Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
46255	Ailstock	2010	Protocols for Use of Potamogeton perfoliatus and Ruppia maritima Seeds in Large-Scale Restoration	seed storage, aeration,cold storage, seeds	US	MD	38.67873	-76.18432	Primary/White	research	Laboratory	experimental	Ruppia maritima				seed storage	Altered the temperature and salinity of storing seeds	temperature, salinity, oxygen	This paper provides information on collecting, processing and storing Ruppia maritima seeds for use in restoration. Cold storage and higher salinity levels prevented seeds from germinating prematurely. Aeration was not necessary for R. maritima seeds. Large scale restoration efforts need to understand that different seagrass species require slightly different procedures to ensure productivity of each species will be high.
47120	Al-Haj	2013	Sustainable seagrass restoration in the Virginia coastal bays:	distribution, sediment levels, photosynthesis, depth	US	VA	37.47097	-75.73097	Theses/ Dissertations	research	Laboratory	mesocosm	Zostera marina				light, sediment	Tested the effects of sediment and light individually on photosynthesis	PAM fluorometer, plant productivity	This paper provides information on factors that affect the spacial distribution of Zostera marina. Experiments with elevated sediment levels did not have an effect on photosynthesis of seagrass. The minimum depth limit of this seagrass is dependent on the interactions between light and temperature.
46617	Altstatt	2005	Restoration of a Historic Eelgrass (Zostera marina) Bed at Frenchy's Cove, Anacapa Island	brittlestar, donor beds, transplantation, recovery	US	CA	34.00629	-119.40736	Primary/White, Conference proceedings	restoration, recovery	Field	experimental	Zostera marina	300	500	metal anchor	transplanting techniques, shoot harvesting	Harvested single shoots from donor beds by shaking rhizome free and breaking it off, then transplanted	shoot counts not as density (e.g. per PU), photographs, video, faunal counts	This paper provides guidelines for transplanting seagrass from donor beds and planting them for restoration projects. After planting the seagrass, a brittlestar directly interferred with the project and caused massive eelgrass mortality (95%). After the brittlestar population declined, the eelgrass began to recover and eventually surpassed intitial transplant densities.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48106	Anastasiou	2009	Characterization of the underwater light environment and its relevance to seagrass recovery and sustainability	light, sustainability, wavelength, LIDAR, PAR, chlorophyll, organic matter	US	FL	27.72975	-82.58064	Theses/ Dissertations	research	Field	experimental					light	Estimated light at the bottom compared to the surface, used calulations	water depth, PAR	This paper provides information on the absorption of different wavelengths of light by seagrass. Seagrasses are blue-light limited and compete with colored dissovled organic matter for blue-light. More mangroves and less seagrass were observed with higher levels of colored dissolved organic material.
47335	Avery	2000	Recolonization by Halodule wrightii in Hillsborough Bay, Florida	water quality, distribution, Hillsborough Bay, recolonization	US	FL	27.89250	-82.46405	Abstract	monitoring/ followup	Field	observational	Halodule wrightii						shoot density, leaf length, aerial coverage, epiphytes	This abstract provides information on the seagrass population of Halodule wrightii in the Hillsborough Bay. It discusses the potential effect of water quality on H. wrightii distribution and the recolonization in the bay.
