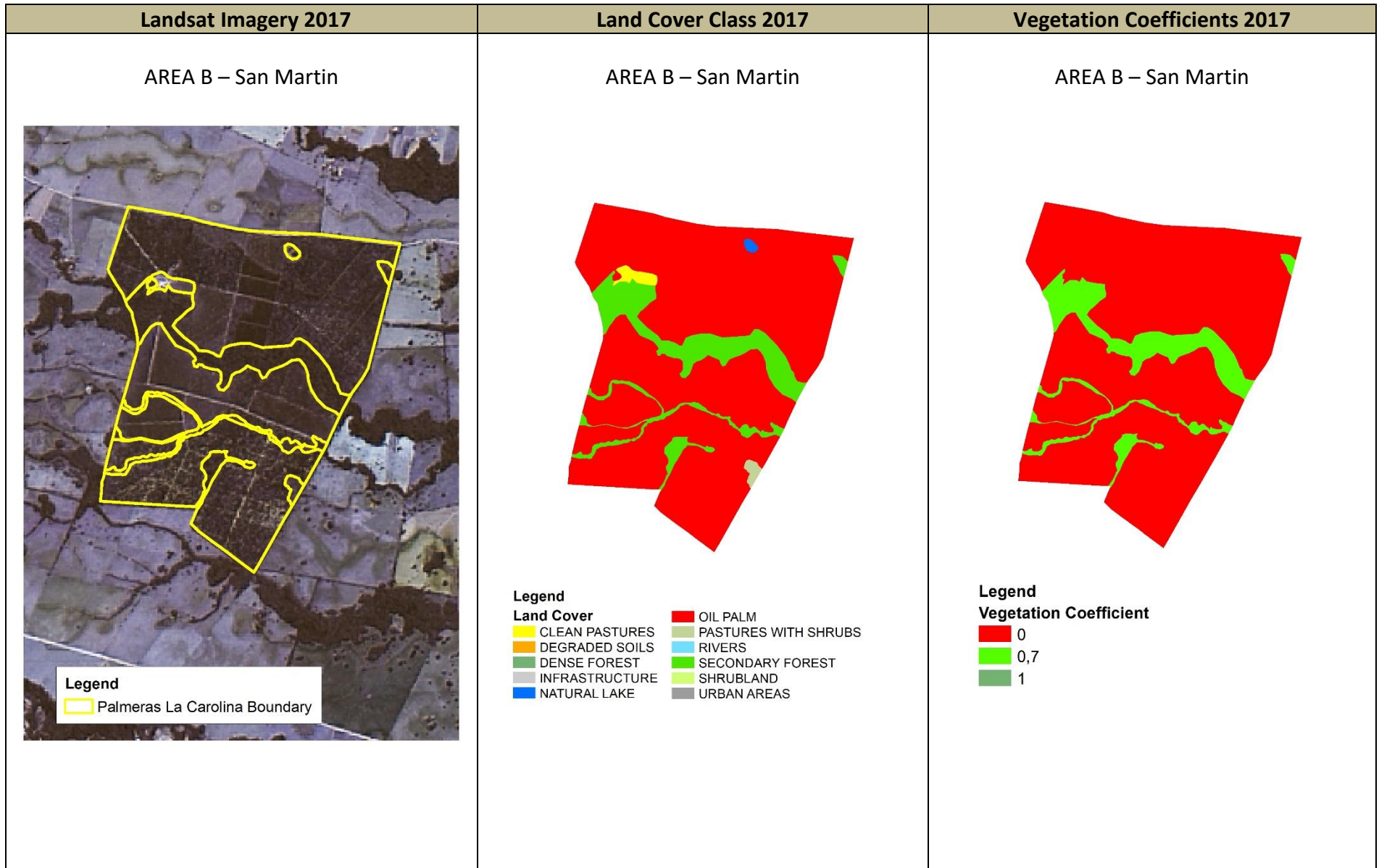


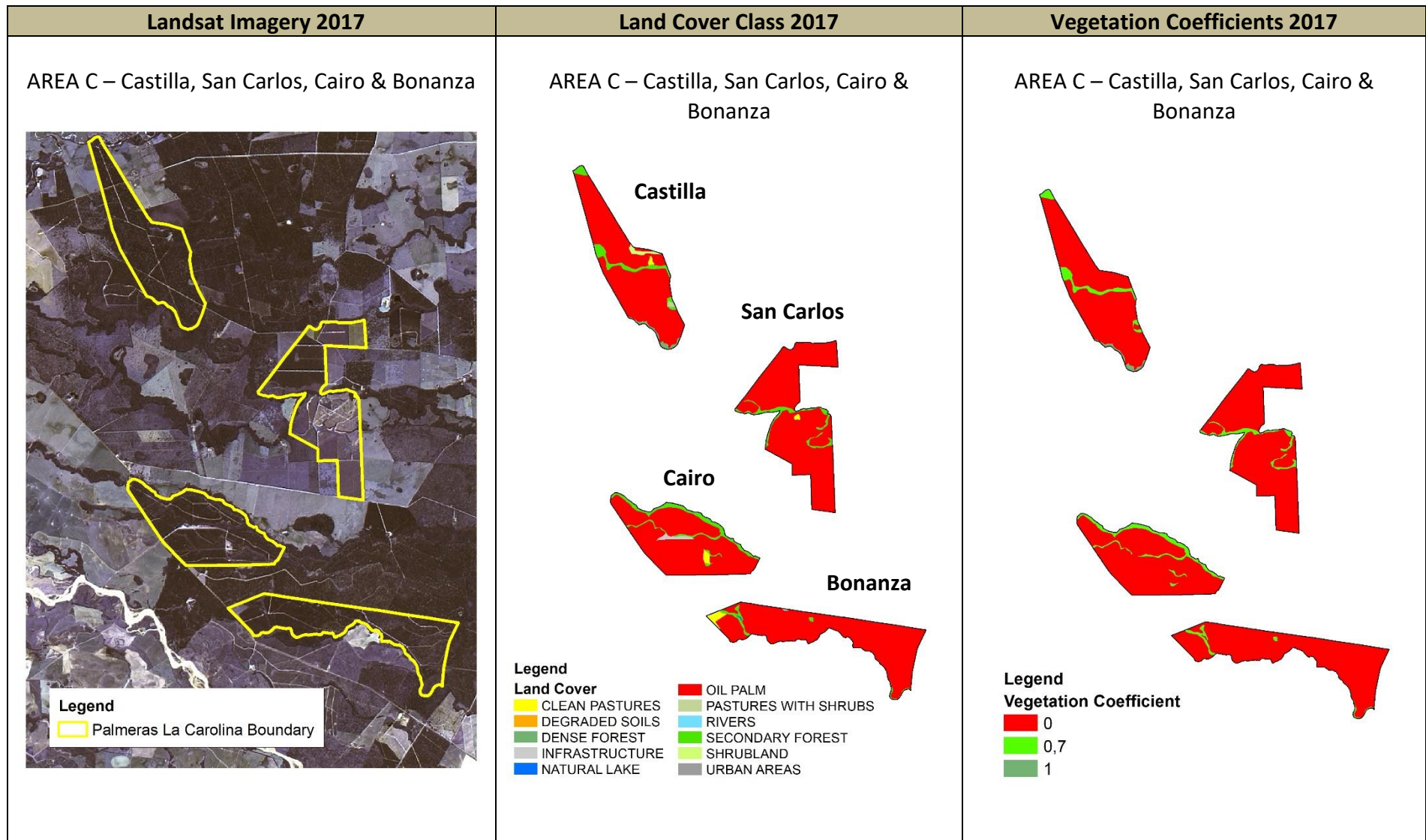












3. Visual interpretation (analysis) results

A summary of main changes in land use for each period is included in Table 3.

