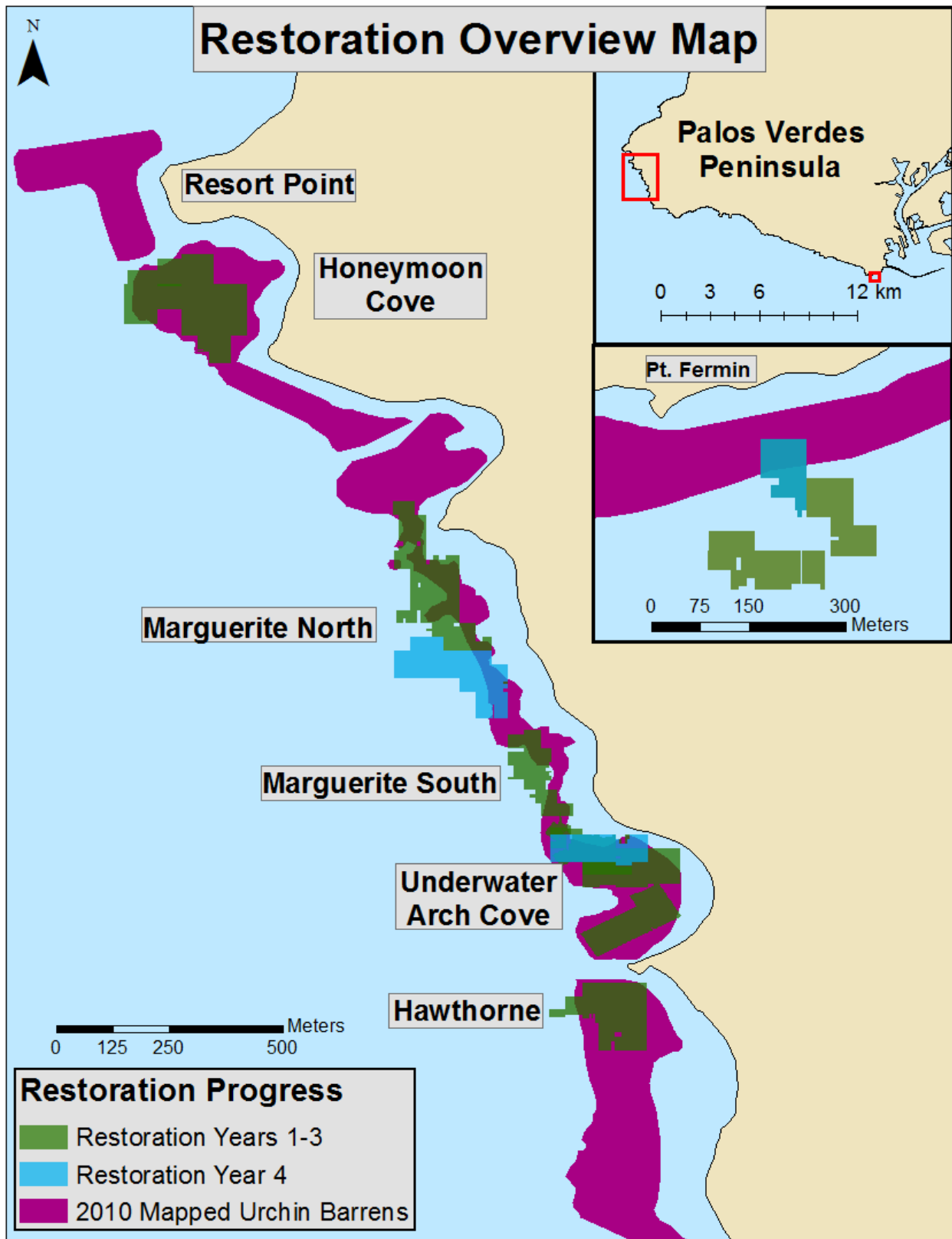
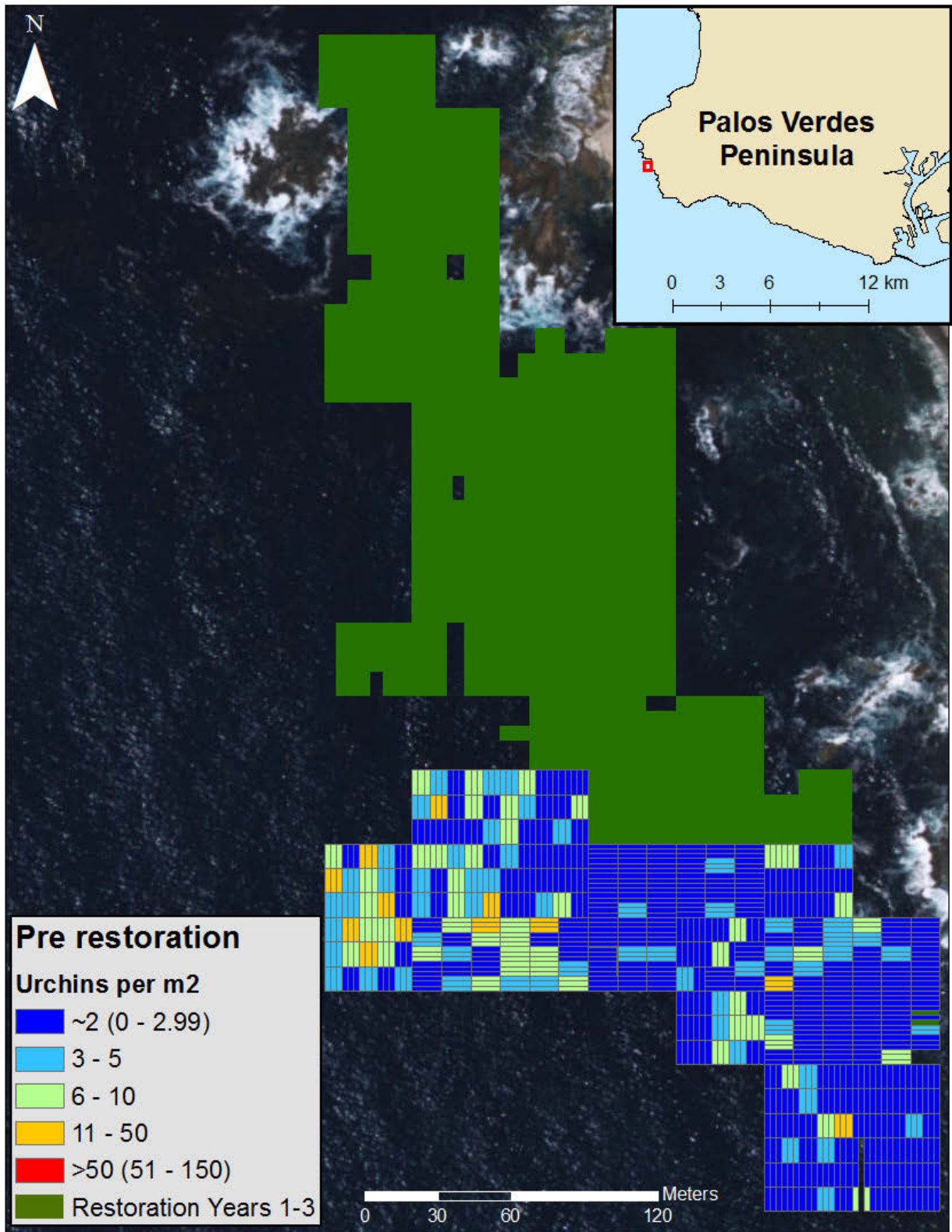


Appendix A: Palos Verdes Kelp restoration Project Map Images

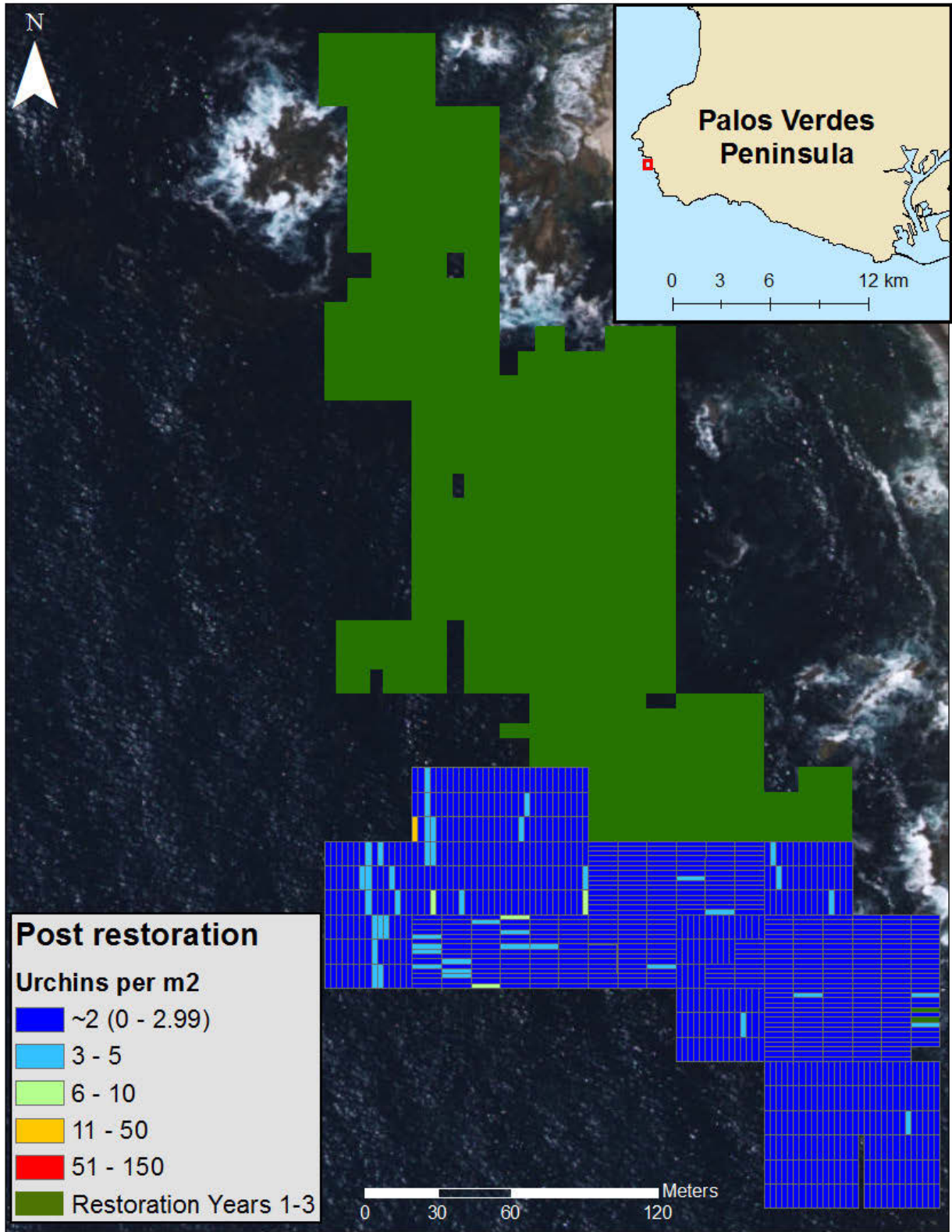


Map A1. Overview of the project area along the Palos Verdes Peninsula showing the urchin barren extent (purple) mapped in 2010. The locations of restoration areas completed in years 1 through 3 are in green, areas restored in year 4 are blue.

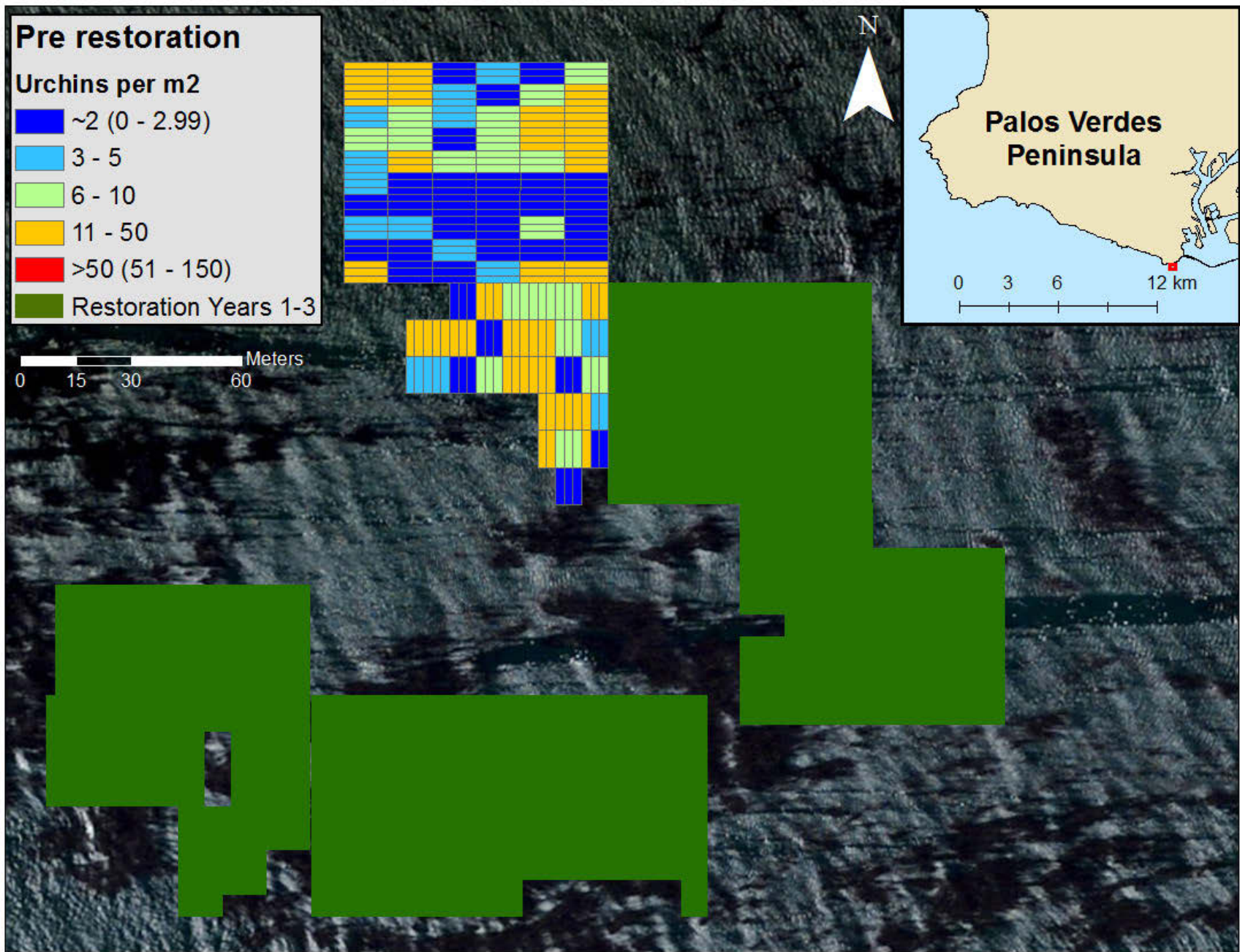
Pre and Post Restoration Urchin Density Maps –July 1, 2013 through June 30, 2017



