DAFTAR PUSTAKA

Ali, N., & Sinilele, A. 2019. Kearifan lokal dalam melestarikan pulau dan laut di Pulau Bonetambu Sulawesi Selatan. *Hasanuddin Journal of Sociology*, 101-115.

Amalyah, R., Hamid, D., & Hakim, L. 2016. Peran stakeholder pariwisata dalam pengembangan Pulau Samalona sebagai destinasi wisata bahari. Brawijaya University.

Burke, L., Reytar, K., Spalding, M., & Perry, A. 2002. Reefs at risk revisited in the Coral Triangle.

CoralNet. 2023. (https://coralnet.ucsd.edu/).

Dewanto, D. K. 2016. Kepadatan Ascidiacea (*Didemnum molle*) di Perairan Pantai Tasik Ria, Sulawesi Utara. *Kauderni: Journal Of Fisheries, Marine And Aquatic Science*, *1*(1), 27-32.

Ernaningsih, E., Jamal, M., Tajuddin, M., & Halifah, H. 2022. Productivity of Squid Fishing Lines on Badi Island, Pangkep Regency. *JURNAL AGRIKAN (Agribisnis Perikanan)*, *15*(1), 15-27.

Fadli, N. 2008. Tingkat kelangsungan hidup fragmen karang Acropora Formosa yang ditransplantasikan pada media buatan yang terbuat dari pecahan karang (*rubble*). *Berita biologi*, *9*(3), 265-273.

Fathuddin, F., Hidayani, M. T., Supardi, S., & Noor, R. J. 2023. Analisis pola sebaran mikro atol karang porites di Pulau Badi Kabupaten Pangkajene dan Kepulauan. *Jurnal Sumberdaya Akuatik Indopasifik*, *7*(1), 85-92.

Febrizal, F., Damar, A., & Zamani, N. P. 2009. Kondisi Ekosistem terumbu karang di Perairan Kabupaten Bintan dan alternatif pengelolaanya. *Jurnal Ilmu-ilmu Perairan dan Perikanan Indonesia*, *16*(2), 167-175.

Ghiffar, M. A., Irham, A., Harahap, S. A., Kurniawaty, N., & Astuty, S. 2017. Hubungan kondisi terumbu karang dengan kelimpahan ikan karang target di perairan Pulau Tinabo Besar, Taman Nasional Taka Bonerate, Sulawesi Selatan. *Jurnal Ilmu Kelautan SPERMONDE*, *3*(2), 17-24.

Giyanto, M., Abrar, M., Siringoringo R. M., Suharti, S. R., Wibowo, K., Edrus, I. N., Arbi, U. Y., Cappenberg, H. A. W., Sihaloho, H. F., Tuti, Y., & Anita, D. Z. 2014. Panduan Monitoring Kesehatan Terumbu Karang. Jakarta: COREMAP CTI LIPI 2014.

Giyanto., Abrar, M., Hadi, T. A., Budiyanto, A., Haizt, M., Salatalohy, A., & Iswari, M. Y. 2017. Status terumbu karang Indonesia 2017. Jakarta: Pusat Penelitian Oseanografi - LIPI.

Hadi, T. A., Giyanto., Prayudha, B., Haizt, M., Budiyanto, A., & Suharsono. 2018. Status terumbu karang Indonesia 2018. Jakarta: Pusat Penelitian Oseanografi - LIPI.

Haya, L. O. M. Y. 2017. *Assessment of coral reef degradation and the economic loss in the Pangkajene and Kepulauan regency, Spermonde Archipelago, Indonesia* (Doctoral dissertation, 北海道大学).

Hildayanti, A. 2022. Pengembangan lanskap Pulau Lae-Lae berbasis kawasan wisata pantai. *Jurnal Al-Ḥaḍārah Al-IslĀmiyah*, *2*(2), 1-20.

Hoeksema, B. W. 2012. Distribution patterns of mushroom corals (Scleractinia: Fungiidae) across the Spermonde Shelf, South Sulawesi. *Raffles Bulletin of Zoology*, *60*(1).

Imran, A. M., Kaharuddin, M. S., D. A. Suriamihardja & H. Sirajuddin. 2013. Geology of spermonde platform. *Proceedings of the 7th International Conference on Asian and Pacific Coasts (APAC 2013) Bali, Indonesia, September 24-26, 2013.*

Jalil, A. R. 2013. Distribusi kecepatan arus pasang surut pada muson peralihan barat-timur terkait hasil tangkapan ikan pelagis kecil di perairan Spermonde. *Depik*, *2*(1).

Johan, O., Purwanto, P., Rumengan, I., & Awaludinnoer, A. 2020. Kelimpahan penyakit karang di Kepulauan Ayau dan Asia Kabupaten Raja Ampat. *Jurnal Riset Akuakultur*, *15*(2), 121-128.

Jompa, J. 1996. Monitoring and Assessment of Coral Reef in Spermonde Archipelago, South Sulawesi, Indonesia.