Table 3. Visual interpretation results

Year	Land Use Change
2005	<ul style="list-style-type: none"> • Predominantly Oil Palm plantations • Small area of dense forest on the edge of one farm (Castilla) • Areas of Secondary Forest mainly along rivers • Large area of degraded soil on one farm (Bonanza) • One farm (Cairo) predominantly pastures with shrubs
2005-2007	<ul style="list-style-type: none"> • Cairo farm transitioned from predominantly pastures with shrubs to clean pastures
2007-2009	<ul style="list-style-type: none"> • Cairo farm transitioned from predominantly clean pastures to Oil Palm • Large area of degraded soil on Bonanza farm transitioned to Oil Palm
2009-2014	<ul style="list-style-type: none"> • Very small area of Oil Palm along farm edges transitioned back to river
2014-2017	<ul style="list-style-type: none"> • Very small area of Oil Palm along farm edges transitioned back to river
Quality of Satellite imagery	The imagery provided is of acceptable quality with relative low cloud cover.
Irregularities found in the data	-
Findings	-

4. Vegetation Coefficients

According to the RSPO remediation and compensation procedures document, the land cover classes should be reclassified into 4 vegetation coefficients, which are:

1. Coefficient 1.0 : Structurally complex forest with uneven or multi layered canopy.
2. Coefficient 0.7 : Structurally simplified or degraded forest with even or single-layered canopy.
3. Coefficient 0.4 : Multi-species agroforestry
4. Coefficient 0 : Highly modified and/or degraded areas retaining little or no natural, structurally intact vegetation.

5. Land Use Change Calculation

Table 4 is a comparison of land cover areas (Ha) per year using shapefiles provided by the company. No differences between the company estimations and the reviewer were observed.

Land Cover	Veg. Coeff.	2005			2007			2009			2014			2017		
		Reviewer	Company	Diff.	Reviewer	Company	Diff.	Reviewer	Company	Diff.	Reviewer	Company	Diff.	Reviewer	Company	Diff.
Clean pastures	0	8	8	0	364	364	0	20	20	0	20	20	0	20	20	0
Degraded soils	0	89	89	0	89	89	0	1	1	0	1	1	0	1	1	0
Dense forest	1	10	10	0	10	10	0	10	10	0	10	10	0	10	10	0
Infrastructure	0	3	3	0	3	3	0	10	10	0	10	10	0	10	10	0
Natural lake	0	2	2	0	2	2	0	2	2	0	2	2	0	2	2	0
Oil palm	0	2384	2384	0	2383	2383	0	2816	2816	0	2814	2814	0	2809	2809	0
Pastures with shrubs	0	375	375	0	19	19	0	11	11	0	11	11	0	11	11	0
Rivers	0	0	0	0	1	1	0	1	1	0	3	3	0	8	8	0
Secondary forest	0.7	201	201	0	201	201	0	201	201	0	201	201	0	201	201	0
Shrubland	0	14	14	0	14	14	0	14	14	0	14	14	0	14	14	0
Urban areas	0	3	3	0	3	3	0	3	3	0	3	3	0	3	3	0
Grand total	-	3090.3	3090.3	0	3090.3	3090.3	0	3090.3	3090.3	0	3090.3	3090.3	0	3090.3	3090.3	0

Table 4 . Land Cover areas (Ha) estimated by the company vs areas estimated by the reviewer

6. Calculation of Final Conservation Liability

A review of areas (Ha) shows no changes from vegetation coefficients 1 and 0.7 to 0 from the baseline (2005) for each one of the liability periods. The final compensation liability calculated by the reviewer is **0 ha** (Table 5). Table 6 is the information provided by the company. Tables 7 to 10 show the area statement for each period as well as the preceding year and vegetation coefficient which according to the information received remains constant for all periods.