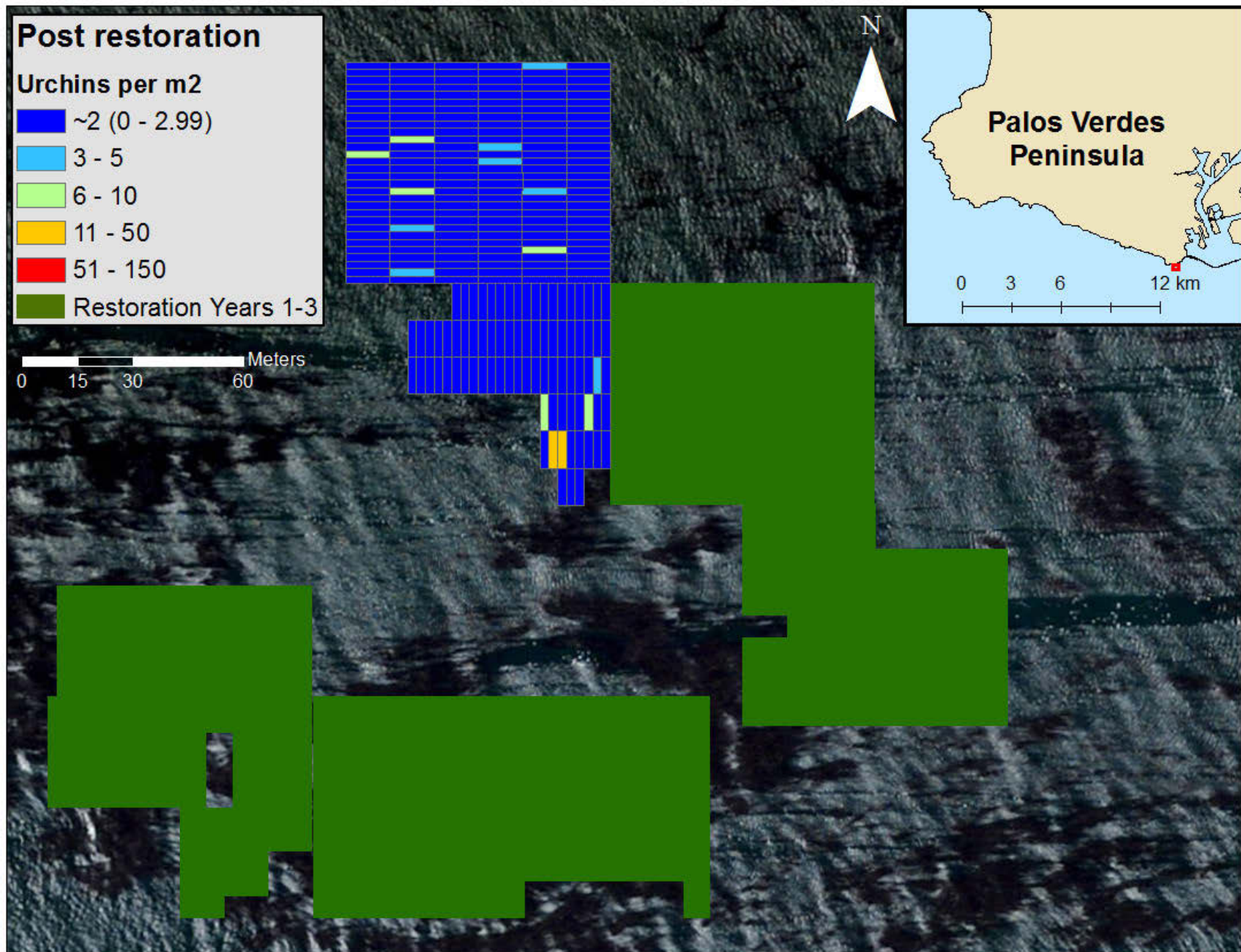
Map A2. Density of *S. purpuratus* (individuals per square meter) pre-restoration in Marguerite (north), Palos Verdes, California.



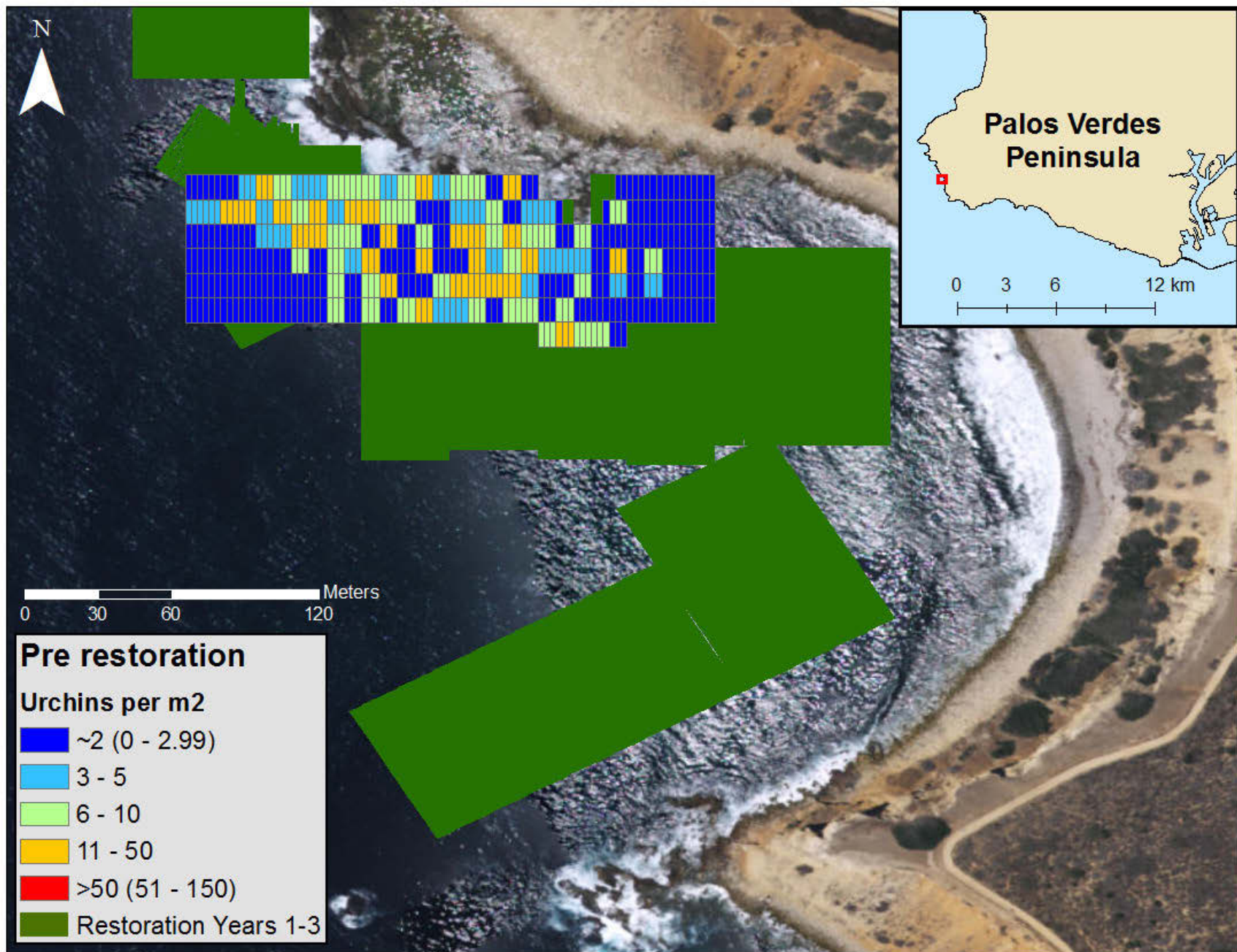
Map A3. Density of *S. purpuratus* (individuals per square meter) post-restoration in Marguerite (north), Palos Verdes, California.



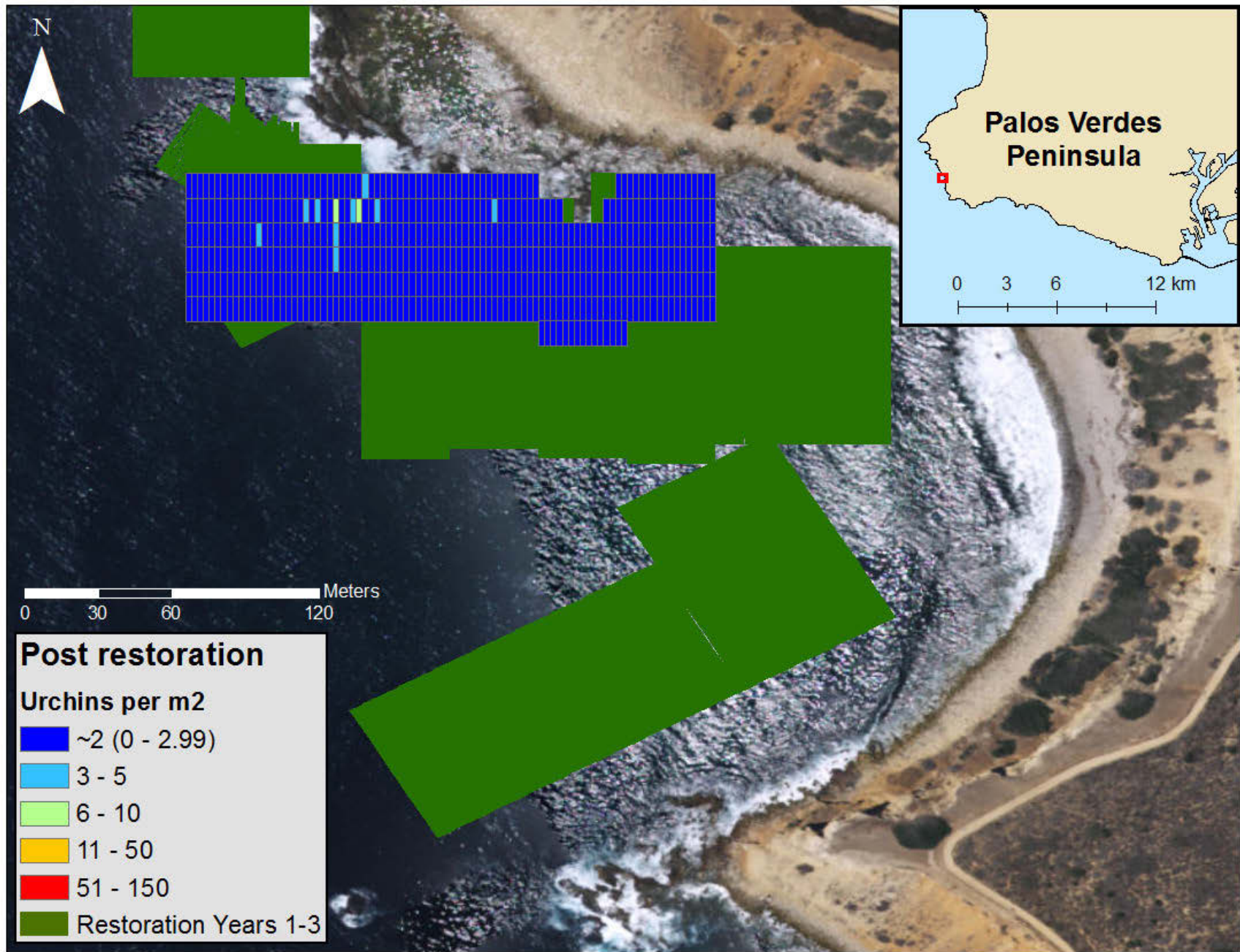
Map A4. Density of *S. purpuratus* (individuals per square meter) pre-restoration in Point Fermin, Palos Verdes, California.



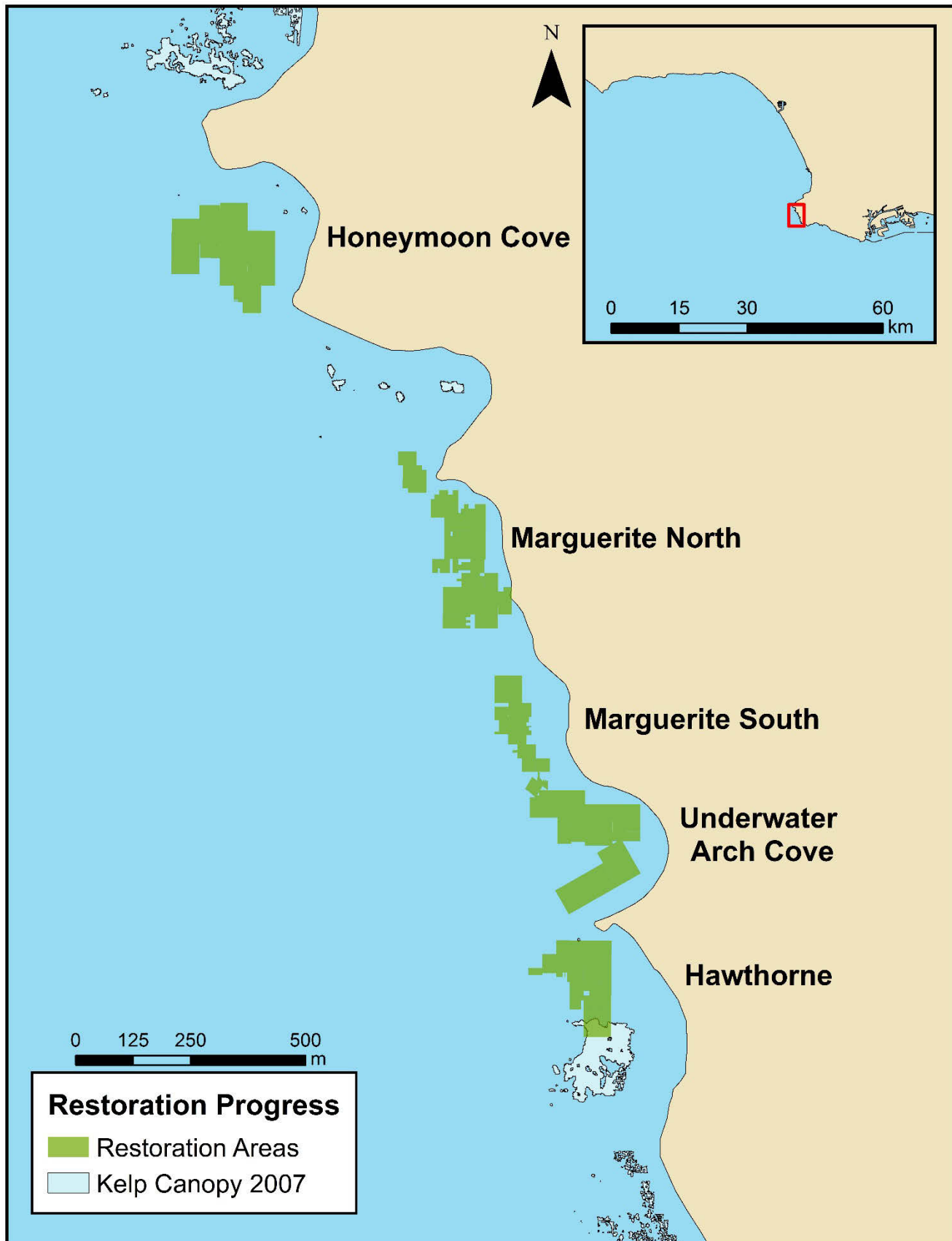
Map A5. Density of *S. purpuratus* (individuals per square meter) pre-restoration in Point Fermin, Palos Verdes, California.