Jompa, J., Moka, W., & Yanuarita, D. 2005. Kondisi ekosistem perairan kepulauan Spermonde: keterkaitannya dengan pemanfaatan sumberdaya laut di kepulauan Spermonde. Divisi Kelautan Pusat Kegiatan Penelitian, Universitas Hasanuddin.

Kasnir, M. 2011. Analisis aspek ekologi penatakelolaan minawisata bahari di Kepulauan Spermonde Kabupaten Pangkep, Sulawesi Selatan. *ILMU KELAUTAN: Indonesian Journal of Marine Sciences*, *16*(2), 61-69.

Mitchell, Simon F. 2002. Palaeoecology of corals and rudists in mixed volcaniclastic–carbonate small-scale rhythms (Upper Cretaceous, Jamaica). Volume 186, Issues 3–4.

Muhaemin, M., Arifin, T., Mahdafikia, N., & Fihrin, H. 2022. Pengaruh parameter oseanografi fisik terhadap indikasi pemutihan karang (coral bleaching) di Taman Wisata Perairan (TWP) Kapoposang Spermonde Selat Makassar. *Journal of Marine Research*, *11*(4), 587-597.

MuhIis. 2011. Ekosistem terumbu karang dan kondisi oseanografi perairan kawasan wisata bahari Lombok. Berk. PeneI. *Hayati:* 16 (111-112), 2011.

Mutaqin, B. W., Yuendini, E. P., Aditya, B., Rachmi, I. N., Fathurrizqi, M. I., Damayanti, S. I., ... & Puspitasari, N. N. 2020. Kelimpahan megabentos sebagai indikator kesehatan karang di Perairan Bilik, Taman Nasional Baluran, Indonesia. *Jurnal Enggano*, *5*(2), 181-194.

NatGeo Indonesia. 2019.

Nurdin, N., Komatsu, T., & Fakhriyyah, S. 2016. Coral reef destruction of small island in 44 years and destructive fishing in Spermonde Archipelago, Indonesia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 47, No. 1, p. 012011). IOP Publishing.

Nurdin, N., Prasyad, H., Rani, C., Al Azizi, S. Q., Pulubuhu, D. A. T., Aris, A., Aushaf S. T., Nurdin N., & Komatsu, T. 2023. Tracking coral loss in the Spermonde

Archipelago of Indonesia: 32 years of satellite monitoring from 1990 to 2022. *International Journal of Remote Sensing*, 1-31.

Nyompa, S., Maru, R., & Arfan, A. 2018. Penduduk Pulau Barrang Lompo (suatu analisis aspek-aspek demografi).

Papu, Adelfia. 2011. Kondisi tutupan karang Pulau Kapoposang, Kabupaten Pangkajene Kepulauan, Provinsi Sulawesi Selatan. *Jurnal Ilmiah Sains*, 6-12.

Plass-Johnson, J. G., Teichberg, M., Bednarz, V. N., Gärdes, A., Heiden, J. P., Lukman, M., & Ferse, S. C. 2018. Spatio-temporal patterns in the coral reef communities of the Spermonde Archipelago, 2012–2014, II: fish assemblages display structured variation related to benthic condition. *Frontiers in Marine Science*, *5*, 36.

Polapa, F., & Suharto, S. 2023. Coral reef transplant success rate in Bonetambu Island, Spermonde Archipelago. *Jurnal Ilmu Kelautan SPERMONDE*, *9*(2), 9-13.

Rani, C. 2003. Perikanan dan terumbu karang yang rusak: bagaimana mengelolanya?. *Bionatura*, *5*(2), 218004.

Rani, C., Burhanuddin, A. I., & Atjo, A. A. 2009. Sebaran dan keragaman ikan karang di Pulau Barrang Lompo: kaitannya dengan kondisi dan kompleksitas habitat. Seminar Nasional Perikanan UGM. Yogyakarta. 14 pp.

Rasyid, Abdul. 2011. Pemetaan Pola pergerakan arus permukaan pada musim peralihan Timur-Barat di Perairan Spermonde. *Globe*, *13*(1), 8-14.

Rauf, A., & Yusuf, M. 2004. Studi distribusi dan kondisi terumbu karang dengan menggunakan teknologi penginderaan jauh di Kepulauan Spermonde, Sulawesi Selatan. *Ilmu Kelautan: Indonesian Journal of Marine Sciences*, *9*(2), 74-81.

Rice, S. A., & Hunter, C. L. 1992. Effects of suspended sediment and burial on scleractinian corals from west central Florida patch reefs. *Bulletin of Marine Science*, *51*(3), 429-442.

Rizqia, A., Sunarto, S., Agung, M. U. K., & Riyantini, I. 2022. Kondisi tutupan terumbu karang dan tingkat prevalensi penyakit serta gangguan kesehatan pada berbagai lifeforms karang di Pulau Pramuka, Kepulauan Seribu. *Jurnal Kelautan Nasional*, *17*(1), 47-58.

Rosalina, D., Rombe, K. H., & Hasnatang, H. 2022. Pemetaan sebaran lamun menggunakan metode lyzenga studi kasus Pulau Kapoposang, Provinsi Sulawesi Selatan. *Jurnal Kelautan Tropis*, *25*(2), 169-178.

