

**Table S1:** Marine strains used in this study.

<b>Bacteria name</b>	<b>Taxa</b>	<b>Colony Morphology</b>	<b>Genome Sequence Available?</b>	<b>16S rRNA Gene Accession Number</b>	<b>WGS Accession</b>	<b>Isolation Site</b>
<i>Marinobacterium georgiense</i>	Gamma-Proteobacteria	small, circular, translucent, white	Yes	U58339.1	NZ_CP022297.1	Coastal Georgia (USA) seawater by enrichment with lignocellulose from a pulp mill (1)
<i>Bacillus-Clostridium</i> strain SE165	Bacillus-Clostridium group	Large, orange colonies	No	AY038905.1	N/A	<i>Spartina</i> leaves; Skidaway Island, Georgia (USA) (2)
<i>Bacillus-Clostridium</i> strain SE98	Bacillus-Clostridium group	Large, white flat colonies	No	AY038926.1	N/A	<i>Spartina</i> leaves; Skidaway Island, Georgia (USA) (2)
<i>Alteromonas macleodii</i> strain EZ55	Gamma-Proteobacteria	Medium, white, flat colonies	Yes	EU704114	NZ_CABDXN010000001.1	Isolated from a Prochlorococcus strain MIT 9215 lab culture (3)
<i>Vibrio natriegens</i> ATCC 14048	Gamma-Proteobacteria	Large, beige, flat colonies	Yes	NR_117890.1	ASM145625v1	Salt marsh sediment; Sapelo Island, Georgia (USA) (4)
<i>Rhodospirillaceae</i> strain EZ35	Alpha-proteobacteria	Medium, beige, flat colonies	No	AF493974	N/A	Isolated from a Prochlorococcus strain MED4 lab culture (3)
<i>Flavobacteriaceae</i> strain EZ40	Bacteroidetes	small, flat, yellow colonies	No	EU591706	N/A	Isolated from a Prochlorococcus strain MIT 9312 lab culture (3)
<i>Alcanivorax</i> sp. strain EZ46	Gamma-Proteobacteria	Slow grower, small, white colonies	No	EU591711	N/A	Isolated from a Prochlorococcus strain NATL2A lab culture (3, 5)

<i>Ruegeria pomeroyi</i> DSS-3	Alpha- proteobacteria	Small, beige (turns dark brown), raised colonies	Yes	NR_028727	NC_003911.12	Coastal seawater; Sapelo Island, Georgia (USA), via enrichment on DMSP (6)
<i>Citricella</i> sp. SE45	Alpha- proteobacteria	Medium, mucoid, whiteish- yellow colonies	Yes	AF388308	ACNW0000000.1	<i>Spartina alterniflora</i> (smooth cordgrass) detritus; southeastern US salt marshes off Skidaway Island, Georgia (USA) (2)
<i>Sagittula stellata</i> E-37	Alpha- proteobacteria	Small, white, raised colonies	Yes	NR_026016	NZ_AAYA0000000.1	Coastal Georgia (USA) seawater by enrichment with lignocellulose from a pulp mill (7)
<i>Sulfitobacter</i> sp. EE-36	Alpha- proteobacteria	Small, white colonies with orange center	Yes	AF007254	GCA_000152605.1	Salt marsh; Sapelo Island, Georgia (USA) (7)
<i>Sulfitobacter</i> sp. NAS- 14.1	Alpha- proteobacteria	Small, white colonies	Yes	642973159 (IMG)	NZ_AALZ0000000.1	Surface waters in North Atlantic Ocean via enrichment on DMSP (8)
<i>Ruegeria</i> sp. TM1040	Alpha- proteobacteria	Small, yellow colonies	Yes	640715081 (IMG)	NC_008044.1	Phycosphere of the dinoflagellate <i>Pfiesteria piscicida</i> (9)
<i>Roseovarius</i> sp. 217	Alpha- proteobacteria	Tiny, white colonies	Yes	642973074 (IMG)	NZ_AAMV0000000.1	Surface waters near Plymouth, England enriched for growth on methyl halide (10)
<i>Roseovarius</i> <i>nubinihibens</i> ISM	Alpha- proteobacteria	Small, orange colonies	Yes	AF098495.1	GCF_000152625.1	Surface waters of the Caribbean Sea (6)

Rhodobacterales strain Y4I	Alpha-proteobacteria	Small, blue/white colonies	Yes	AF388307.1	ABXF00000000.1	<i>Spartina alterniflora</i> (smooth cordgrass) detritus; southeastern salt marshes off Skidaway Island, Georgia (USA) (11)
<i>Sulfitobacter pontiacus</i> CB-D	Alpha-proteobacteria	Small, white colonies	Yes	JN121396	IV89_000278	<i>Emiliana huxleyi</i> bloom in Raunefjorden, Norway enriched for growth on DMSP (12)
<i>Escherichia coli</i> DH5 $\alpha$	Gamma-Proteobacteria	Medium, mucoid, white colonies	Yes	KC161283	JRYM00000000.1	N/A