46845	Bayley	2012	The role of eelgrass (Zostera marina L.) source population characteristics in resilience to stress and restoration success	donor beds, stressors, genetics	US	NH, NY	41.54333	-71.33621	Theses/ Dissertations	restoration	Field, Laboratory	mesocosm	Zostera marina				genetics, light intensity	Increased sediment organic matter, light limiting	percent survival (of planting units), shoot counts not as density (e.g. per PU), shoot density, leaf length, leaf width, rhizome length, rhizome internode #, leaves per shoot, rhizome elongation rate, sheath length, sediment organic matter content	This paper provides information on the stress associated with transplanting Zostera marina from different donor beds. Seagrass from different donor beds had different responses to stress of increase sediment organic matter and decreased light. This suggests the importance of donor bed population genetics on the success of restoration.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45392	Bell	2014	The Value of Long-Term Assessment of Restoration: Support from a Seagrass Investigation	long-term monitoring, planting, restoration, field survey	US	FL	27.74419	-82.58336	Primary/White	monitoring/ followup	Field	observational	Halodule wrightii				monitoring	Monitored a seagrass restoration project for 7 years after initial restoration	seagrass percent cover	This paper provides information on the need for long-term monitoring of seagrass restoration habitats. The paper suggests extending the duration of the post-planting survey to assess restoration success would be more accurate and provide more information on the restoration process. Early evaluation of the success of a restoration project could be misleading and may be reversed if monitored long-term.
44600	Bell	2008	Evaluation of seagrass planting and monitoring techniques: Implications for assessing restoration success and habitat equivalency	planting methods, transplanting techniques	US	FL	27.74419	-82.58336	Primary/White	restoration	Field	experimental	Halodule wrightii	10000	6,000	peat pot, staple, mechanical boat, rubber band	method, planting, recovery	Fifteen plots each 45x15 m tested four methods of seagrass planting and compared their recovery rate to adjacent natural seagrass beds.	shoot counts not as density (e.g. per PU), seagrass percent cover	This paper provides information on different methods for planting and monitoring of H. wrightii. Manual planting of rubber band units resulted in the highest cover of seagrass when compared to peat pot and mechanical planting methods. BB scores were also compared to conventional measures of seagrass characteristics; results were similar when BB scores were high and low but differed when BB scores were intermediate.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44611	Biber	2009	Experimental analysis of the response and recovery of Zostera marina (L.) and Halodule wrightii (Ascher.) to repeated light-limitation stress	light limitation, recovery, duration	US	NC	34.69600	-76.62706	Primary/White	recovery	Laboratory	experimental	Halodule wrightii, Zostera marina				shading, sediment cores	Seagrass exposed to acute shading events	shoot counts not as density (e.g. per PU), seagrass percent cover, biomass (above or below), chlorophyll content	This paper provides information on the recovery of Zostera marina and Halodule wrightii from chronic light-limitation. Recovery responses were similar in both species, and survival was dependent on the duration of light-limiting events and recovery periods. Long-term survival was higher when recovery periods had equal or longer duration than light-limiting events.
45104	Boese	2009	Recolonization of intertidal Zostera marina L. (eelgrass) following experimental shoot removal	physical disturbance, seeds, rhizome growth, donor bed	US	OR	44.61150	-124.01858	Primary/White	recovery	Field	experimental	Zostera marina				monitoring, seed dispersal, shoot harvesting	Eelgrass shoots were removed from 4m (2) plots and monitored for 3 years. Seeds were added to additional plots in the second year	shoot counts not as density (e.g. per PU), species	This paper provides guidelines for Zostera marina recovery from physical disturbance. Even though seeds were planted to aid seagrass recovery, recovery was solely dependent on rhizome growth from adjacent seagrass beds. This supports seagrass donor bed recovery.