Saptarini, D., & Mukhtasor, I. F. 2016. Variasi bentuk pertumbuhan (lifeform) karang di sekitar kegiatan pembangkit listrik, studi kasus kawasan Perairan PLTU Paiton, Jawa Timur. *PROSIDING* ISSN: 2337-506X SEMNAS BIODIVERSITAS Maret 2016 Vol.5 No.2.

Sardy, O. J., A. J. Patandean & Nasrul Ihsan. 2016. Pemetaan kondisi terumbu karang di Pulau Lae-Lae Kecil dengan menggunakan citra spot 4. *Jurnal Sains dan Pendidikan Fisika* Jilid 12 Nomor 1, April 2016 halaman 96 – 101.

Sari, N. W. P., Siringoringo, R. M., Abrar, M., Putra, R. D., Sutiadi, R., & Yusuf, S. 2021. Status of coral reefs in the water of Spermonde, Makassar, South Sulawesi. In *E3S Web of Conferences* (Vol. 324, p. 03007). EDP Sciences.

SAS Planet Application. 2023.

Sawalman, R., Zamani, N. P., Werorilangi, S., & Ismet, M. S. 2020. Akumulasi mikroplastik pada spesies ikan ekonomis penting di perairan Pulau Barranglompo, Makassar. *Jurnal Ilmu dan Teknologi Kelautan Tropis, 13*(2): 241-259.

Selamat, M. B., Muhiddin, A. H., & Ukkas, M. 2014. Karakterisasi 3d Substrat Bentik Perairan Karang Pulau Bonetambung Makassar. *Torani Journal of Fisheries and Marine Science*, *24*(2).

Suharsono. 2008. Jenis-jenis karang di Indonesia. LIPI press, anggota Ikapi. Jakarta. 375 Hal.

Sunarto. 2006. Keanekaragaman hayati dan degradasi ekosistem terumbu karang. Karya Ilmiah FKIP Unpad.

Syahadat, S. I. M. L. 2018. Nelayan Pulau Lumu-Lumu dan Pulau Langkai pasca penegakan aturan pelarangan penggunaan bahan peledak dalam menangkap ikan. *Jurnal Ilmiah Pena Vol. 1 Nomor 1 Tahun 2018.*

Tahir, A., Boer, M., Susilo, S. B., & Jaya, I. 2009. Indeks kerentanan pulau-pulau kecil: kasus Pulau Barrang Lompo-Makasar. *Jurnal Ilmu Kelautan*, *14*(4), 8-13.

Tatipata, K. B., & Mashoreng, S. 2019. Dampak Kondisi Karang Terhadap Struktur Komunitas Megabentos yang Berasosiasi dengan Terumbu Karang Kepulauan Spermonde. *Jurnal TORANI JFMarcSci*, *3*(1), 37-50.

Teichberg, M., Wild, C., Bednarz, V. N., Kegler, H. F., Lukman, M., Gärdes, A. A., ... & Plass-Johnson, J. G. 2018. Spatio-temporal patterns in coral reef communities of the Spermonde Archipelago, 2012–2014, I: comprehensive reef monitoring of water and benthic indicators reflect changes in reef health. *Frontiers in Marine Science*, *5*, 33.

Thamrin, T. 2012. Ekosistem terumbu karang hubungan antara karang dan zooxanthellae.

Tudang, E. M., Rembet, U. N., & Wantasen, A. S. 2019. Ecological Conditions And Economic Values Of Coral Reef Flats In Mattiro Deceng Village, Badi Island, Pangkajenne Kepulauan Regency, South Sulawesi. *Jurnal Ilmiah Platax*, *7*(1), 142-148.

Yusuf, S., Rani C., & Jompa J. 2009. Fenomena bleaching karang Tahun 2009 di Pulau Badi Selat Makassar.

Zurba, Nabil. 2019. Pengenalan terumbu karang sebagai pondasi utama laut kita. Aceh: Unimal Press.

LAMPIRAN

Lampiran 1. Nilai rata-rata tutupan bentik Pulau Spermonde Tahun 2021

Site	Live Coral	Dead Coral	Algae	Other	Abiotic
Lae-Lae	0.98	0	75.18	1.55	21.02
Samalona	16.15	0.8	17.00	27.11	36.98
Barrang Lompo	15.62	0.33	10.49	6.42	65.16
Bonetambung	9.45	2.96	6.69	5.96	72.53
Badi	42.87	9.62	8.47	7.22	29.2
Lumu-Lumu	45.69	21.13	7.16	16.51	7.96
Karang Kassi	49.93	12.62	9.22	5.89	19.69
Kapoposang	31.18	10.71	8.87	6.89	39.2

Standar error

Site	Live Coral	Dead Coral	Algae	Other	Abiotic
Lae-Lae	0.45	0	4.98	0.99	5.18
Samalona	5.42	0.34	7.16	1.45	3.68
Barrang Lompo	6.48	0.18	4.12	0.33	4.17
Bonetambung	4.59	0.84	3.14	1.33	9.51
Badi	3.58	3.75	1.77	0.98	6.04
Lumu-Lumu	2.56	1.10	1.18	0.91	2.33
Karang Kassi	5.56	4.48	2.18	1.01	7.45
Kapoposang	7.07	2.60	2.18	1.72	6.93