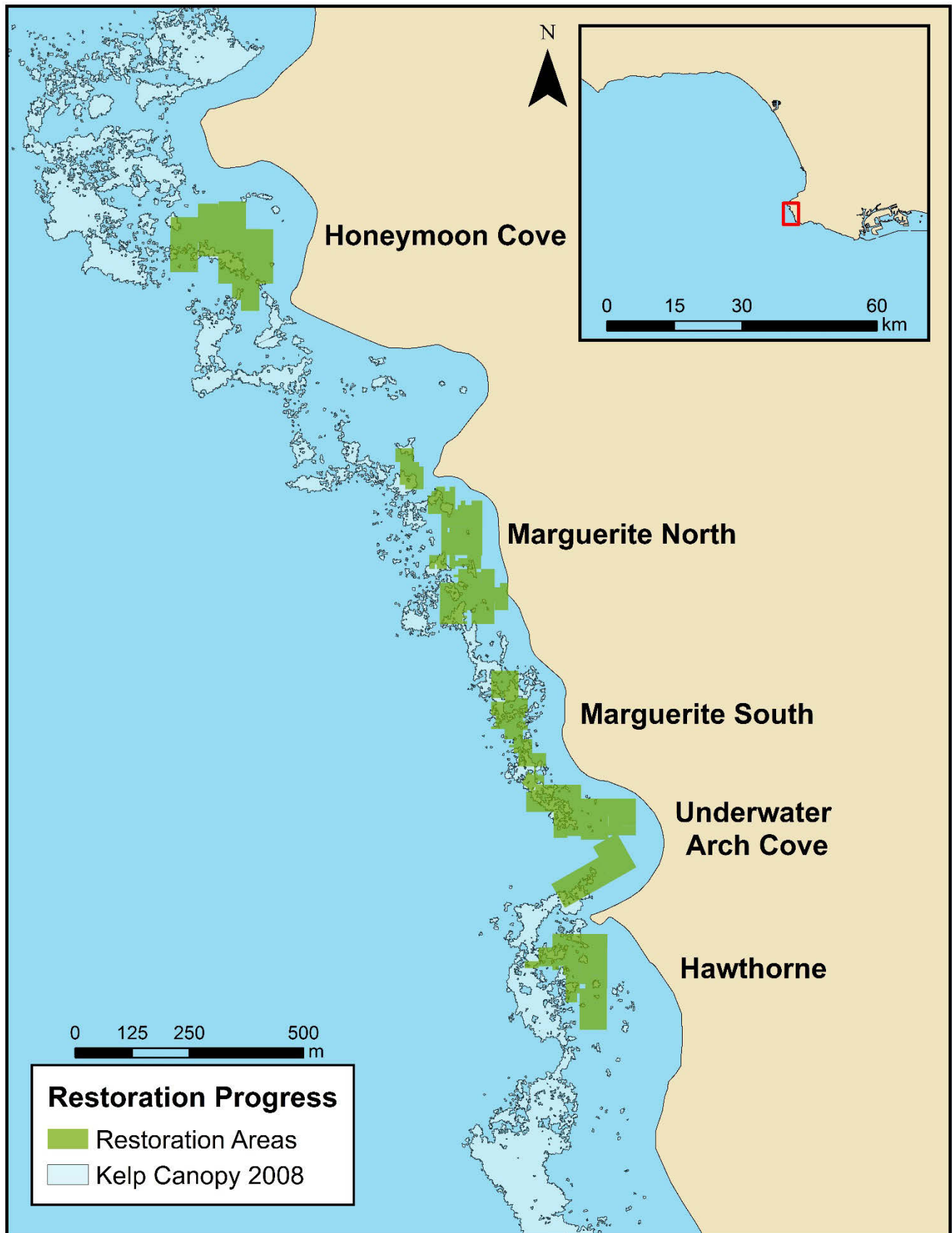
Map A6. Density of *S. purpuratus* (individuals per square meter) in Underwater Arch, Palos Verdes, California. Excess urchins were observed in 2.64 acres of the site area previously restored in 2013.



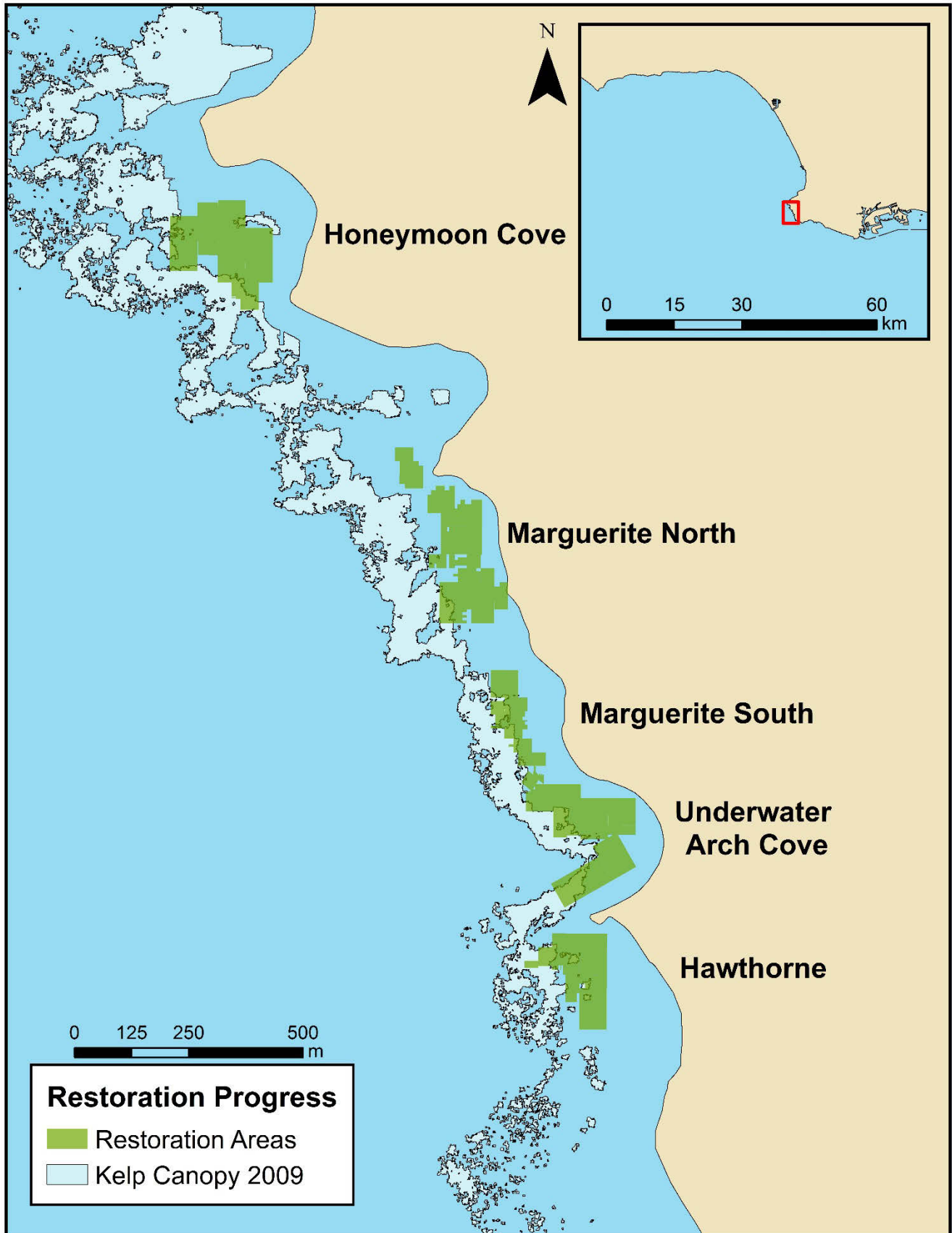
Map A7. Density of *S. purpuratus* (individuals per square meter) in Underwater Arch, Palos Verdes, California. Excess urchins were observed in 2.64 acres of the site area previously restored in 2013. Restoration teams culled urchins to target densities in winter and spring of 2017.



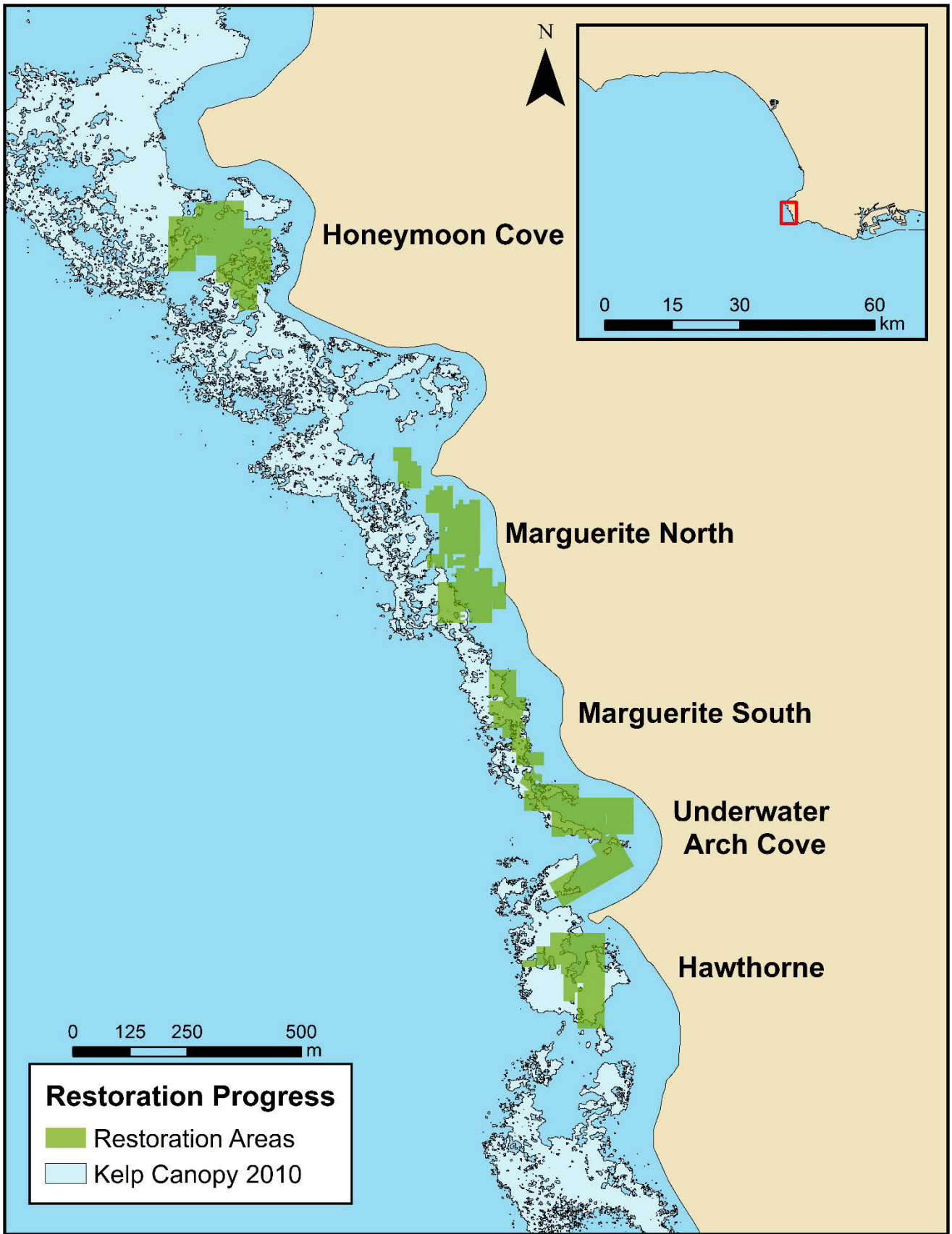
Map A8. Aerial kelp canopy coverage (*Macrocystis pyrifera*) from 2007. Data provided by MBC Applied Environmental. Canopy coverage is represented in light blue while restoration areas are in green.



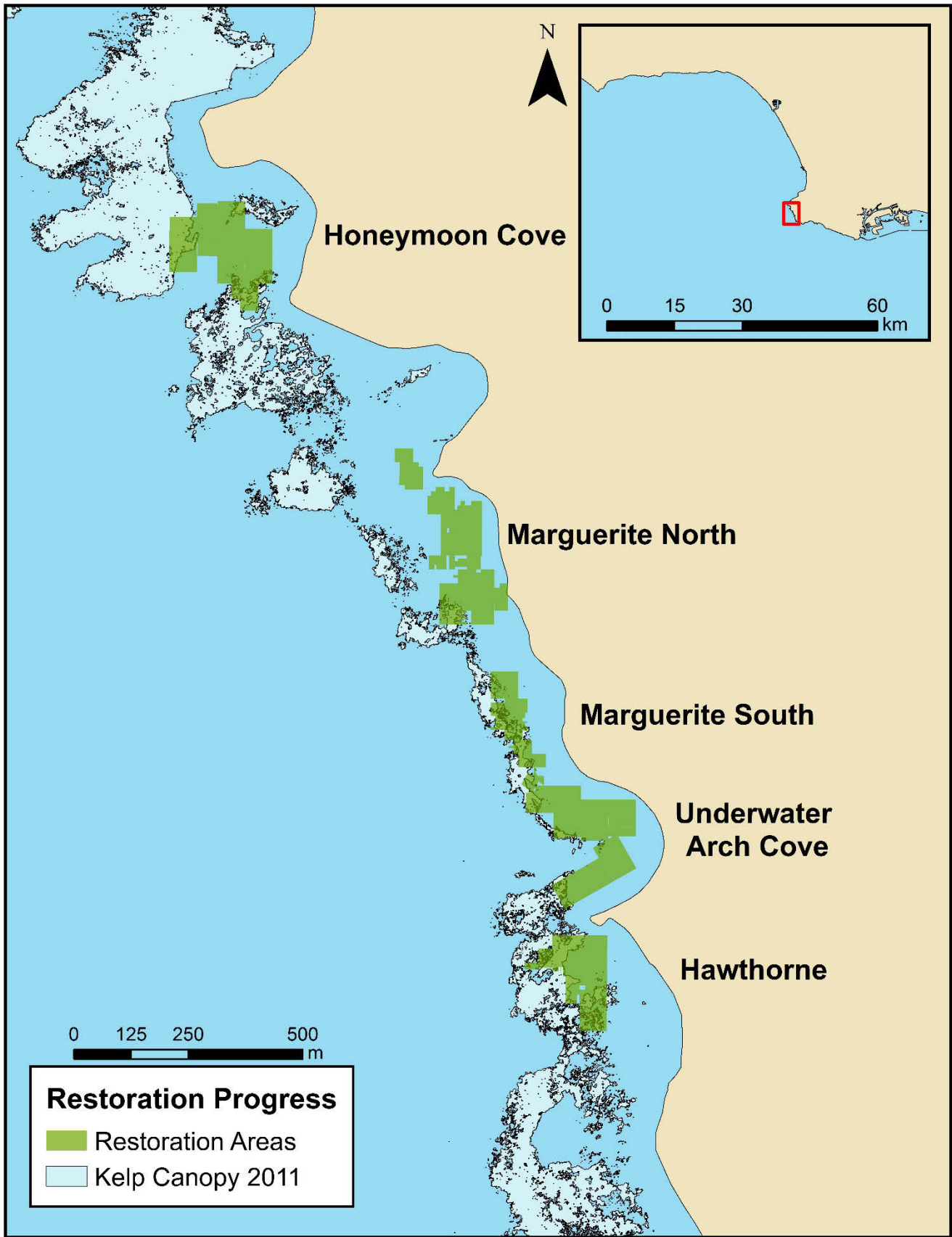
Map A9. Aerial kelp canopy coverage (*Macrocystis pyrifera*) from 2008. Data provided by MBC Applied Environmental. Canopy coverage is represented in light blue while restoration areas are in green.