	Vegetation coefficients all periods					
VEG. COEF_2005	0	0.7	1	Grand Total	Non Member RSPO Final Liability	Member RSPO Final Liability
0	2879.3			2879.3	0	0
0.7		201.4		201.4	0	0
1			9.6	9.6	0	0
Grand Total	2879.3	201.4	9.6	3090.3	0	0

Table 5. Final Conservation Liability calculated by reviewer

Box 5.1 Determining final conservation liability (hectares)		Control of Land	
		Land controlled by a non-member at time of clearance	Land controlled by an RSPO member at the time of clearance. Including land acquired from other RSPO members
Land clearing after May 9, 2014	Guidance	Social and environmental remediation. Twice the sum of all corporate clearing without prior HCV assessment multiplied by their vegetation coefficient(s) in Nov 2005. $= (2) \times [(Hectares) \times (1.0) + (Hectares) \times (0.7) + (Hectares) \times (0.4) + (Hectares) \times (0)]$	Expulsion from RSPO* if the areas are later acquired by another RSPO member and only if the seller was a member of RSPO before 9 May 2014, liability is as per "non-member".
	Final Liability (Ha)	0	(hectares)
Land cleared between January 1, 2010 and May 9, 2014	Guidance	Social remediation and/or compensation. Environmental remediation. The sum of all areas cleared for corporate purposes without prior HCV assessment multiplied by their vegetation coefficient(s) in Nov 2005. $= (Hectares) \times (1.0) + (Hectares) \times (0.7) + (Hectares) \times (0.4) + (Hectares) \times (0)$	Social remediation and/or compensation. Environmental remediation. Twice the sum of all areas cleared for corporate purposes without prior HCV assessment multiplied by their vegetation coefficient(s) in Nov 2005. $= (2) \times [(Hectares) \times (1.0) + (Hectares) \times (0.7) + (Hectares) \times (0.4) + (Hectares) \times (0)]$
	Final Liability (Ha)	0	(hectares)
Land cleared between December 1, 2007 and December 31, 2009	Guidance	Social remediation and/or compensation. Environmental remediation. Half the sum of all areas cleared for corporate purposes without prior HCV assessment multiplied by their vegetation coefficient(s) in Nov 2005. $= 0.5 \times [(Hectares) \times (1.0) + (Hectares) \times (0.7) + (Hectares) \times (0.4) + (Hectares) \times (0)]$	Social remediation and/or compensation. Environmental remediation. The sum of all areas cleared for corporate purposes without prior HCV assessment multiplied by their vegetation coefficient(s) in Nov 2005. $= (Hectares) \times (1.0) + (Hectares) \times (0.7) + (Hectares) \times (0.4) + (Hectares) \times (0)$
	Final Liability (Ha)	0	(hectares)
Land cleared between November 1, 2005 and November 30, 2007	Guidance	Social remediation and/or compensation. Environmental remediation.	Social remediation and/or compensation. Environmental remediation.
	Final Liability (Ha)	0	(hectares)

Total sum of the final liability calculations from Box 5.1 in hectares. Compensation/remediation for social HCVs calculated separately.	Box 5.2 Final conservation liability (hectares)	0
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Table 6. Final Conservation Liability estimated by the Company

Vegetation coefficient 2005 (Baseline)	Vegetation coefficient 2007			Non Member RSPO Final Liability	Member RSPO Final Liability
	0	0.7	1		
0	2879.3	-	-	0	0
0.7	-	201.4	-	0	0
1	-	-	9.6	0	0
Grand Total	2879.3	201.4	9.6	0	0

Table 7. Final Conservation Liability calculated by reviewer for the period 2005-2007

Vegetation coefficient 2005 (Baseline)	Vegetation coefficient 2007	Vegetation coefficient 2009			Non Member RSPO Final Liability: 0.5X[(Hectares)X(1.0)+(Hectares)X(0.7)+(Hectares)X(0.4)+(Hectares)X(0)]	Member RSPO Final Liability: [Hectares)X(1.0)+(Hectares)X(0.7)+(Hectares)X(0.4)]
		0	0.7	1		
0	0	2879.3	-	-	0	0
0.7	0.7	-	201.4	-	0	0
1	1	-	-	9.6	0	0
Grand Total	-	2879.3	201.4	9.6	0	0

Table 8. Final Conservation Liability calculated by reviewer for the period 2007-2009