Lampiran 2. Uji One-Way ANOVA *live coral* 2021

Tests of Normality

	Site	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
LiveCoral	Lae-Lae	.224	3	.	.984	3	.762
	Samalona	.202	3	.	.994	3	.855
	Barrang Lompo	.335	3	.	.858	3	.262
	Bonetambung	.265	3	.	.954	3	.585
	Badi	.184	3	.	.999	3	.929
	Lumu-Lumu	.181	3	.	.999	3	.942
	Karang Kassi	.257	3	.	.961	3	.619
	Kapoposang	.230	3	.	.981	3	.735

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

LiveCoral

Levene Statistic	df1	df2	Sig.
1.529	7	16	.227

ANOVA

LiveCoral

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7124.073	7	1017.725	14.061	.000009
Within Groups	1158.098	16	72.381		
Total	8282.171	23			

LiveCoral

Tukey HSD

Site	N	Subset for alpha = 0.05		
		1	2	3
Lae-Lae	3	.9778		
Bonetambung	3	9.4444	9.4444	
Barrang Lompo	3	15.6222	15.6222	
Samalona	3	16.1556	16.1556	
Kapoposang	3		31.1778	31.1778
Badi	3			42.8667
Lumu-Lumu	3			45.6889
Karang Kassi	3			49.9333
Sig.		.408	.092	.192

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 3. Uji Kruskal-Wallis *dead coral* 2021

Test Statistics[a,b]

	DeadCoral
Chi-Square	20.515
df	7
Asymp. Sig.	.005

a. Kruskal Wallis Test

b. Grouping Variable: Site

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of DeadCoral is the same across categories of Site.	Independent-Samples Kruskal-Wallis Test	.005	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Lampiran 4. Uji One-Way ANOVA *algae* 2021

Tests of Normality

	Site	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Algae	Lae-Lae	.263	3	.	.955	3	.592
	Samalona	.315	3	.	.891	3	.356
	Barrang Lompo	.321	3	.	.883	3	.332
	Bone Tambung	.243	3	.	.972	3	.681
	Badi	.175	3	.	1.000	3	1.000
	Lumu-Lumu	.214	3	.	.989	3	.802
	Karang Kassi	.385	3	.	.750	3	.000
	Kapoposang	.343	3	.	.842	3	.220

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Algae

Levene Statistic	df1	df2	Sig.
2.902	7	16	.037

ANOVA

Algae

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11470.503	7	1638.643	37.377	.000
Within Groups	701.446	16	43.840		
Total	12171.949	23			

Algae

Tukey HSD

Site	N	Subset for alpha = 0.05	
		1	2
Bone Tambung	3	6.6889	
Lumu-Lumu	3	7.1556	
Badi	3	8.4667	
Kapoposang	3	8.8667	
Karang Kassi	3	9.2222	
Barrang Lompo	3	10.4889	
Samalona	3	17.0000	
Lae-Lae	3		75.1778
Sig.		.565	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 5. Uji One-Way ANOVA *other* 2021

Tests of Normality

Site		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Other	Lae-Lae	.373	3		.779	3	.066
	Samalona	.375	3		.774	3	.055
	Barrang Lompo	.315	3		.892	3	.360
	Bonetambung	.207	3		.992	3	.830
	Badi	.189	3		.998	3	.907
	Lumu-Lumu	.217	3		.988	3	.789
	Karang Kassi	.303	3		.909	3	.416
	Kapoposang	.247	3		.969	3	.661

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Other

Levene Statistic	df1	df2	Sig.
3.589	7	16	.016

ANOVA

Other

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.192	7	.313	16.532	.000003
Within Groups	.303	16	.019		
Total	2.496	23			

Other

Tukey HSD

Site	N	Subset for alpha = 0.05			
		1	2	3	4
Lae-Lae	3	.3487			
Bonetambung	3		.8256		
Karang Kassi	3		.8277		
Barrang Lompo	3		.8697	.8697	
Kapoposang	3		.8741	.8741	
Badi	3		.9087	.9087	
Lumu-Lumu	3			1.2421	1.2421
Samalona	3				1.4478
Sig.		1.000	.994	.066	.611

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 6. Uji One-Way ANOVA *abiotic* 2021

Tests of Normality

	Site	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Abiotic	Lae-Lae	.300	3	.	.913	3	.430
	Samalona	.365	3	.	.798	3	.110
	Barrang Lompo	.199	3	.	.995	3	.867
	Bonetambung	.220	3	.	.987	3	.779
	Badi	.346	3	.	.837	3	.207
	Lumu-Lumu	.228	3	.	.982	3	.744
	Karang Kassi	.326	3	.	.874	3	.307
	Kapoposang	.334	3	.	.859	3	.266

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Abiotic

Levene Statistic	df1	df2	Sig.
1.304	7	16	.310

ANOVA

Abiotic

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10551.905	7	1507.415	13.688	.000011
Within Groups	1762.059	16	110.129		
Total	12313.964	23			