45156	Bologna	2012	Restoration of Seagrass Habitat in New Jersey, United States	restoration, monitoring, expand	US	NJ	39.85725	-74.11415	Primary/White	restoration	Field	experimental	Ruppia maritima, Zostera marina	6076	1519	peat pot, staple	monitoring, transplanting techniques	Zostera marina and Ruppia maritima were transplanted and monitored for 4 years	percent survival (of planting units), shoot counts not as density (e.g. per PU), patch expansion, patch size or perimeter, species, sediment partical size	This paper provides guidelines on the restoration of Zostera marina and Ruppia maritima seagrass habitats. Zostera marina site success and survival increased over the monitoring period, while Ruppia maritima success was more dependent on other environmental factors. At the end of the 4 years, both species of seagrass were starting to establish and expand.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44507	Bourque	2014	Effects of common seagrass restoration methods on ecosystem structure in subtropical seagrass meadows	fertilizer, filled sediments, grounding, recovery, damaged beds	US	FL	25.40309	-80.27770	Primary/White	recovery	Field	experimental	Halodule wrightii, Syringodium filiforme, Thalassia testudinum				fertilization, recovery, bird stakes, filled sediment, sediment cores	18 sites (each 34 m^2) evaluated. Disturbed, filled, reference sites were each tested with bird stakes as fertilizer as well.	seagrass percent cover, faunal counts, algae percent cover, pH, sediment organic matter content, sediment partical size, nitrogen, phosphorus, porewater sulfide	This paper provides information on the short-term effects of filling excavations and fertilizing in seagrass beds damaged by vessel groundings. The filled sites had low organic matter content, and adding a fertilizer did not increase nutrient pools at the fill sites, but did increase nutrients at reference sites and unrestored disturbed sites. There was not a convergence between restored and unrestored sites after one year, indicating restoration projects should be monitored for longer periods of time.
45397	Bourque	2013	Variability in herbivory in subtropical seagrass ecosystems and implications for seagrass transplanting	herbivores, biomass, herbivory rates, success criteria	US	FL	25.40309	-80.27770	Primary/White	research	Field	experimental	Halodule wrightii, Syringodium filiforme, Thalassia testudinum				season, enclosure, herbivory assays	Herbivory assays were put in place for different sites, seasons, and seagrass species. Herbivory exclusion included no cage, partial cage or full cage.	seagrass percent cover, biomass (above or below), species, roving diver fish count survey, carbon, nitrogen, phosphorus	This paper provides information on herbivory of restored seagrass habitats. Seagrass herbivores removed substantial amount of seagrass biomass ranging from 0% to 82%. Herbivory rates at a future restoration site should be examined before restoration occurs to increase chances of success. The paper suggests that to maximize seagrass planting success, planting should take place during the winter months when herbivory rates are low, and avoid areas in close proximity to coral reefs.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
47780	Bourque	2012	Ecosystem structure in disturbed and restored subtropical seagrass meadows	groundings, damaged beds, recovery, filled sediments, bird stakes	US	FL	25.40309	-80.27770	Theses/ Dissertations	restoration, recovery	Field	experimental	Halodule wrightii, Syringodium filiforme, Thalassia testudinum				recovery, bird stakes, filled sediment, sediment cores	Fill and bird stakes were added to injured seagrass bed damaged from groundings	seagrass percent cover	This paper provides information on the recovery of seagrass beds damaged from ship groundings. Fill treatments lacked organic nutrients while the bird stakes provided nutrients but no enhancement of seagrass production was observed. The more damage to a seagrass bed, the longer it will take to recover even with aided restoration techniques.
44613	Bull	2004	An experimental evaluation of different methods of restoring Phyllospadix torreyi (Surfgrass)	transplant methods, planting, surf grass	US	CA	34.39536	-119.70849	Primary/White	restoration	Field	experimental	Phyllospadix torreyi	2.84	510	plug, rope, epoxy, nylon net	tidal zone, planting, transplanting techniques	Laboratory-reared seedling, sprigs, and plugs were transplanted in the intertidal and subtidal to determine the best transplant technique.	leaves per shoot, aerial coverage	This paper provides guidelines for restoring Phyllospadix torreyi seagrass habitat. Transplanted seedlings survived poorly at both sites. Survivorship of plugs was high at both sites, but physical disturbances on the donor population resulted in a net loss. Transplanted sprigs had the greatest overall increase and is suggested that this method may be the most effective approach.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44831	Busch	2010	Large-Scale Zostera marina (eelgrass) Restoration in Chesapeake Bay, Maryland, USA. Part I: A Comparison of Techniques and Associated Costs	Chesapeake Bay, cost, seeds, spring, fall	US	MD	37.91737	-76.15291	Primary/White	restoration	Field	cost analysis	Zostera marina	255000	13000000	mechanical boat, buoy seed dispersal, hand broadcasting	cost analysis, season, seed storage, seed dispersal, seed harvesting	Collected seeds and compared seed storage conditions, and two seed dispersal methods: spring seed buoys and fall seed broadcasts.		This paper provides information on seed restoration techniques used in the large-scale restoration of the Chesapeake Bay. Fall seed broadcasts was consistantly a more expensive method than spring seed dispersal because of the additional costs required with seed processing and storage. The paper suggests that using seeds for large-scale Zostera marina restoration projects is more advantagous than traditional transplanting methods.