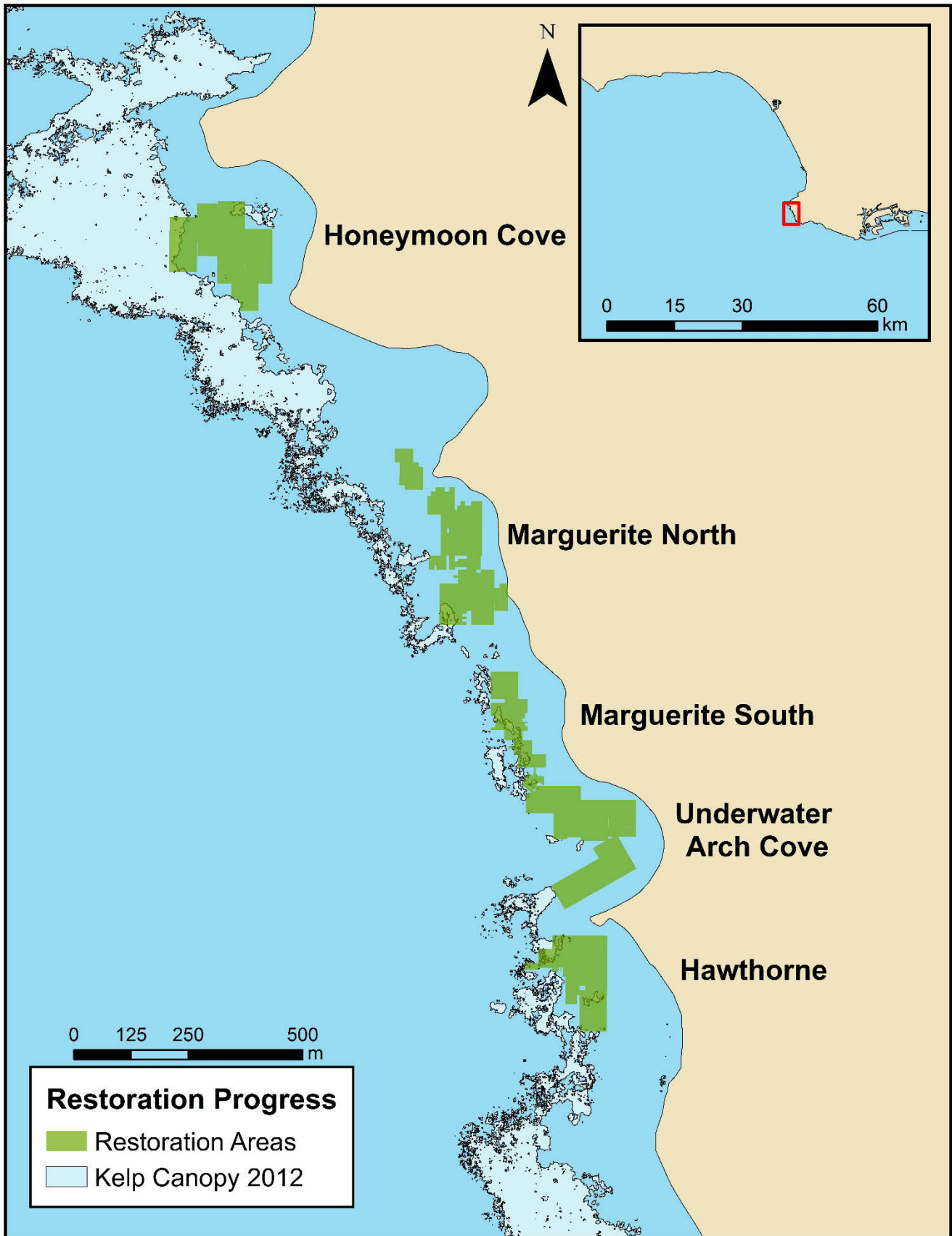
Map A10. Aerial kelp canopy coverage (*Macrocystis pyrifera*) from 2008. Data provided by MBC Applied Environmental. Canopy coverage is represented in light blue while restoration areas are in green.



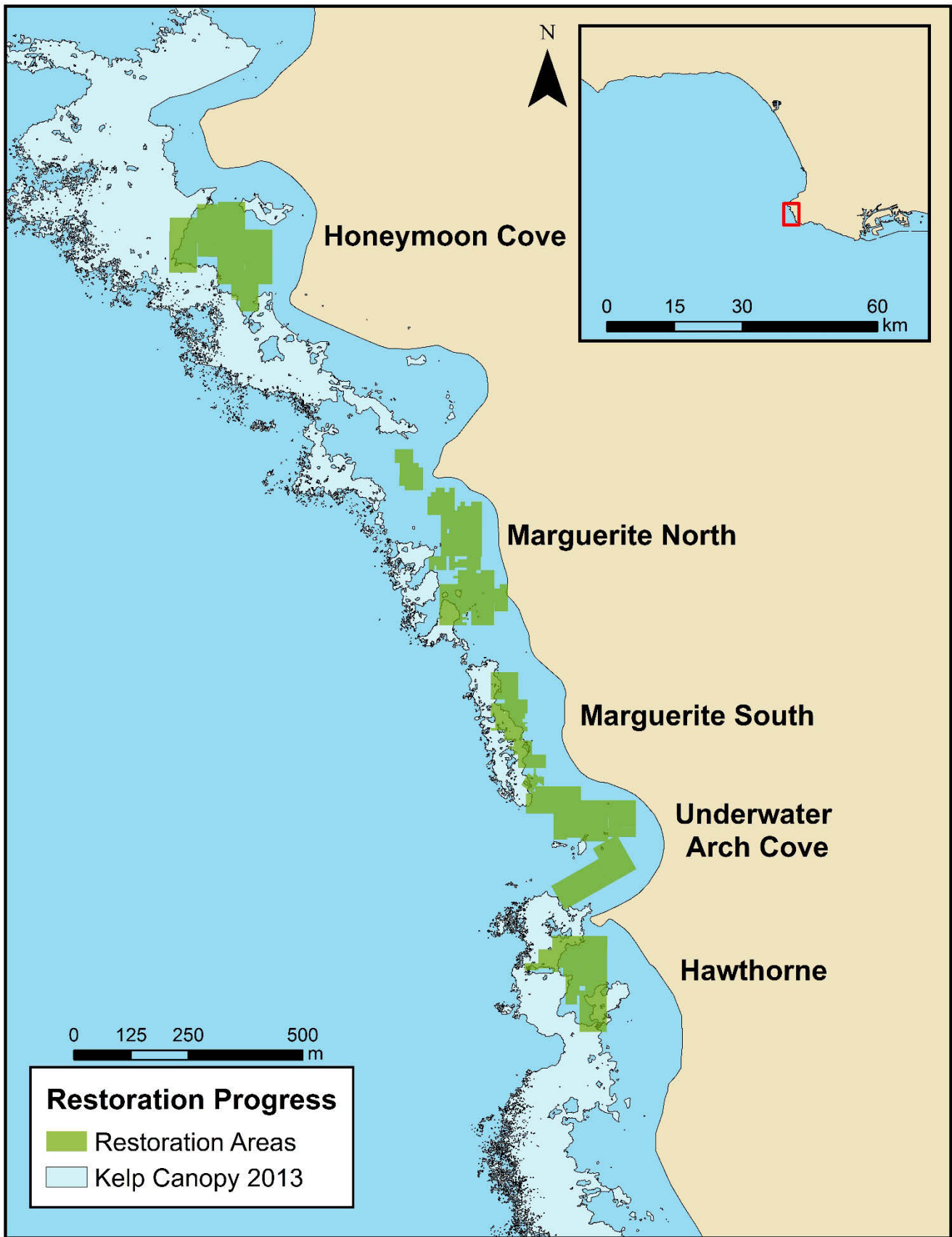
Map A11. Aerial kelp canopy coverage (*Macrocystis pyrifera*) from 2010. Data provided by MBC Applied Environmental. Canopy coverage is represented in light blue while restoration areas are in green.



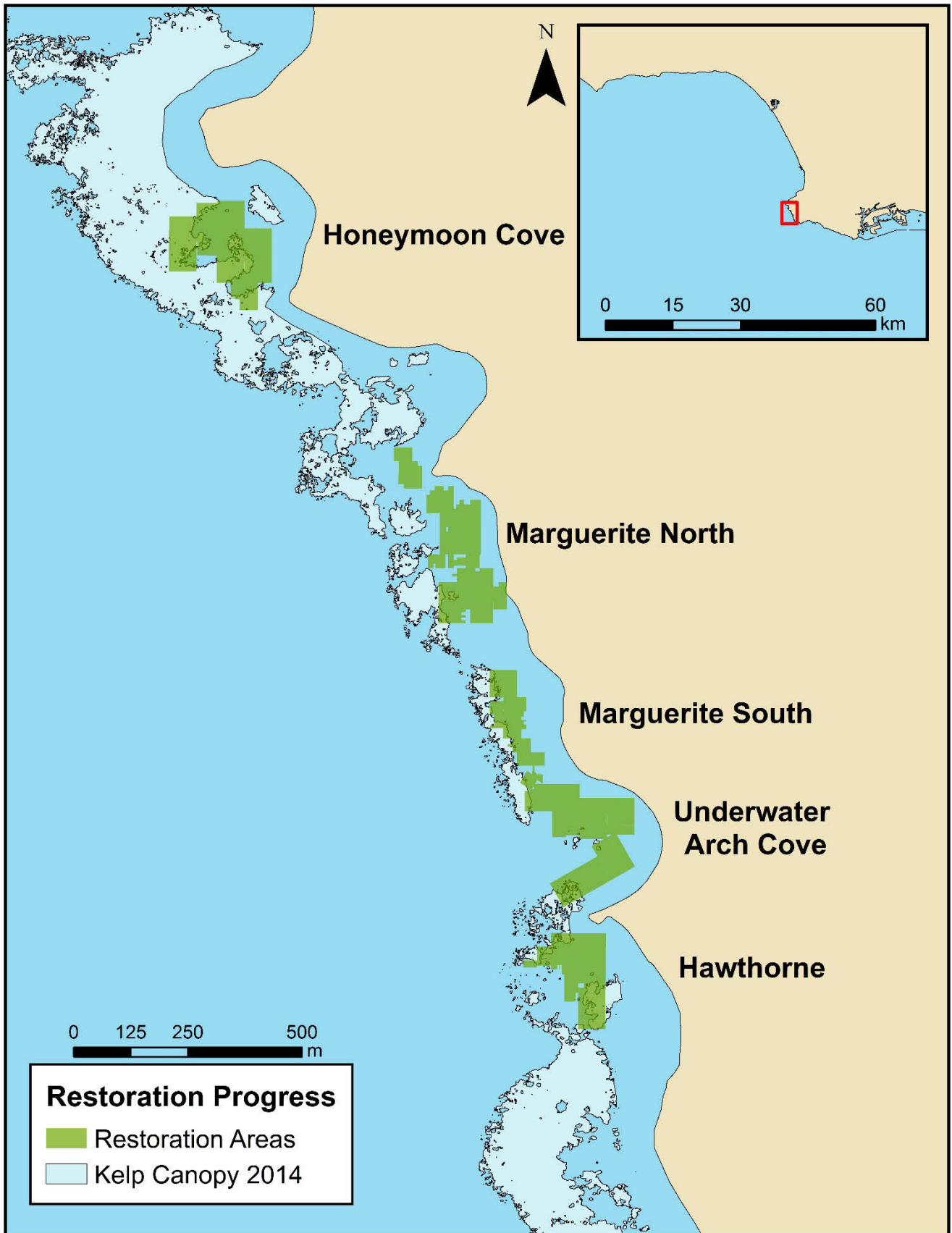
Map A12. Aerial kelp canopy coverage (*Macrocystis pyrifera*) from 2011. Data provided by MBC Applied Environmental. Canopy coverage is represented in light blue while restoration areas are in green.



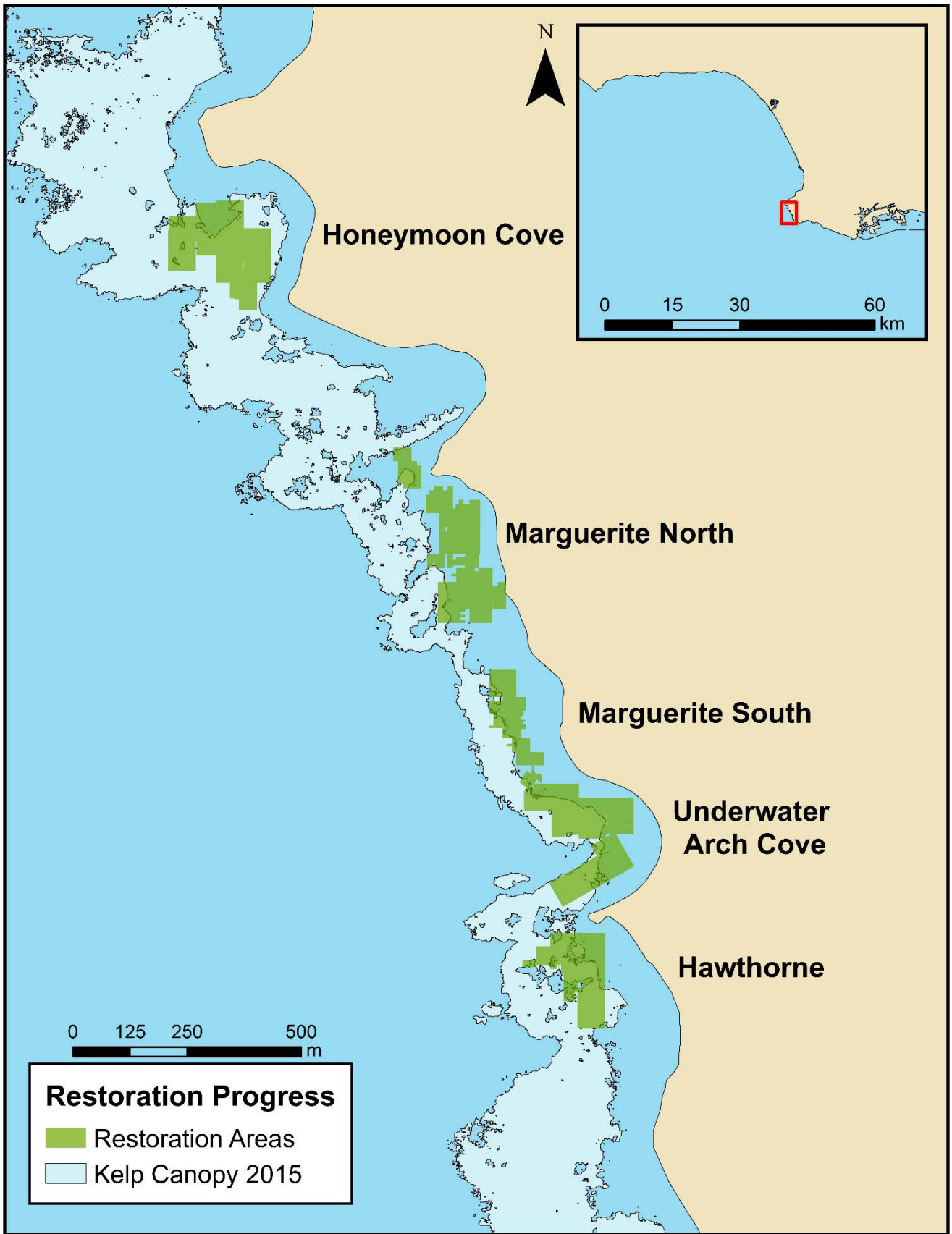
Map A13. Aerial kelp canopy coverage (*Macrocystis pyrifera*) from 2012. Data provided by MBC Applied Environmental. Canopy coverage is represented in light blue while restoration areas are in green.