Abiotic

Tukey HSD

Site	N	Subset for alpha = 0.05			
		1	2	3	4
Lumu-Lumu	3	7.9556			
Karang Kassi	3	19.6889	19.6889		
Lae-Lae	3	21.0222	21.0222		
Badi	3	29.2000	29.2000		
Samalona	3	36.9778	36.9778	36.9778	
Kapoposang	3		39.2000	39.2000	
Barrang Lompo	3			65.1556	65.1556
Bonetambung	3				72.5333
Sig.		.058	.361	.069	.986

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 7. Nilai rata-rata tutupan bentik Pulau Spermonde Tahun 2022

Site	Live Coral	Dead Coral	Algae	Other	Abiotic
Lae-Lae	0.25	0	69.09	0.89	28.07
Samalona	17.53	1.16	29.44	13.07	37.04
Barrang Lompo	20.34	0.42	7.91	33	35.98
Bonetambung	9.04	0.86	1.93	19.56	67.4
Badi	23.93	3.71	2.16	12.75	55.38
Lumu-Lumu	43.33	3.09	11.24	24.62	15.56
Karang Kassi	40.84	4.47	4.09	14.75	32.15
Kapoposang	31.8	3.54	0.93	9.07	52.8

Standar error

Site	Live Coral	Dead Coral	Algae	Other	Abiotic
Lae-Lae	0.21	0	0.21	0.59	0.89
Samalona	7.96	0.49	6.09	1.62	6.01
Barrang Lompo	2.87	0.12	1.82	2.49	3.39

Bonetambung	2.15	0.35	1.04	2.88	6.49
Badi	2.91	1.08	0.89	2.23	7.14
Lumu-Lumu	5.01	0.29	0.82	1.00	4.96
Karang Kassi	6.72	2.04	0.60	4.16	6.08
Kapoposang	9.13	1.16	0.23	0.61	10.50

Lampiran 8. Uji One-Way ANOVA *live coral* 2022

Tests of Normality

	Site	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Live Coral	Lae-Lae	.353	3	.	.824	3	.174
	Samalona	.234	3	.	.979	3	.719
	Barrang Lompo	.371	3	.	.784	3	.077
	Bonetambung	.243	3	.	.973	3	.682
	Badi	.245	3	.	.970	3	.670
	Lumu-Lumu	.369	3	.	.789	3	.088
	Karang Kassi	.202	3	.	.994	3	.855
	Kapoposang	.202	3	.	.994	3	.853

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Live Coral

Levene Statistic	df1	df2	Sig.
1.969	7	16	.124

ANOVA

Live Coral

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4675.718	7	667.960	7.478	.000448
Within Groups	1429.164	16	89.323		
Total	6104.882	23			

Live Coral

Tukey HSD

Site	N	Subset for alpha = 0.05		
		1	2	3
Lae-Lae	3	.2444		
Bone Tambung	3	9.0444	9.0444	
Samalona	3	17.5333	17.5333	17.5333
Barrang Lompo	3	20.3333	20.3333	20.3333
Badi	3	23.9333	23.9333	23.9333
Kapoposang	3		31.8000	31.8000
Karang Kassi	3			40.8444
Lumu-Lumu	3			43.3333
Sig.		.102	.126	.062

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 9. Uji One-Way ANOVA *dead coral* 2022

Tests of Normality[a]

	Site	Kolmogorov-Smirnov[b]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Dead Coral	Samalona	.240	3	.	.975	3	.694
	Barrang Lompo	.253	3	.	.964	3	.637
	Bonetambung	.253	3	.	.964	3	.637
	Badi	.353	3	.	.823	3	.170
	Lumu-Lumu	.337	3	.	.855	3	.253
	Karang Kassi	.175	3	.	1.000	3	1.000
	Kapoposang	.193	3	.	.997	3	.890

a. Dead Coral is constant when Site = Lae-Lae. It has been omitted.

b. Lilliefors Significance Correction

Test of Homogeneity of Variances

Dead Coral

Levene Statistic	df1	df2	Sig.
2.588	7	16	.055

ANOVA

Dead Coral

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	62.527	7	8.932	3.340	.022
Within Groups	42.785	16	2.674		

Total	105.313	23			

Dead Coral

Tukey HSD

Site	N	Subset for alpha = 0.05
		1
Lae-Lae	3	.0000
Barrang Lompo	3	.4222
Bone Tambung	3	.8667
Samalona	3	1.1556
Lumu-Lumu	3	3.0889
Kapoposang	3	3.5333
Badi	3	3.7111
Karang Kassi	3	4.4667
Sig.		.062

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 10. Uji One-Way ANOVA *algae* 2022

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
Site		Statistic	df	Sig.	Statistic	df	Sig.
Algae	Lae-Lae	.189	3		.998	3	.906
	Samalona	.279	3		.939	3	.524
	Barrang Lompo	.221	3		.986	3	.772
	Bonetambung	.256	3		.962	3	.626
	Badi	.177	3		1.000	3	.968
	Lumu-Lumu	.256	3		.962	3	.626
	Karang Kassi	.177	3		1.000	3	.970
	Kapoposang	.343	3		.843	3	.221