Vegetation coefficient 2005 (Baseline)	Vegetation coefficient 2007	Vegetation coefficient 2009	Vegetation coefficient 2014			Non Member RSPO Final Liability: [(Hectares)X(1.0)+(Hectares)X(0.7)+(Hectares)X(0.4)+(Hectares)X(0)]	Member RSPO Final Liability: 2X[Hectares)X(1.0)+(Hectares)X(0.7)+(Hectares)X(0.4)]
			0	0.7	1		
0	0	0	2879.3	-	-	0	0
0.7	0.7	0.7	-	201.4	-	0	0
1	1	1	-	-	9.6	0	0
Grand Total	-	-	2879.3	201.4	9.6	0	0

Table 9 Final Conservation Liability calculated by reviewer for the period 2009-2014

Vegetation Coeff. 2005 (Baseline)	Vegetation coeff. 2007	Vegetation coeff. 2009	Vegetation coeff. 2014	Vegetation coefficient 2017			Non Member RSPO Final Liability: 2x[(Hectares)X(1.0)+(Hectares)X(0.7)+(Hectares)X(0.4)+(Hectares)X(0)]	Member RSPO Final Liability
				0	0.7	1		
0	0	0	0	2879.3	-	-	0	N/A
0.7	0.7	0.7	0.7	-	201.4	-	0	N/A
1	1	1	1	-	-	9.6	0	N/A
Grand Total	-	-	-	2879.3	201.4	9.6	0	-

Table 10. Final Conservation Liability calculated by reviewer for the period 2014-2017

7. Prohibited areas

- Clearing of areas where planting is prohibited was reported by the company in an update of their calculations and in Annex 5. as 12.02 Ha. The calculation in the updated shape file received is correct.
- Drainage areas were identified by the company; therefore not requiring riparian vegetation protection. The information provided (screenshots) was verified by the reviewer using Google Earth imagery effectively showing that they corresponded to artificial drainages. Example of one of the areas requested for clarification -Bonanza Farm, upper picture-, declared by the company as artificial drainage and verified by reviewer as such (lower picture):