Map A14. Aerial kelp canopy coverage (*Macrocystis pyrifera*) from 2013. Data provided by MBC Applied Environmental. Canopy coverage is represented in light blue while restoration areas are in green.



Map A15. Aerial kelp canopy coverage (*Macrocystis pyrifera*) from 2014. Data provided by MBC Applied Environmental. Canopy coverage is represented in light blue while restoration areas are in green.



Map A16. Aerial kelp canopy coverage (*Macrocystis pyrifera*) from 2015. Data provided by MBC Applied Environmental. Canopy coverage is represented in light blue while restoration areas are in green.

Appendix B: CRANE Data Tables 2011 – 2017.

For all tables included in Appendix B, site designations are color coded as follows: Blue – Control, Yellow – Restoration, and Reference – Green.

Restoration began in 2015 at the site Marguerite Central (previously a control site) and was completed in the fall of 2016. Marguerite Central is designated as Restoration for the 2017 surveys.

Table B1. CRANE Survey Metadata.

CRANE Survey Date								
						Spring	Summer	
Site	2011	2012	2013	2014	2015	2016	2016	2017
Abalone Cove Kelp West	5/27/2011	6/22/2012	6/21/2013	7/25/2014	9/2/2015	2/10/2016	6/29/2016	7/21/2017
Marguerite Central	5/3/2011	6/8/2012	7/3/2013	6/20/2014	9/23/2015	2/10/2016	7/26/2016	7/18/2017
Golden Cove	2/7/2011	6/12/2012	6/12/2013	7/11/2014	9/23/2015	2/10/2016	6/22/2016	7/18/2017
Honeymoon Cove	1/28/2011	3/13/2012	5/31/2013	7/2/2014	8/19/2015	2/10/2016	6/22/2016	7/18/2017
Point Vicente West	10/12/2011	8/10/2012	4/24/2013	4/18/2014	9/23/2015	2/10/2016	6/22/2016	7/21/2017
Rocky Point North	6/24/2011	6/29/2012	7/2/2013	7/11/2014	9/25/2015	2/10/2016	6/10/2016	6/29/2017
Bottom Temperature (°C)								
						Spring	Summer	Summer
Site	2011	2012	2013	2014	2015	2016	2016	2017
Abalone Cove Kelp West	16	13	18	17	20	14	14	20
Marguerite Central	15	17	17	20	22	14	14	20
Golden Cove	15	19	15	15	22	14	14	17
Honeymoon Cove	15	12	18	16	21	14	14	20
Point Vicente West	11	19	15	14	21	14	14	21
Rocky Point North	18	15	18	21	21	15	15	18
Coordinates								
Site	Latitude	Longitude						
Abalone Cove Kelp West	33.73942	-118.38828						
Marguerite Central	33.75694	-118.41772						
Golden Cove	33.75300	-118.41507						
Honeymoon Cove	33.76490	-118.42339						
Point Vicente West	33.74093	-118.41257						
Rocky Point North	33.77942	-118.42731						

Table B2. Fish Species Richness (total number of species)

Designation	Site	2011		2012		2013		2014		Spring 2015		Summer 2016		2017	
		Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Control	Abalone Cove Kelp West	7	7	10	9	8	13	13	9						
	Marquerite Central	6	10	10	9	11	8	11	8					8	
Restoration	Underwater Arch Cove	6	9	6	12	8	7	6	11						
	Honeymoon Cove	0	2	4	8	5	5	12	7						
Reference	Point Vicente West	8	6	10	11	12	11	12	9						
	Rocky Point North	8	8	8	9	6	7	5	9						

Table B3. Density of kelp and related understory algal species (individuals per 100 meters squared).

Species	Designation	Site	2011		2012		2013		2014		2015		Spring 2016		Summer 2016		2017		
			Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	
<i>Cystoseira osmundacea</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17.5	9.2
		Marquerite Central	—	—	0.8	0.8	—	—	—	—	—	—	150.8	150.8	10.8	9.2	6.7	1.7	—
	Restoration	Underwater Arch Cove	—	—	—	—	11.7	1.7	10.8	4.2	22.5	22.5	—	—	0.8	0.8	2.2	2.2	—
		Honeymoon Cove	2.5	2.5	—	—	—	—	—	—	0.8	0.8	—	—	—	—	2.5	2.5	—
	Reference	Point Vicente West	0.8	0.8	—	—	—	—	—	—	1.7	1.7	—	—	—	—	0.8	0.8	—
	Rocky Point North	—	—	—	—	—	—	—	2.5	0.8	17.5	17.5	1.7	—	41.7	13.3	4.2	0.8	—
<i>Egrecia menziesii</i>	Control	Abalone Cove Kelp West	2.5	2.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Marquerite Central	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15.0	8.3
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	0.8	0.8	—	—	—	—	—	—	—
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Reference	Point Vicente West	19.2	12.5	13.3	8.3	10.0	10.0	3.3	1.7	30.0	5.0	10.8	5.8	19.2	5.8	3.3	—	—	
	Rocky Point North	—	—	—	—	5.0	—	12.5	5.8	29.2	20.8	5.0	5.0	3.3	3.3	6.7	—	—	
<i>Eisenia arborea</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Marquerite Central	11.7	11.7	3.3	3.3	12.5	5.8	—	—	—	—	4.2	2.5	—	—	10.8	9.2	—
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	0.8	0.8	—	—	—	—	—
Reference	Point Vicente West	226.7	80.0	253.3	25.0	291.7	8.3	39.2	17.5	97.5	15.8	95.0	10.0	95.8	47.5	25.8	9.2	9.2	
	Rocky Point North	—	—	2.5	2.5	18.3	11.7	28.3	6.7	21.7	13.3	14.2	5.8	25.8	7.5	55.8	4.2	—	
<i>Macrocystis pyrifera</i> Holdfasts	Control	Abalone Cove Kelp West	4.2	4.2	—	—	—	—	—	—	56.7	11.7	43.3	11.7	62.5	0.8	74.2	19.2	—
		Marquerite Central	—	—	—	—	—	—	10.0	10.0	9.2	4.2	3.3	1.7	46.7	35.0	95.0	8.3	—
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	25.0	—	45.8	4.2	—	—	—	—	26.1	12.8	—
		Honeymoon Cove	1.7	1.7	—	—	—	—	7.5	7.5	118.3	—	25.0	1.7	152.5	40.8	110.8	25.8	—
	Reference	Point Vicente West	28.3	6.7	27.5	10.8	12.5	0.8	5.8	2.5	13.3	8.3	—	—	59.2	24.2	69.2	12.5	—
	Rocky Point North	110.0	15.0	20.0	3.3	76.7	15.0	319.2	169.2	27.5	0.8	—	—	114.2	29.2	54.2	2.5	—	
<i>Macrocystis pyrifera</i> Stipes	Control	Abalone Cove Kelp West	22.5	22.5	—	—	—	—	—	—	345.0	60.0	319.2	104.2	556.7	20.0	332.5	10.8	
		Marquerite Central	—	—	—	—	—	—	28.3	28.3	52.5	30.8	5.0	1.7	188.3	136.7	470.8	137.5	
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	67.5	2.5	183.3	10.0	—	—	—	—	108.3	56.3	
		Honeymoon Cove	3.3	3.3	—	—	—	—	25.8	25.8	564.2	15.8	45.0	13.3	580.0	161.7	481.7	75.0	
Reference	Point Vicente West	449.2	219.2	195.0	36.7	136.7	8.3	35.0	18.3	159.2	89.2	—	—	294.2	180.8	585.8	69.2		
	Rocky Point North	1084.2	107.5	235.0	20.0	986.7	196.7	1097.5	619.2	157.5	19.2	—	—	364.2	144.2	544.2	19.2		
<i>Macrocystis pyrifera</i> Stipes per Holdfast	Control	Abalone Cove Kelp West	2.0	2.0	—	—	—	—	—	—	23.7	1.8	25.2	7.0	32.8	2.6	21.6	1.7	
		Marquerite Central	—	—	—	—	—	—	2.8	2.8	17.4	10.2	3.8	0.4	7.8	2.2	12.7	1.8	
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	9.0	2.6	13.0	0.2	—	—	—	—	9.3	1.2	
		Honeymoon Cove	3.3	3.3	—	—	—	—	4.6	4.6	18.1	1.9	6.0	2.0	8.6	1.2	15.1	0.8	
Reference	Point Vicente West	81.4	26.1	47.3	14.9	38.9	16.1	17.9	9.6	48.9	8.1	—	—	15.0	8.1	37.3	11.9		
	Rocky Point North	27.1	4.0	58.5	4.1	43.8	7.7	5.2	1.8	28.1	1.5	—	—	4.3	0.0	45.5	6.0		
<i>Sargassum homeri</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	—	—	404.2	172.5	—	—	6.7	5.0	
		Marquerite Central	—	—	—	—	—	—	—	—	118.3	38.3	11.7	10.0	24.2	24.2	—	—	
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	—	—	28.3	28.3	—	—	—	—	
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	90.0	51.7	—	—	0.8	0.8	
Reference	Point Vicente West	—	—	—	—	—	—	—	—	—	—	2.5	0.8	—	—	—	—		
	Rocky Point North	—	—	—	—	—	—	—	—	5.0	1.7	77.5	40.8	15.8	9.2	2.5	2.5		
<i>Sargassum muticum</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	2.5	2.5	318.3	318.3	—	—	—	—	
		Marquerite Central	—	—	—	—	—	—	—	—	—	—	1.7	1.7	5.8	5.8	—	—	
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	—	—	12.5	12.5	—	—	—	—	
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Reference	Point Vicente West	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	Rocky Point North	—	—	—	—	—	—	—	—	—	—	7.5	4.2	2.5	2.5	—	—		

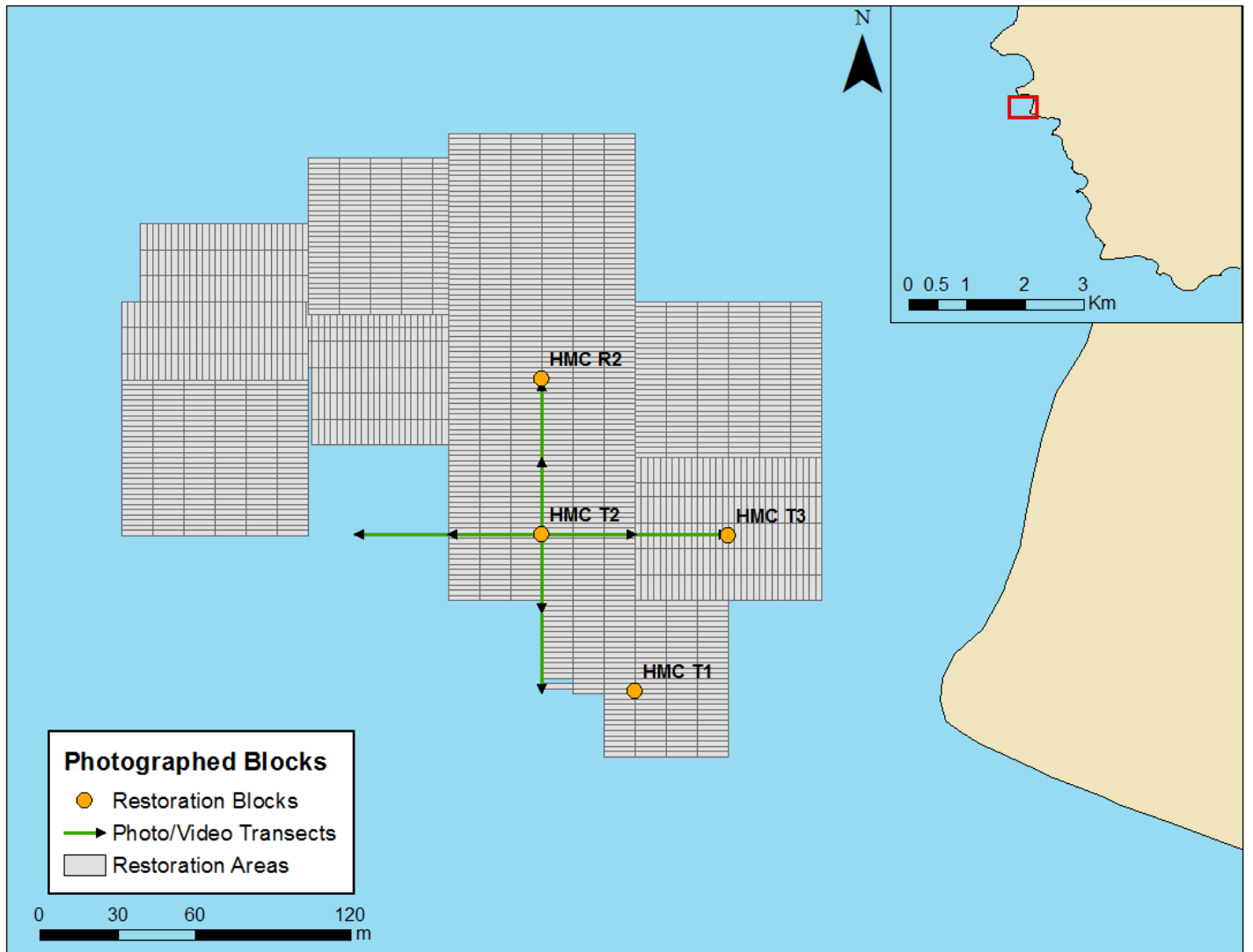
Table B4. Density of kelp forest invertebrate species (individuals per 100 meters squared).