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Algae

Levene Statistic	df1	df2	Sig.
3.689	7	16	.015

ANOVA

Algae

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.796	7	.114	11.003	.000045
Within Groups	.165	16	.010		
Total	.961	23			

Algae

Tukey HSD

		Subset for alpha = 0.05			
Site	N	1	2	3	4
Lae-Lae	3	.0143			
Samalona	3	.0360			
Lumu-Lumu	3	.0824	.0824		
Barrang Lompo	3	.1223	.1223		
Karang Kassi	3	.2020	.2020	.2020	
Badi	3		.3690	.3690	.3690
Bonetambung	3			.4229	.4229
Kapoposang	3				.5312
Sig.		.369	.051	.204	.537

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 11. Uji One-Way ANOVA *other* 2022

Tests of Normality

	Site	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Other	Lae-Lae	.374	3	.	.778	3	.062
	Samalona	.323	3	.	.878	3	.319
	Barrang Lompo	.258	3	.	.960	3	.615
	Bonetambung	.339	3	.	.851	3	.243
	Badi	.244	3	.	.971	3	.674
	Lumu-Lumu	.312	3	.	.895	3	.371
	Karang Kassi	.175	3	.	1.000	3	.990
	Kapoposang	.314	3	.	.893	3	.363

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Other

Levene Statistic	df1	df2	Sig.
1.772	7	16	.162

ANOVA

Other

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2019.212	7	288.459	18.718	.000001
Within Groups	246.566	16	15.410		
Total	2265.778	23			

Other

Tukey HSD

Site	N	Subset for alpha = 0.05			
		1	2	3	4
Lae-Lae	3	.8889			
Kapoposang	3	9.0667	9.0667		
Badi	3		12.7556		
Samalona	3		13.0667		
Karang Kassi	3		14.7556	14.7556	
Bonetambung	3		19.5556	19.5556	
Lumu-Lumu	3			24.6222	24.6222
Barrang Lompo	3				33.0000
Sig.		.243	.071	.101	.220

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 12. Uji One-Way ANOVA *abiotic* 2022

Tests of Normality

	Site	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Abiotic	Lae-Lae	.201	3	.	.994	3	.856
	Samalona	.232	3	.	.980	3	.727
	Barrang Lompo	.236	3	.	.977	3	.711
	Bonetambung	.312	3	.	.895	3	.371
	Badi	.198	3	.	.995	3	.869
	Lumu-Lumu	.341	3	.	.846	3	.230
	Karang Kassi	.203	3	.	.994	3	.850
	Kapoposang	.202	3	.	.994	3	.854

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

Abiotic

Levene Statistic	df1	df2	Sig.
1.205	7	16	.355

ANOVA

Abiotic

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5925.194	7	846.456	7.207	.001
Within Groups	1879.250	16	117.453		
Total	7804.444	23			

Abiotic

Tukey HSD

Site	N	Subset for alpha = 0.05		
		1	2	3
Lumu-Lumu	3	15.5556		
Lae-Lae	3	28.0667	28.0667	
Karang Kassi	3	32.1556	32.1556	
Barrang Lompo	3	35.9778	35.9778	
Samalona	3	37.0444	37.0444	37.0444
Kapoposang	3		52.8	52.8
Badi	3		55.3778	55.3778
Bonetambung	3			67.4
Sig.		0.292	0.099	0.053

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 13. Uji T karang hidup masing-masing stasiun penelitian pada 2021 dan 2022

Pulau Lae-Lae

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Live Coral	Equal variances assumed	1.293	.319	1.487	4	.211	.73333	.49327	-.63619	2.10286
	Equal variances not assumed			1.487	2.868	.238	.73333	.49327	-.87824	2.34490

Pulau Samalona

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Live Coral	Equal variances assumed	.491	.522	-.143	4	.893	-1.38000	9.62760	-28.11049	25.35049
	Equal variances not assumed			-.143	3.529	.894	-1.38000	9.62760	-29.57985	26.81985

Pulau Barrang Lompo

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Live Coral	Equal variances assumed	3.575	.132	-.665	4	.543	-4.71333	7.09018	-24.39882	14.97216
	Equal variances not assumed			-.665	2.754	.558	-4.71333	7.09018	-28.46022	19.03355

Pulau Bonetambung

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Live Coral	Equal variances assumed	1.962	.234	.080	4	.940	.40333	5.06873	-13.66973	14.47639
	Equal variances not assumed			.080	2.836	.942	.40333	5.06873	-16.26793	17.07460

Pulau Badi

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Live Coral	Equal variances assumed	.059	.821	4.103	4	.015	18.93333	4.61482	6.12055	31.74612
	Equal variances not assumed			4.103	3.839	.016	18.93333	4.61482	5.90538	31.96128

Pulau Lumu-Lumu

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Live Coral	Equal variances assumed	2.749	.173	.419	4	.697	2.35667	5.62280	-13.25473	17.96806
	Equal variances not assumed			.419	2.980	.703	2.35667	5.62280	-15.60402	20.31735