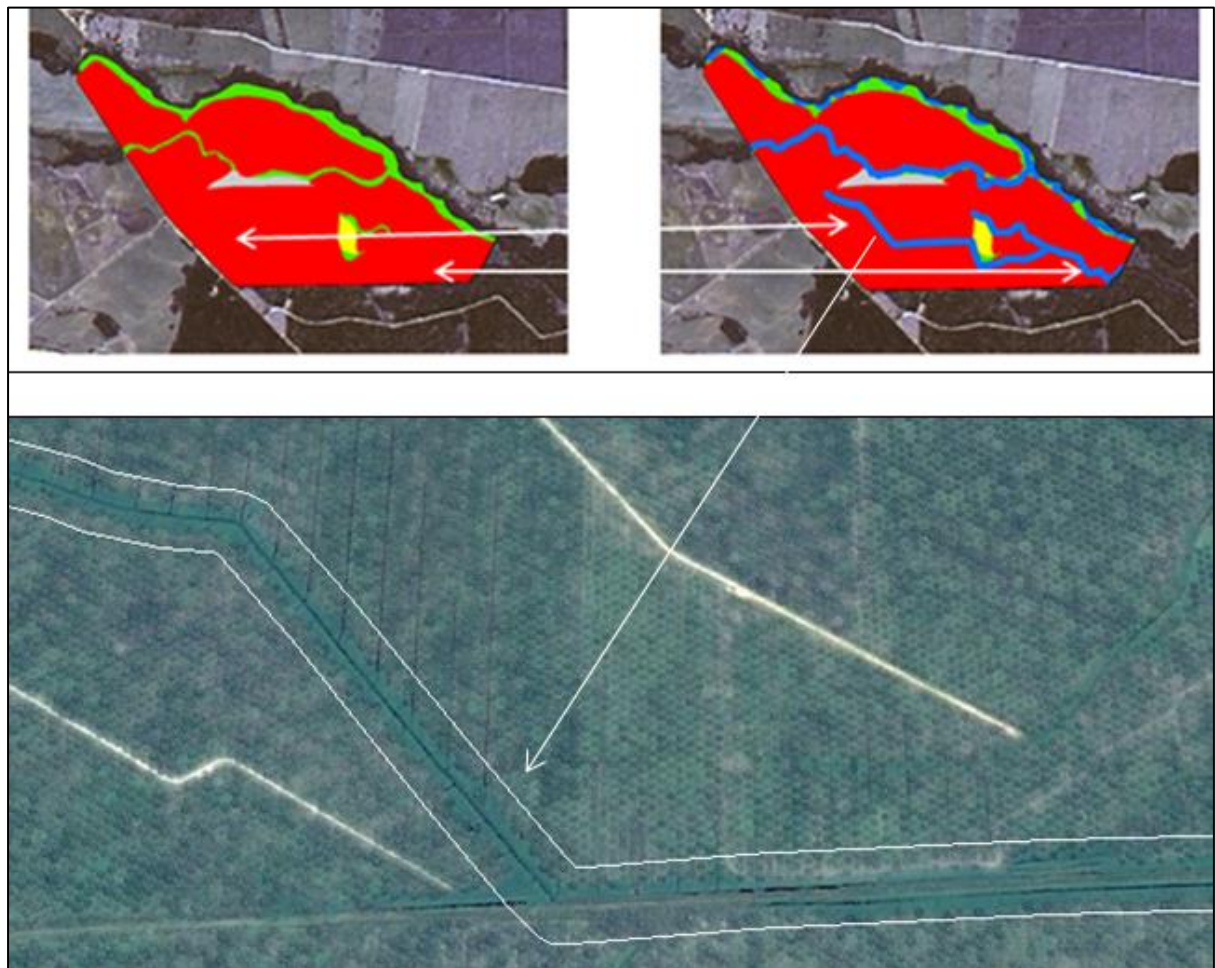


Figure 1 Example of artificial drainage

- Information regarding the source of regulations and/or legislations used to allocate the width of the riparian strips was received by the reviewer:

“According to the national regulation of the Ministry of Environment and Sustainable Development:

ARTICLE 2.2.1.1.18.2. Protection and conservation of forests. In relation to the protection and conservation of the forests, the owners of the farms are obliged to:

1. Maintain protected forest areas within the farms:

b. A strip not less than 30 meters wide, parallel to the lines of maximum tides, on each side of riverbeds and streams, whether permanent or not, and around lakes or water reservoirs.(Decree 1449 of 1977) Art. 3.)". This information was verified by the reviewer and it is accepted.

Slopes: The reviewer is satisfied that no oil palm was planted in slopes > 18% as per the RSPO Manual on Best Management Practices (BMPs) guidelines.

8. Other Findings

Information and/or supporting documentation regarding the actual HCV assessment and its report date was requested. This is a sample of key information received to address this request:

**PALMERAS LA CAROLINA LUCA ASSESSMENT:
CLARIFICATIONS
September 2018**

HCV assessment for the company Palmeras La Carolina S.A. was carried out between May and November 2017. This assessment was carried out as part of the regional project led by the company BIOD. This regional assessment included six more palm oil companies and a total of 35.638 hectares of oil palm plantation evaluated. The date of the HCV final report was November 28, 2017 and the HCV categories identified for the company were HCV 1, HCV 2 and HCV 3.

9. Conclusions and Recommendations

1. The company followed the RSPO guidelines
2. The imagery provided is of acceptable quality
3. The calculation of areas and liability matches those of the reviewer
4. Inconsistencies between Annex 2 disclosure template and 2_Reporting template have been resolved
5. The boundary shape file inconsistency has been resolved
6. Land use erroneously classified has been resolved
7. Information regarding metadata of satellite imagery was requested in the previous review. This information has been received and verified by the reviewer as correct
8. Information and references relating to the regulations and/or legislations used to determine the width of the buffer zones was requested in the preliminary report. This information has been received
9. Information regarding the HCV and its date of completion was requested in a previous review. The company has indicated that the HCV was completed in November 2017 and a summary of the assessment was provided
10. The Company has achieved Pass status