Species	Designation	Site	2011		2012		2013		2014		2015		Spring 2016		Summer 2016		2017	
			Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE
<i>Anthopleura elegantissima</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Marguerite Central	272.5	207.5	3.3	3.3	—	—	—	—	—	—	—	—	—	—	—	—
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Reference	Point Vicente West	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Rocky Point North	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Anthopleura sola</i>	Control	Abalone Cove Kelp West	42.5	25.8	3.3	—	10.0	3.3	90.0	58.3	—	—	1.7	—	4.2	4.2	3.3	3.3
		Marguerite Central	79.2	52.5	34.2	20.8	85.8	9.2	33.3	10.0	16.7	—	63.3	10.0	10.0	1.7	7.5	0.8
	Restoration	Underwater Arch Cove	52.5	5.8	115.0	51.7	24.2	10.8	18.3	5.0	4.2	2.5	40.8	7.5	18.3	5.0	7.8	3.9
		Honeymoon Cove	—	—	5.0	1.7	—	—	1.7	1.7	—	—	3.3	3.3	1.7	1.7	—	—
	Reference	Point Vicente West	85.8	4.2	155.8	77.5	144.2	44.2	198.3	6.7	0.8	0.8	8.3	1.7	3.3	1.7	—	—
		Rocky Point North	0.8	0.8	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Aplysia vaccaria</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	7.5	7.5	—	—	—	—	—	—
		Marguerite Central	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	—	—	—	—	12.5	4.2	—	—
		Honeymoon Cove	—	—	—	—	—	—	0.8	0.8	—	—	3.3	1.7	3.3	1.7	—	—
	Reference	Point Vicente West	—	—	—	—	—	—	—	—	—	—	—	—	2.5	2.5	—	—
		Rocky Point North	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Centrostephanus coronatus</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	1.7	1.7	0.8	0.8	7.5	4.2	—	—
		Marguerite Central	—	—	—	—	—	—	—	—	—	—	4.2	0.8	—	—	—	—
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	0.8	0.8	—	—	—	—	—	—
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Reference	Point Vicente West	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Rocky Point North	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Megastrea undosa</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	4.2	0.8	14.2	5.8	25.8	15.8	26.7	13.3
		Marguerite Central	—	—	—	—	—	—	—	—	0.8	0.8	73.3	63.3	75.0	50.0	50.8	22.5
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	0.8	0.8	5.0	5.0	33.3	5.0	29.2	12.5	8.9	4.5
		Honeymoon Cove	2.5	0.8	—	—	0.8	0.8	0.8	0.8	9.2	0.8	9.2	7.5	0.8	0.8	26.7	8.3
	Reference	Point Vicente West	—	—	—	—	0.8	0.8	—	—	1.7	—	1.7	1.7	—	—	3.3	1.7
		Rocky Point North	27.5	9.2	25.8	4.2	4.2	0.8	0.8	3.3	—	2.5	2.5	—	—	0.8	0.8	
<i>Panulirus interruptus</i>	Control	Abalone Cove Kelp West	0.8	0.8	—	—	—	—	—	—	—	—	6.7	6.7	0.8	0.8	—	—
		Marguerite Central	—	—	—	—	—	—	—	—	4.2	4.2	—	—	—	—	—	—
	Restoration	Underwater Arch Cove	—	—	—	—	0.8	0.8	—	—	—	—	—	—	0.8	0.8	—	—
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	—	—	1.7	—	0.8	0.8
	Reference	Point Vicente West	2.5	0.8	0.8	0.8	1.7	1.7	0.8	0.8	5.0	5.0	1.7	1.7	—	—	5.0	3.3
		Rocky Point North	—	—	—	—	1.7	1.7	2.5	2.5	1.7	—	—	—	—	—	—	
<i>Patiria miniata</i>	Control	Abalone Cove Kelp West	20.8	5.8	11.7	1.7	5.0	1.7	2.5	2.5	—	—	—	—	—	—	—	—
		Marguerite Central	1.7	1.7	13.3	6.7	0.8	0.8	—	—	—	—	—	—	—	—	—	—
	Restoration	Underwater Arch Cove	10.8	2.5	21.7	1.7	—	—	—	—	—	—	—	—	0.8	0.8	—	—
		Honeymoon Cove	35.0	10.0	8.3	—	20.0	5.0	—	—	—	—	—	—	—	—	—	—
	Reference	Point Vicente West	—	—	—	—	0.8	0.8	0.8	0.8	—	—	—	—	—	—	—	—
		Rocky Point North	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Pisaster giganteus</i>	Control	Abalone Cove Kelp West	25.0	1.7	33.3	10.0	23.3	5.0	0.8	0.8	—	—	—	—	0.8	0.8	—	—
		Marguerite Central	29.2	14.2	20.0	1.7	26.7	10.0	—	—	—	—	—	—	—	—	—	—
	Restoration	Underwater Arch Cove	6.7	1.7	15.8	2.5	—	—	—	—	—	—	—	—	—	—	—	—
		Honeymoon Cove	6.7	1.7	3.3	—	1.7	—	—	—	—	—	—	—	—	—	—	—
	Reference	Point Vicente West	21.7	8.3	8.3	3.3	10.0	—	—	—	—	—	—	—	—	—	—	—
		Rocky Point North	1.7	1.7	—	—	1.7	1.7	—	—	—	—	—	—	—	—	—	
<i>Pisaster ochraceus</i>	Control	Abalone Cove Kelp West	30.0	5.0	3.3	—	5.0	3.3	—	—	—	—	0.8	0.8	0.8	0.8	—	—
		Marguerite Central	23.3	6.7	8.3	—	10.8	5.8	0.8	0.8	—	—	—	—	—	—	—	—
	Restoration	Underwater Arch Cove	20.8	5.8	12.5	2.5	1.7	—	—	—	—	—	—	—	—	—	—	—
		Honeymoon Cove	9.2	4.2	3.3	1.7	1.7	1.7	—	—	—	—	—	—	—	—	—	—
	Reference	Point Vicente West	23.3	6.7	8.3	3.3	5.0	1.7	—	—	—	—	—	—	—	—	—	—
		Rocky Point North	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Strongylocentrotus franciscanus</i>	Control	Abalone Cove Kelp West	464.2	220.8	165.8	129.2	110.0	10.0	50.0	11.7	0.8	0.8	2.5	2.5	10.0	3.3	4.2	2.5
		Marguerite Central	45.0	16.7	58.3	30.0	12.5	0.8	8.3	3.3	2.5	2.5	1.7	1.7	0.8	0.8	—	—
	Restoration	Underwater Arch Cove	54.2	17.5	33.3	13.3	23.3	18.3	42.5	7.5	2.5	0.8	1.7	—	0.8	0.8	3.9	1.1
		Honeymoon Cove	63.3	1.7	44.2	0.8	34.2	4.2	11.7	1.7	7.5	2.5	2.5	0.8	—	—	0.8	0.8
	Reference	Point Vicente West	31.7	10.0	55.8	27.5	32.5	4.2	26.7	10.0	2.5	0.8	0.8	0.8	3.3	—	—	—
		Rocky Point North	5.0	5.0	9.2	9.2	1.7	1.7	0.8	0.8	—	—	—	—	—	—	—	
<i>Strongylocentrotus purpuratus</i>	Control	Abalone Cove Kelp West	1250.0	250.0	902.5	267.5	462.5	87.5	1567.5	317.5	11.7	1.7	50.0	18.3	21.7	5.0	9.2	0.8
		Marguerite Central	2450.0	900.0	5765.0	1526.7	1499.2	80.8	1705.8	302.5	193.3	50.0	182.5	25.8	43.3	3.3	0.8	0.8
	Restoration	Underwater Arch Cove	2195.8	470.8	939.2	349.2	1008.3	465.0	24.2	10.8	1.7	—	3.3	3.3	0.8	0.8	8.9	0.6
		Honeymoon Cove	1541.7	141.7	1222.5	215.8	1223.3	303.3	325.0	298.3	9.2	0.8	6.7	5.0	16.7	16.7	6.7	1.7
	Reference	Point Vicente West	247.5	75.8	490.8	369.2	535.8	47.5	185.8	5.8	16.7	5.0	19.2	12.5	12.5	0.8	15.0	3.3
		Rocky Point North	15.8	7.5	30.8	12.5	10.0	8.3	3.3	—	5.8	5.8	0.8	0.8	—	—	0.8	0.8

Table B5. Fish Density (individuals per 100 meters squared).

Species	Designation	Site	2011		2012		2013		2014		2015		Spring 2016		Summer 2016		2017		
			Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	Mean Density (#/100m ²)	SE	
<i>Anisotremus davidsonii</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	27.9	20.9	—	—	—	—	1.3	1.3	
		Marguerite Central	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	0.4	0.4	—	—	—	—	—	—	—
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	—	—	0.8	0.5	2.5	2.5	—
Reference	Point Vicente West	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Rocky Point North	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.4	4.9	
<i>Chromis punctipinnis</i>	Control	Abalone Cove Kelp West	14.6	7.6	—	—	4.2	4.2	4.6	2.7	—	—	11.7	11.7	—	—	0.8	0.8	
		Marguerite Central	0.8	0.8	—	—	6.3	5.2	—	—	—	—	—	—	—	—	—	—	
	Restoration	Underwater Arch Cove	1.3	1.3	1.3	1.3	0.4	0.4	2.1	0.8	—	—	—	—	21.3	8.5	2.5	2.5	
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	—	—	2.5	2.5	—	—	
Reference	Point Vicente West	—	—	—	—	—	—	8.3	5.5	—	—	22.5	21.4	2.9	1.3	—	—		
	Rocky Point North	0.4	0.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
<i>Embiotoca jacksoni</i>	Control	Abalone Cove Kelp West	1.7	1.2	0.4	0.4	3.8	2.2	2.9	1.3	0.8	0.8	1.3	0.8	0.8	0.5	4.2	3.1	
		Marguerite Central	0.4	0.4	2.1	0.8	1.7	0.7	2.1	1.3	1.3	0.8	0.8	0.5	0.8	0.5	2.1	1.3	
	Restoration	Underwater Arch Cove	2.9	2.4	0.4	0.4	0.4	0.4	0.8	0.8	0.8	0.5	0.4	0.4	—	—	0.4	0.4	
		Honeymoon Cove	—	—	0.4	0.4	—	—	—	—	—	—	—	—	0.8	0.5	—	—	
Reference	Point Vicente West	1.7	0.7	0.4	0.4	6.3	0.8	2.5	1.1	1.3	0.8	2.5	1.4	0.8	0.8	—	—		
	Rocky Point North	2.9	1.4	3.8	1.7	0.4	0.4	0.8	0.5	0.8	0.5	3.3	2.8	—	—	—	—		
<i>Girella nigricans</i>	Control	Abalone Cove Kelp West	1.3	0.8	0.4	0.4	1.3	1.3	0.8	0.5	—	—	—	—	2.1	1.0	—	—	
		Marguerite Central	—	—	1.7	1.7	—	—	0.4	0.4	20.0	13.1	5.4	3.1	31.7	13.4	0.4	0.4	
	Restoration	Underwater Arch Cove	4.2	3.6	0.4	0.4	—	—	0.4	0.4	—	—	0.4	0.4	—	—	0.8	0.5	
		Honeymoon Cove	—	—	—	—	—	—	—	—	0.8	0.8	—	—	1.3	0.8	—	—	
Reference	Point Vicente West	—	—	—	—	1.3	0.8	1.7	1.2	0.4	0.4	0.8	0.5	0.8	0.5	1.3	0.8		
	Rocky Point North	—	—	0.8	0.8	—	—	1.7	1.0	1.3	0.8	3.8	2.2	0.4	0.4	—	—		
<i>Halichoeres semicinctus</i>	Control	Abalone Cove Kelp West	—	—	0.4	0.4	—	—	—	—	2.5	0.5	4.6	1.4	2.1	0.4	8.3	3.1	
		Marguerite Central	—	—	—	—	—	—	—	—	7.5	1.6	7.9	4.9	28.3	12.1	—	—	
	Restoration	Underwater Arch Cove	0.8	0.5	—	—	0.4	0.4	0.8	0.8	2.1	0.8	2.1	0.8	1.7	1.2	16.3	11.8	
		Honeymoon Cove	—	—	—	—	—	—	2.9	1.7	—	—	4.6	0.8	5.0	1.2	6.7	1.2	
Reference	Point Vicente West	0.4	0.4	—	—	0.4	0.4	—	—	1.3	0.4	2.9	0.4	3.8	0.4	1.3	0.4		
	Rocky Point North	2.1	1.6	—	—	5.0	2.4	0.4	0.4	8.3	2.0	3.8	1.3	—	—	4.2	1.6		
<i>Hermosilla azurea</i>	Control	Abalone Cove Kelp West	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		Marguerite Central	—	—	—	—	—	—	—	—	1.3	0.8	0.4	0.4	22.5	13.4	—	—	
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.4	0.4	
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Reference	Point Vicente West	—	—	—	—	—	—	—	—	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.5		
	Rocky Point North	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
<i>Hypsypops rubicundus</i>	Control	Abalone Cove Kelp West	4.6	0.8	4.6	1.3	2.5	1.1	1.7	1.2	0.8	0.8	0.8	0.5	1.3	0.8	6.7	2.6	
		Marguerite Central	—	—	5.8	2.2	4.2	1.1	6.3	2.3	7.1	4.4	2.1	0.4	16.7	7.6	5.4	3.8	
	Restoration	Underwater Arch Cove	1.3	0.8	0.8	0.8	0.4	0.4	3.3	1.5	3.3	1.9	4.6	1.4	2.9	1.3	6.3	3.8	
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	0.8	0.5	1.7	1.7	0.8	0.8	
Reference	Point Vicente West	5.0	1.7	2.1	0.8	5.4	1.8	7.9	3.0	7.9	2.3	5.0	0.7	5.8	1.1	5.0	1.7		
	Rocky Point North	1.7	0.7	2.1	1.0	1.7	0.7	—	—	0.8	0.5	1.7	—	—	—	—	—		
<i>Medialuna californiensis</i>	Control	Abalone Cove Kelp West	—	—	—	—	0.4	0.4	0.8	0.5	—	—	—	—	0.8	0.5	—	—	
		Marguerite Central	—	—	0.4	0.4	—	—	—	—	4.2	2.5	—	—	0.4	0.4	—	—	
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	—	—	2.5	1.4	—	—	—	—	—	—	
		Honeymoon Cove	—	—	—	—	—	—	—	—	—	—	—	—	0.4	0.4	—	—	
Reference	Point Vicente West	0.4	0.4	—	—	—	—	—	—	2.5	0.8	0.8	0.8	1.3	0.8	0.8	0.8		
	Rocky Point North	—	—	—	—	—	—	—	—	—	—	1.3	1.3	—	—	—	—		
<i>Oxyjulis californica</i>	Control	Abalone Cove Kelp West	5.4	1.7	0.4	0.4	—	—	—	—	0.8	0.8	1.3	1.3	0.4	0.4	—	—	
		Marguerite Central	—	—	0.8	0.8	2.9	1.8	3.8	2.2	5.4	4.9	—	—	2.9	1.4	—	—	
	Restoration	Underwater Arch Cove	—	—	0.4	0.4	0.8	0.8	1.7	1.2	—	—	—	—	—	—	—	—	
		Honeymoon Cove	—	—	—	—	—	—	0.8	0.8	2.9	1.3	—	—	0.4	0.4	12.1	5.6	
Reference	Point Vicente West	13.3	6.7	2.1	1.0	1.3	0.4	23.3	7.9	—	—	—	—	—	—	8.8	8.2		
	Rocky Point North	0.4	0.4	0.8	0.5	—	—	0.4	0.4	—	—	—	—	—	—	—	—		
<i>Paralabrax clathratus</i>	Control	Abalone Cove Kelp West	0.4	0.4	—	—	0.8	0.5	0.4	0.4	1.3	0.4	2.1	1.0	2.1	1.6	1.7	0.7	
		Marguerite Central	—	—	1.3	1.3	1.7	1.2	3.3	0.7	5.0	3.0	1.7	0.7	7.1	3.8	11.3	0.8	
	Restoration	Underwater Arch Cove	—	—	0.4	0.4	0.4	0.4	6.7	4.5	4.2	2.2	2.9	0.8	4.6	1.3	17.1	8.3	
		Honeymoon Cove	—	—	—	—	0.8	0.5	1.3	0.4	0.8	0.8	0.4	0.4	2.1	0.4	4.2	3.6	
Reference	Point Vicente West	—	—	—	—	0.8	0.5	—	—	2.9	0.4	1.3	0.4	4.6	1.8	7.5	1.1		
	Rocky Point North	1.7	0.7	2.5	1.4	6.7	1.9	2.1	0.8	4.2	1.6	2.5	1.4	0.4	0.4	2.5	1.6		
<i>Paralabrax nebulifer</i>	Control	Abalone Cove Kelp West	—	—	0.4	0.4	—	—	1.3	0.8	0.8	0.5	2.1	1.6	2.9	1.3	0.4	0.4	
		Marguerite Central	0.4	0.4	—	—	0.4	0.4	1.3	0.8	—	—	0.8	0.8	2.1	1.3	0.8	0.5	
	Restoration	Underwater Arch Cove	—	—	—	—	—	—	1.3	0.8	—	—	0.4	0.4	0.4	0.4	1.3	0.8	
		Honeymoon Cove	—	—	—	—	—	—	0.8	0.5	—	—	—	—	—	—	—	—	
Reference	Point Vicente West	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	Rocky Point North	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
<i>Semicossyphus pulcher</i>	Control	Abalone Cove Kelp West	—	—	0.4	0.4	0.4	0.4	—	—	0.8	0.5	0.8	0.8	—	—	1.3	1.3	
		Marguerite Central	0.4	0.4	0.4	0.4	—	—	0.8	0.5	—	—	1.3	0.8	2.9	1.8	0.8	0.5	
	Restoration	Underwater Arch Cove	0.4	0.4	1.3	0.4	—	—	0.4	0.4	—	—	0.8	0.5	2.9	1.8	1.7	1.7	
		Honeymoon Cove	—	—	—	—	—	—	—	—	0.4	0.4	0.4	0.4	0.8	0.8	—	—	
Reference	Point Vicente West	0.4	0.4	—	—	—	—	1.3	0.8	0.8	0.5	1.3	0.4	2.5	1.6	0.4	0.4		
	Rocky Point North	0.8	0.8	1.7	0.7	3.8	0.4	0.4	0.4	0.4	0.4	0.8	0.8	0.4	0.4	—	—		