Karang Kassi

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Live Coral	Equal variances assumed	.059	.820	1.043	4	.356	9.09000	8.71800	-15.11506	33.29506
	Equal variances not assumed			1.043	3.865	.358	9.09000	8.71800	-15.45339	33.63339

Pulau Kapoposang

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Live Coral	Equal variances assumed	.144	.724	-.054	4	.960	-.62333	11.54934	-32.68943	31.44276
	Equal variances not assumed			-.054	3.764	.960	-.62333	11.54934	-33.49753	32.25087

Lampiran 14. Nilai selisih rata-rata tutupan bentik Pulau Spermonde Tahun 2021 & 2022

Site	Live Coral	Dead Coral	Algae	Other	Abiotic	Rubble
Lae-Lae	-0.738	0	-6.09	-0.67	6.66	0.37
Samalona	1.373	0.36	12.44	-14.04	0.31	-0.25
Barrang Lompo	4.703	0.09	-2.58	26.58	-20.11	-9.06
Bonetambung	-0.396	-2.09	-4.76	13.6	-16.53	11.4
Badi	-18.934	-5.91	-6.31	5.54	10.84	15.33
Lumu-Lumu	-2.343	-18.04	4.08	8.11	-0.84	8.45
Karang Kassi	-9.082	-8.15	-5.13	8.87	1.22	11.24
Kapoposang	0.634	-7.18	-7.94	2.18	-1.2	14.8

Lampiran 15. Analisis regresi linear sederhana *dead coral* & *live coral, live coral* & *algae*, *live coral* & *abiotic* serta *live coral* & *rubble*

SUMMARY OUTPUT DC & LC

Regression Statistics	
Multiple R	0.616842319
R Square	0.380494447
Adjusted R Square	0.358369248
Standard Error	5.717214744
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	562.1214528	562.1214528	17.19733495	0.0003
Residual	28	915.2232439	32.68654442		
Total	29	1477.344697			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.028630281	1.748607408	0.01637319	0.987052782	-3.553229621	3.610490183	-3.553229621	3.610490183
X Variable 1	0.218456049	0.052678512	4.146966958	0.00028301	0.110549009	0.32636309	0.110549009	0.32636309

SUMMARY OUTPUT LC & ALGAE

Regression Statistics	
Multiple R	0.59039741
R Square	0.348569102
Adjusted R Square	0.325303713
Standard Error	16.55412254
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	4105.734824	4105.734824	14.98230262	0.0006
Residual	28	7673.091246	274.0389731		
Total	29	11778.82607			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	35.19472259	3.745605946	9.396269414	3.7363E-10	27.52219662	42.86724856	27.52219662	42.86724856
X Variable 1	-0.438662861	0.113329138	-3.87069795	0.000593697	-0.670807076	-0.206518646	-0.670807076	-0.206518646

SUMMARY OUTPUT LC & ABT

Regression Statistics	
Multiple R	0.741535077
R Square	0.549874271
Adjusted R Square	0.533798352
Standard Error	13.7606487
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	6476.873395	6476.873395	34.20484229	2.753E-06
Residual	28	5301.952675	189.3554527		
Total	29	11778.82607			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	42.54573264	3.703594252	11.4876873	4.14031E-12	34.95926373	50.13220156	34.95926373	50.13220156
X Variable 1	-1.156780761	0.197791335	-5.848490599	2.75326E-06	-1.561937943	-0.751623578	-1.561937943	-0.751623578

SUMMARY OUTPUT LC & R

Regression Statistics	
Multiple R	0.148896022
R Square	0.022170025
Adjusted R Square	-0.012752474
Standard Error	20.28166765
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	261.1368733	261.1368733	0.63483502	0.432
Residual	28	11517.6892	411.3460427		
Total	29	11778.82607			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	30.18827389	5.800395133	5.204520243	1.58573E-05	18.30670307	42.06984471	18.30670307	42.06984471
X Variable 1	-0.168289871	0.211216353	-0.796765348	0.4322918	-0.600946956	0.264367214	-0.600946956	0.264367214

Lampiran 16. Analisis regresi linear sederhana perubahan tutupan bentik (selisih tutupan tahaun 2021 da 2022) *dead coral* & *live coral*, *live coral* & *algae*, *live coral* & *abiotic* serta *live coral* & *rubble*

SUMMARY OUTPUT DC & LC

Regression Statistics	
Multiple R	0.075476169
R Square	0.005696652
Adjusted R Square	-0.070788221
Standard Error	8.433112464
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	5.296877594	5.296877594	0.074480769	0.789
Residual	13	924.5260157	71.11738583		
Total	14	929.8228933			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-7.141895115	2.443409484	-2.92292191	0.011873692	-12.42056038	-1.863229852	-12.42056038	-1.863229852
X Variable 1	-0.048000283	0.175882131	-0.272911651	0.789208318	-0.427970525	0.33196996	-0.427970525	0.33196996