10. Appendices

Table 11. LUCA Reporting Checklist

No	Items	Additional information	Status	File name	Reviewer's comments 1/3/2018	Reviewer's comments 15/06/2018	Reviewer's comments 07/09/2018
1	Disclosure template	<ul style="list-style-type: none"> Due by the end of July 2014 	Submitted	Annex 2 Disclosure of non-compliant land clearing-English (Disclosure)	Submitted (432 ha disclosed)		
2	LUC template	<ul style="list-style-type: none"> Due by the end of Sept 2014 		2_Reporting Template for Land Use Cover Change - English-	Submitted (0 ha disclosed)		
2a	Georeferenced shapefiles indicating the boundaries of management units, e.g. business permit boundary	<ul style="list-style-type: none"> .shp format For example: HGU (Indonesia), Due by the end of Sept 2014 		2a_Boundaries_Palmeras_La_Carolina	Submitted, but one plantation (San Martin farm) boundary is missing. Shapefile only includes 6 plantations		

					, instead of 7 as specified		
2b	Pre-processed Georeferenced satellite imagery for entire permitted area with suitable resolution (between 1-30 meter). Supply the information annually or by time frame.	<ul style="list-style-type: none"> Option one (time frame): Close to Nov 2005 November 2007, 31 Dec 2009, present, or until liabilities end. Option two (annually): Close to Nov 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, or until the liabilities end. .tiff/.geotiff format Due by the 		2b_Landsat_images 2005_11_25 2006_06_13 2008_01_18 2010_01_23 2014_03_31 2017_08_14	Received. Additional information is requested.	Additional information is requested.	Metadata files were received

		end of Sept 2014					
2c	<p>Both raw and processed land cover maps divided into the according vegetation coefficients (1.0, 0.7, 0.4, 0 – Please refer to the compensation procedure document). Supply the information annually or by time frame.</p> <p>Raw land cover maps: land cover maps in shapefile format prior division into the according vegetation</p>	<ul style="list-style-type: none"> Option one (time frame): Close to Nov 2005, November 2007, 31 Dec 2009, present, or until liabilities end. Option two (annually): Close to Nov 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, or until the liabilities end. .shp format Due by the end of Sept 2014 		<p>2c_Land_Cover_RSPO_Coeff</p> <p>Land_Cover_2005</p> <p>Land_Cover_2007</p> <p>Land_Cover_2009</p> <p>Land_Cover_2014</p> <p>Land_Cover_2017</p>	Received		

	<p>coefficients.</p> <p>Processed land cover maps in shapefile format after division into the according vegetation coefficients.</p>						
2d	<p>Description of LUC data, other data used in determining land cover and methodology of the LUC analysis.</p> <p>- A document containing information describing the data that has been submitted.</p>	<ul style="list-style-type: none"> • .doc/.pdf format • Due by the end of Sept 2014 		2d_Documento_LUC_PALMERAS_LA_CAROLI NA-Inglés V1_18_10_2017	Submitted but Table 5 shows Oil Palm with a coefficient of 1. Found to be just a mistake in this document, as Oil Palm is tagged with the correct coefficient of 0 in the		

	<p>For example: satellite data: satellite data source, satellite name, resolution, acquisition date, percentage of could cover, processing level . For example: shapefile data: land cover type, coefficient number, area in hectares, date of survey (if any), entity who conducted the survey, estate name, company name)</p> <p>- A document</p>				<p>landuse shapefiles.</p>		
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	<p>describing the methodology how the land cover data was derived and how it was classified into vegetation coefficients resulting as the total conservation liability area.</p> <p>- A document explaining how the Total Conservation Liability was calculated</p>						
2e	Map indicating areas of clearance in prohibited areas	<ul style="list-style-type: none"> • .shp format • Due by the end of Sept 2014 		2e_Riparian_Areas	Submitted. See section 8 for comment on Riparian areas.	Additional information is requested.	Shapefiles for riparian areas were received

					Additional information is requested		
2f	Additional contextualizing information used in LUCC analysis such as field verification results, historic EIA, HCV assessments , community reports related to land use, etc	<ul style="list-style-type: none"> • .doc/.pdf • Due by the end of Sept 2014 			Not submitted	Not submitted	Requested and received
2g	Company development plan per year for each management unit	<ul style="list-style-type: none"> • .doc/.pdf 			Not received	Not received	Requested or equivalent information to be provided