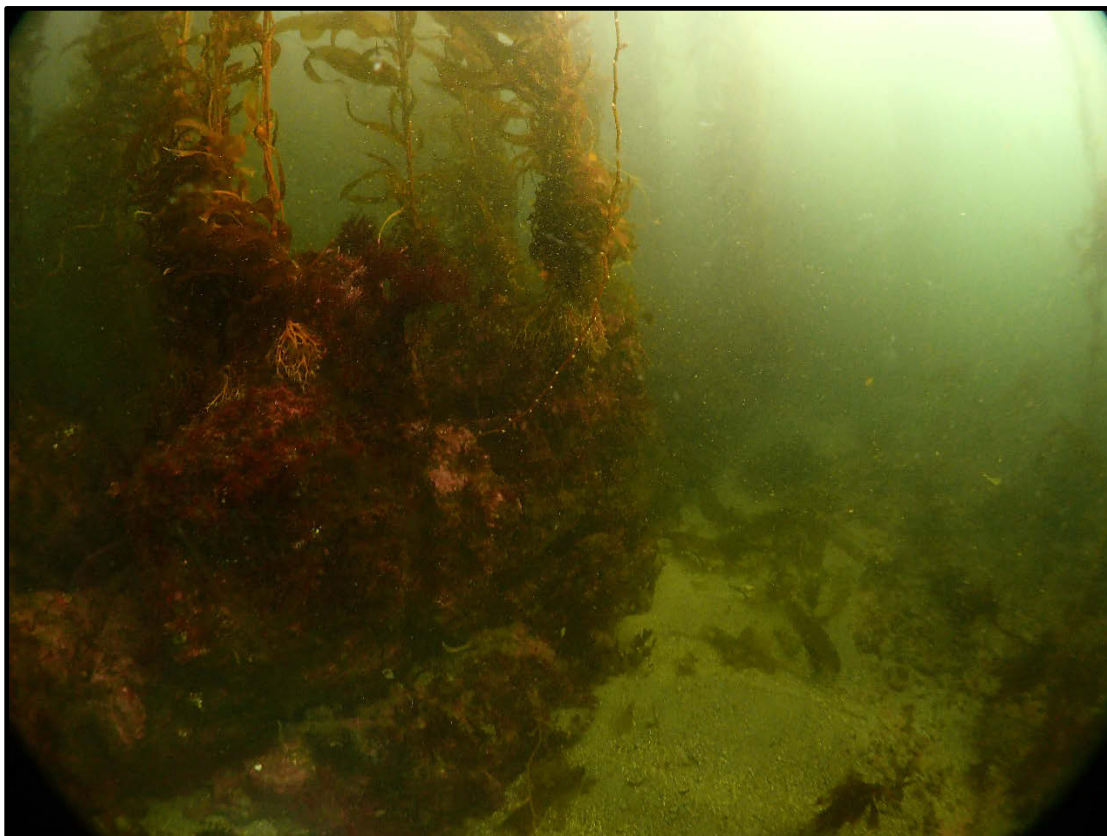
Honeymoon Cove



Honeymoon Cove Block T2 (HMC T2) east-west running ridge is a large distinguishable feature easily found by divers. This block was restored in March 2014. GPS: 33.764260, -118.423734



HMC T2 07/29/2016



HMC T2 08/3/2017

Honeymoon Cove Block R5 (HMC R5) is the site of another TBF project with ongoing monitoring. Divers visit this area quarterly to conduct subtidal surveys allowing the opportunity to collect photos over time. This block was restored in November 2014. GPS: 33.765297, -118.424221



HMC R5 06/22/2015



HMC R5 09/24/2015



HMC R5 11/12/2015

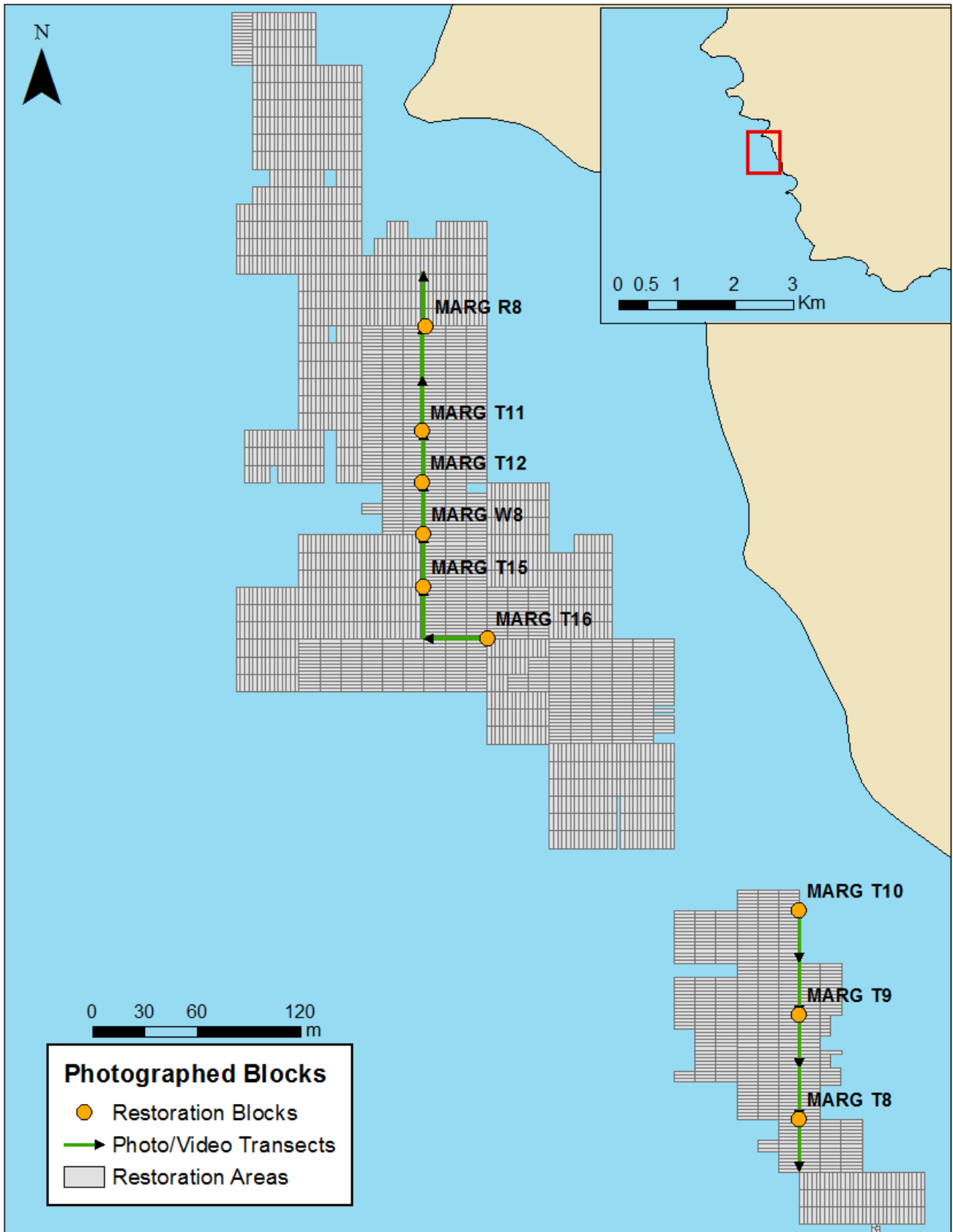


HMC R5 02/10/2016



HMC R5 08/3/2017

Marguerite



Marguerite Block T16 (MARG T16) will be monitored monthly by TBF divers over the next 2 years for a wave attenuation study. This block was restored in September 2016. Photos and video will be taken during these surveys.

GPS: 33.757561, -118.41782

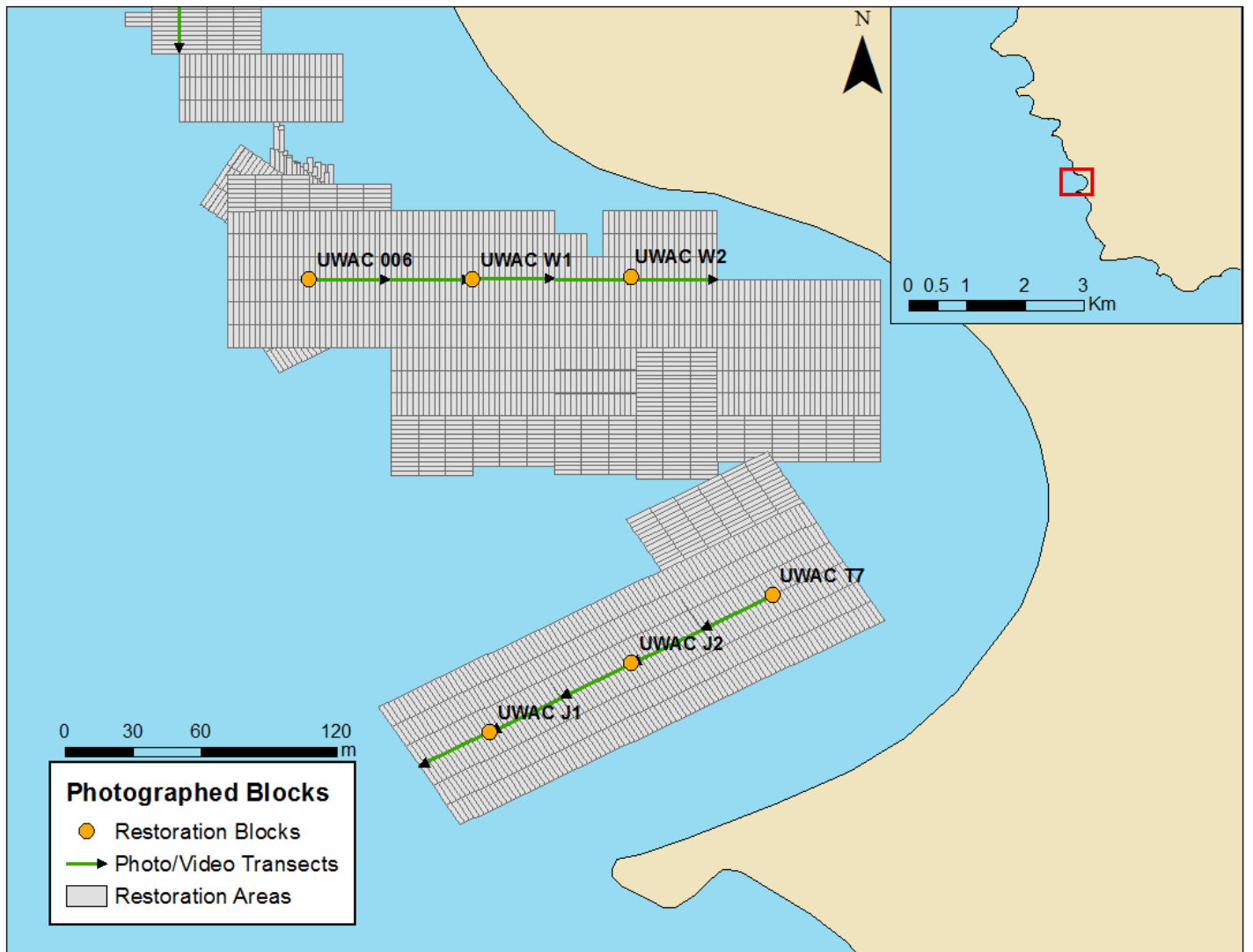


MARG T16 08/10/2016



MARG T16 08/3/2017

Underwater Arch Cove

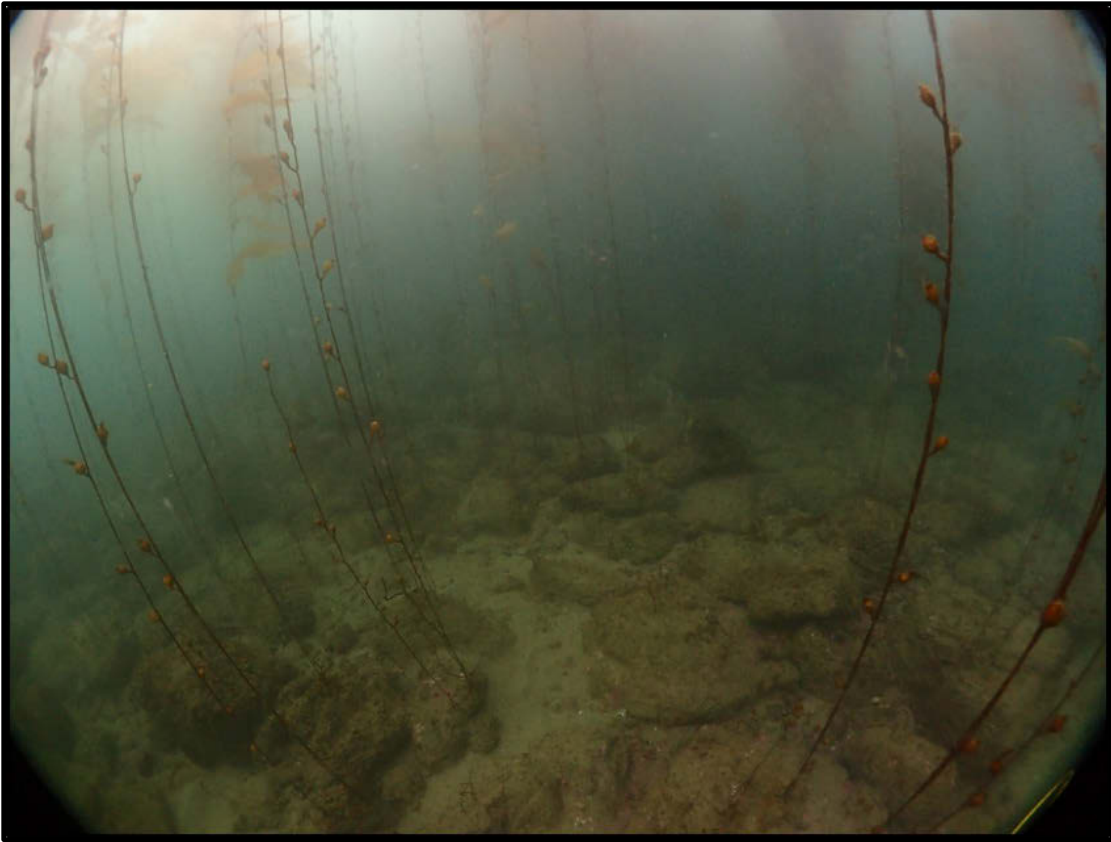


Underwater Arch Cove Blocks (UWAC) J1, J2 and T7 were the locations of our first transect video shot in 2014. In 2016 and 2017, this video transect was recorded again and photos from both dates have been archived. Divers will continue to revisit this area at least annually for video and photography.