SUMMARY OUTPUT LC & ALGAE

Regression Statistics	
Multiple R	0.384865487
R Square	0.148121443
Adjusted R Square	0.082592323
Standard Error	12.27392148
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	340.5260033	340.5260033	2.260391159	0.157
Residual	13	1958.43893	150.6491485		
Total	14	2298.964933			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-3.37522356	3.719724285	-0.907385414	0.380715598	-11.41119932	4.660752195	-11.41119932	4.660752195
X Variable 1	0.804278458	0.53495178	1.50345973	0.156620563	-0.351414599	1.959971516	-0.351414599	1.959971516

SUMMARY OUTPUT LC & ABT

Regression Statistics	
Multiple R	0.514379655
R Square	0.26458643
Adjusted R Square	0.208016155
Standard Error	11.40408162
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	608.2749244	608.2749244	4.677128258	0.050
Residual	13	1690.690009	130.0530776		
Total	14	2298.964933			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-6.19207727	2.944970569	-2.10259394	0.055550414	-12.55429938	0.170144841	-12.55429938	0.170144841
X Variable 1	-0.410370724	0.189752161	-2.162666932	0.049790311	-0.820305346	-0.000436103	-0.820305346	-0.000436103

SUMMARY OUTPUT LC & R

Regression Statistics	
Multiple R	0.761090391
R Square	0.579258583
Adjusted R Square	0.546893859
Standard Error	8.625854529
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1331.695171	1331.695171	17.89783769	0.001
Residual	13	967.2697627	74.40536636		
Total	14	2298.964933			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.870227268	3.277690319	1.180778808	0.258843924	-3.210792164	10.9512467	-3.210792164	10.9512467
X Variable 1	-1.086918868	0.256919368	-4.230583612	0.000982017	-1.641959417	-0.531878318	-1.641959417	-0.531878318

Lampiran 17. Nilai rata-rata *coral life form* dan jenis abiotik Pulau Spermonde 2021

Site	ACB	ACD	ACE	ACS	ACT	CB	CE	CF	CM	CMR	CS	HL	ML	Sand	Rock	Rubble
Lae-Lae	0.11	0.07	0	0	0.51	0.04	0	0	0.11	0.09	0.04	0	0	20.07	0.8	0.16
Samalona	0.04	0.02	0.02	0.42	0.09	0.38	1.24	1.42	5.22	7.02	0.24	0.02	0	1.89	0.73	34.36
Barrang Lompo	0.38	0.02	0.07	0.02	0.58	0.49	1.2	0.04	11.18	1.31	0.33	0	0	36.33	1.58	27.24
Bonetambung	0.44	0	0	0	0	1.51	0.96	0.07	4.29	1.31	0.29	0.02	0.56	28.6	2.6	41.33
Badi	4.82	0.02	0	0	0.22	3.87	7.16	2.62	16.71	5.84	1.2	0	0	7.84	0.16	21.2
Lumu-Lumu	2.4	0	0	0	0.04	7.73	6.29	2.38	4.69	21.11	0.24	0	0.8	0.13	1.4	6.42
Karang Kassi	9.49	0	0	0	0.04	7.44	3.93	16.18	6.71	4.78	0.47	0	0.89	5.78	0.73	13.18
Kapoposang	2.2	0	0	0	0.24	9.8	7.4	2.36	2.4	6.07	0.69	0	0.02	2.6	1.73	34.87
Total	**19.88**	**0.13**	**0.09**	**0.44**	**1.72**	**31.26**	**28.18**	**25.07**	**51.31**	**47.53**	**3.5**	**0.04**	**2.27**	**103.24**	**9.73**	**178.76**

Lampiran 18. Nilai rata-rata *coral life form* dan jenis abiotik Pulau Spermonde 2022

Site	ACB	ACD	ACE	ACS	ACT	CB	CE	CF	CM	CMR	CS	HL	ML	Sand	Rock	Rubble
Lae-Lae	0.02	0	0	0	0	0.04	0	0	0.13	0	0	0	0	27.53	0	0.53
Samalona	0.11	0	0	0	0.02	0.62	0.51	0.84	6.38	9	0.02	0.02	0	2.09	0.84	34.11
Barrang Lompo	1.33	0.51	0	0	0.29	0.51	0.73	0.44	12.62	2.82	1.02	0	0	17.44	0.36	18.18
Bonetambung	0.02	0	0	0	0	1.13	0.22	0.18	4.8	1	1.67	0	0	11.16	3.51	52.73
Badi	0.93	0	0	0	0.38	2.47	3.91	0.78	14.18	0.49	0.62	0	0	18.13	0.71	36.53
Lumu-Lumu	3.18	0	0	0	0.29	4.82	2.76	4.29	5.56	21.42	0.76	0	0.27	0.36	0.33	14.87
Karang Kassi	5.4	0	0	0	1.49	4.6	2.27	12.16	10.42	3.09	1	0	0.33	7.67	0.07	24.42
Kapoposang	0.84	0.13	0	0.02	0.04	12	4.29	4.38	1.2	6.69	2.18	0	0.02	1.82	1.31	49.67
Total	**11.83**	**0.64**	**0**	**0.02**	**2.51**	**26.19**	**14.69**	**23.07**	**55.29**	**44.51**	**7.27**	**0.02**	**0.62**	**86.2**	**7.13**	**231.04**