UWAC J1 restoration was complete in November 2013. GPS: 33.75205979, -118.4156861



UWAC J1 08/14/14



UWAC J1 07/07/16



UWAC J1 07/27/17

UWAC J2 was restored in July 2014. GPS: 33.7523302, -118.4151245



UWAC J2 PRE-RESTORATION 07/12/14

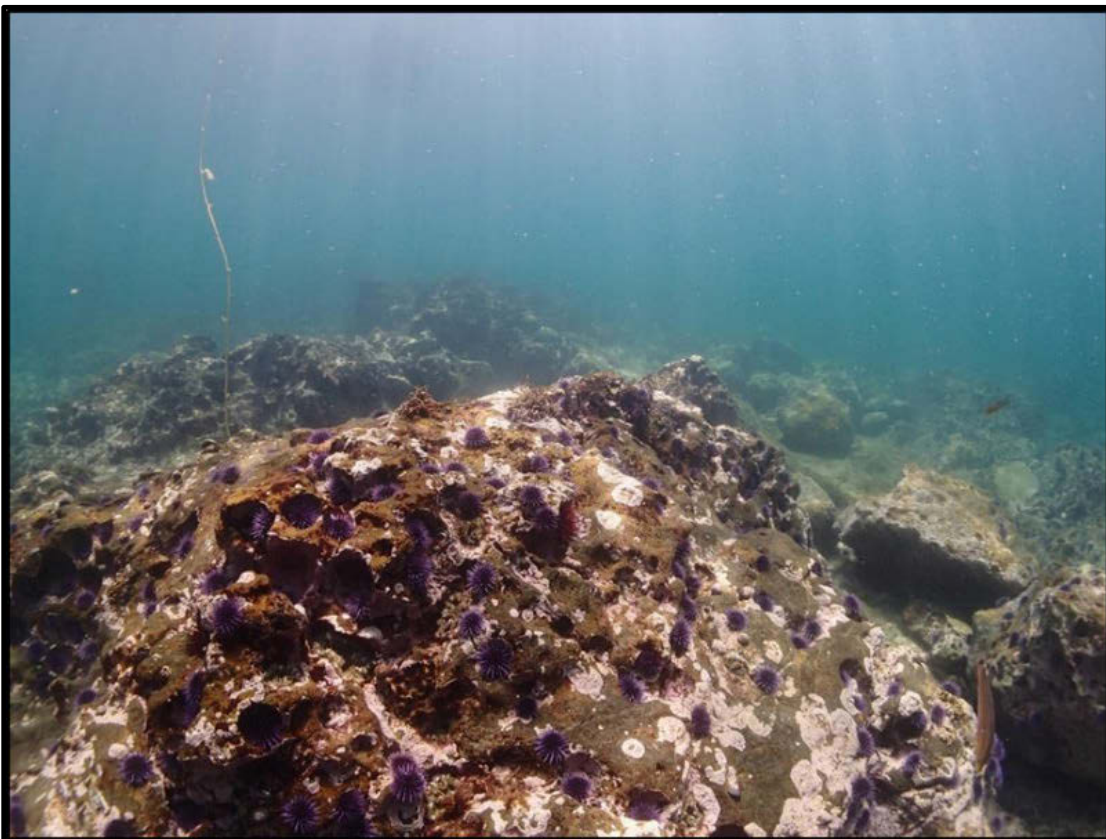


UWAC J2 08/14/14



UWAC J2 07/27/17

UWAC T7 was restored in September 2014. GPS: 33.7526, -118.414563



RESTORATION 08/14/14

UWAC T7 PRE

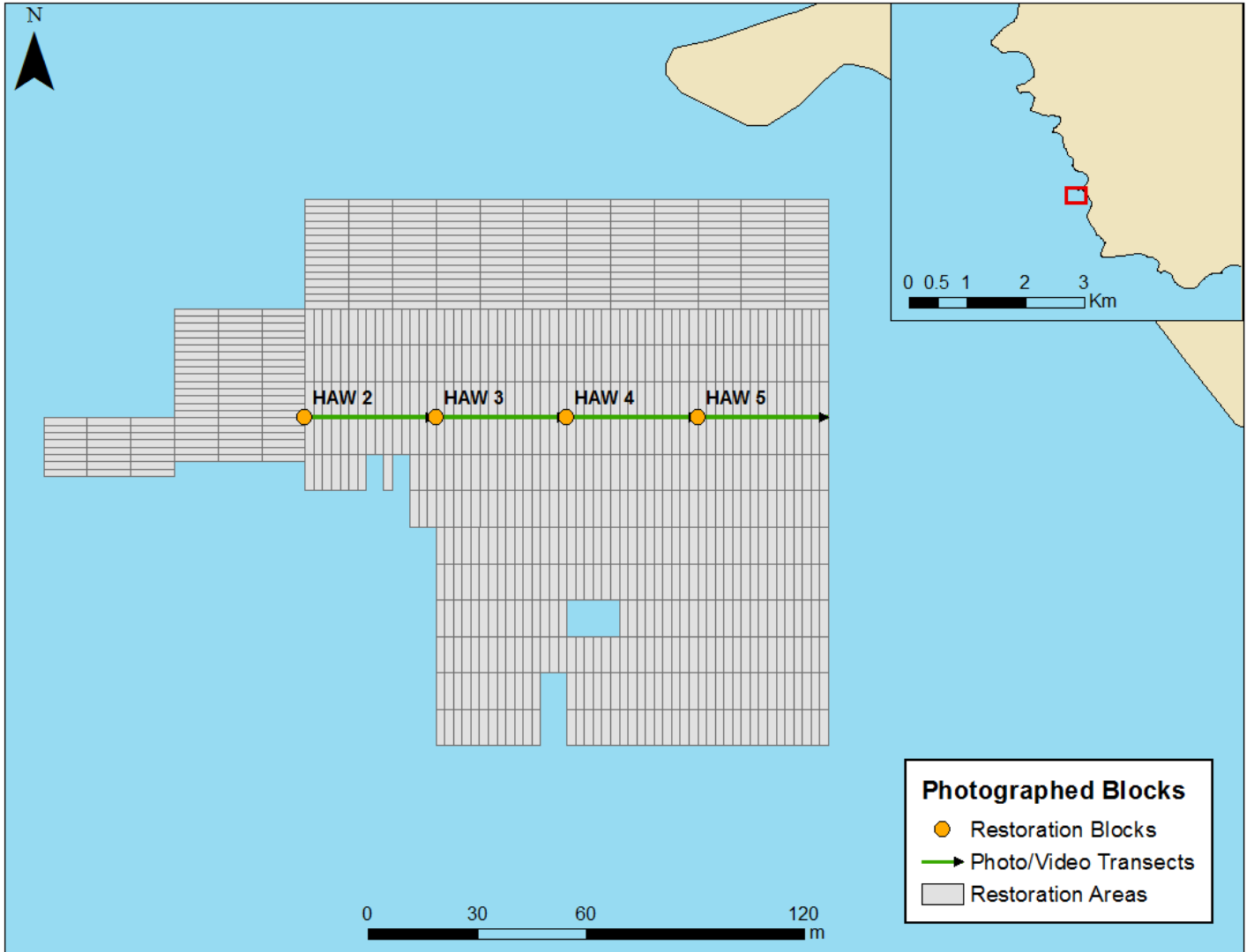


UWAC T7 07/07/16



UWAC T7 07/27/17

Hawthorne



Hawthorne 2 this large pinnacle within Block 2 is easily found by divers and will serve as the starting point for video transects and photos of the site. The photos below show the pinnacle at heading 180 degrees and 90 degrees.

GPS: 33.75064, -118.416097



HAW 2 Heading 180 08/10/2016



HAW 2 Heading 180 08/25/17

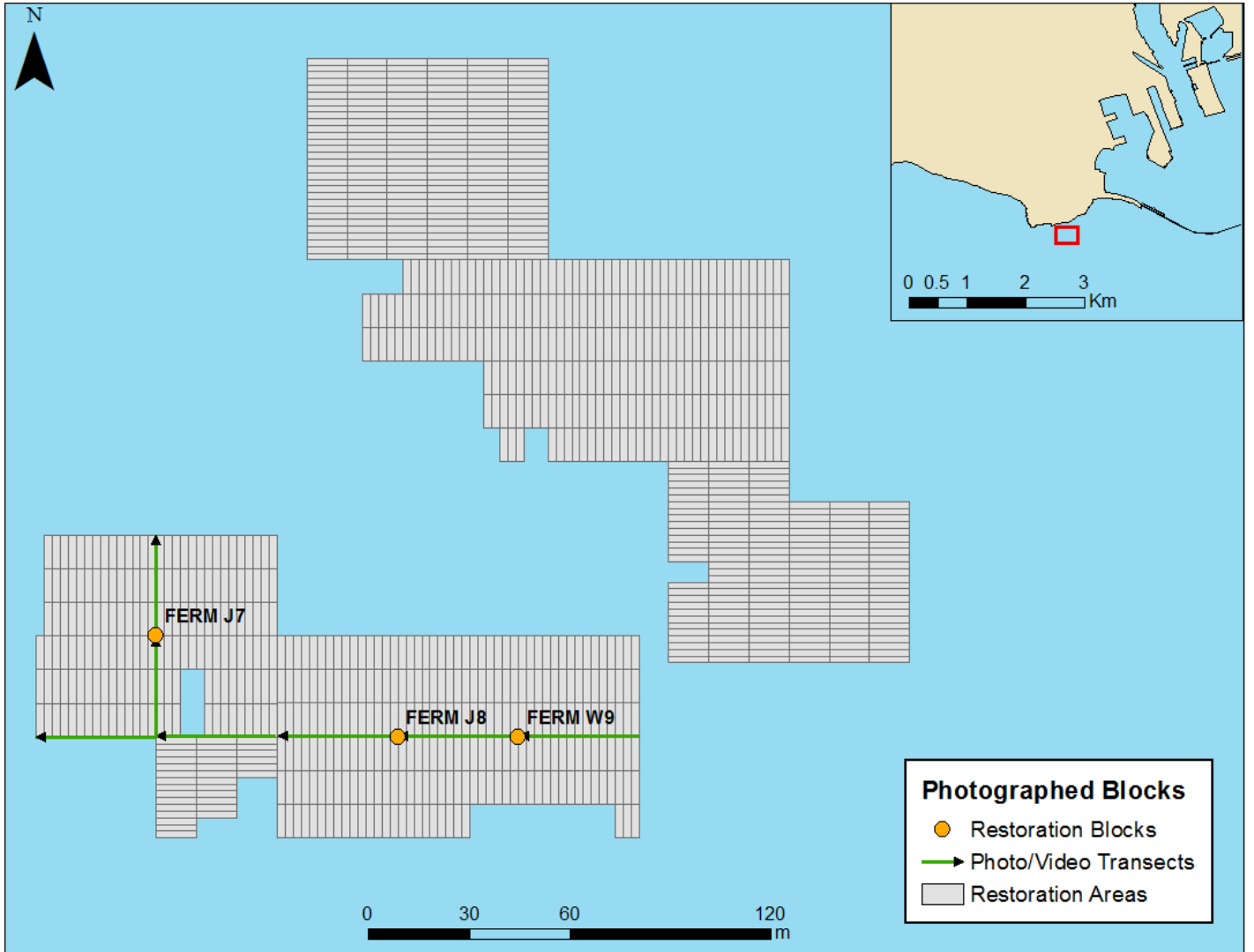


HAW 2 Heading 90 08/10/16

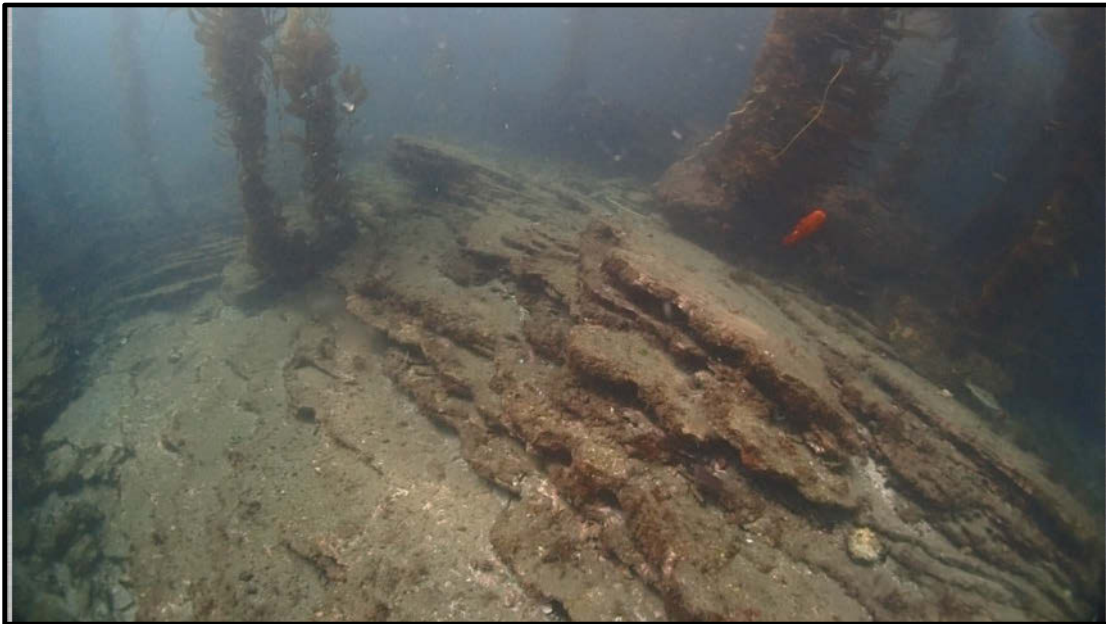


HAW 2 Heading 90 08/25/17

Point Fermin



Point Fermin, Block J7 (FERM J7) north-south running ridge has been well documented with video footage pre and post restoration. GPS: 33.703028, -118.290167



FERM J7 9/25/15



FERM J7 7/7/17



FERM J7 8/10/16



FERM J7 7/7/17

2017 Video Transects (video files available by request)

Video transects are recorded annually at specific GPS points per site. Transect lines are drawn on the maps above for each site.

Files

Honeymoon Cove:

1_HoneymoonCove_Videotransect_2017

Underwater Arch Cove:

2_UnderwaterArch_006_Videotransect_2017

3_UnderwaterArch_T7_Videotransect_2017

Marguerite:

4_Marguerite_T16_Videotransect_2017

5_Marguerite_T10_Videotransect_2017

Hawthorne:

6_Hawthorne_Videotransect_2017

Point Fermin:

7_PointFermin_Videotransect_2017

Timelapse Videos of Sites (video files available by request)

Videos were taken at set blocks per site pre and post restoration. Each video consists of the same transect defined by GPS coordinates during summer months in different years.

Files

Honeymoon Cove:

1_Timelapse_HoneymoonCove_Videotransect

Underwater Arch:

2_Timelapse_UnderwaterArch_Videotransect

Marguerite:

3_Timelapse_Marguerite_Videotransect

Hawthorne:

4_Timelapse_Hawthorne_Videotransect

Point Fermin:

5_Timelapse_PointFermin_Videotransect