45211	Calumpong	2001	Seagrass transplantation and other seagrass restoration methods	rehabilitation, injury, restoration, techniques, monitoring	US				Primary/White	restoration	Review or case study		Cymodocea serrulata, Enhalus acoroides, Halodule pinifolia, Halodule wrightii, Halophila beccarii, Halophila decipiens, Halophila engelmannii, Halophila hawaiiana, Halophila johnsonii, Halophila minor, Halophila nipponica, Halophila ovalis, Halophila stipulacea, Phyllospadix scouleri, Phyllospadix serrulatus, Phyllospadix torreyi, Ruppia maritima, Syringodium filiforme, Thalassia hemprichii, Thalassia testudinum, Zostera marina				method, cost analysis, monitoring, transplanting techniques			This paper provides guidelines on the techniques used in the restoration and rehabilitation of seagrass ecosystems. Site selection, costs, monitoring, and evaluation of seagrass restoration are discussed. The paper is recommended for government agencies or other interested parties undertaking restoration and rehabilitation of injured seagrass habitats.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
46867	Campanella	2010	Zostera marina population genetics in Barnegat Bay, New Jersey, and implications for grass bed restoration	donor beds, genetics, survival	US	NJ	39.86163	-74.11272	Primary/White	restoration	Field	observational	Zostera marina				donor survey, genetics	Comparing genetic health of restored populations to donor populations using microsatellite DNA polymorphisms	heterozygote frequency, inbreeding frequency	This paper provides information on the genetic health of restored eelgrass populations compared to donor populations. The frequency of heterozygotes was higher in restored populations, but indicates reduced diversity and connectivity. The inbreeding frequency was lower in restored populations than in the native populations. All restored populations in this study had effective population values >50 suggesting high probability of survival.
44217	Campanella	2013	An analysis of the population genetics of restored Zostera marina plantings in Barnegat Bay, New Jersey	Barnegat Bay, genetic diversity, donor populations	US	NJ	39.86163	-74.11272	Primary/White	research	Field	observational	Zostera marina				genetics	Genetic investigation of 8 seagrass populations	Hobs value, Hexp value	This paper provides information on the genetic diversity of seagrass populations in the Barnegat Bay. Populations are not genetically diverse and a low degree of outcrossing was observed. The paper suggests that the seagrass populations with the largest effective populations may be the most effective donor beds for restoration projects.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48070	Chesapeake Bay	2000	Chesapeake Bay submerged aquatic vegetation water quality and habitat-based requirements and restoration targets : a second technical synthesis	Chesapeake Bay, light, water quality	US	MD, VA	37.91737	-76.15291	Technical Reports	restoration	Review or case study		Zostera marina				light, water quality	A technical report on findings in the Chesapeake Bay in regards to light requiremtns, water quality, factors that affect light attenuation		This paper provides information on SAV survival requirements in the Chesapeake Bay including light requirements, factors affecting light attenuation, physical habitats, and water quality. This report is a revision to the original technical report in 1992. It covers multiple experimental field studies and monitoring studies performed within the Chesapeake Bay.
44959	Cole	2012	Nitrogen fixation in restored eelgrass meadows	nitrogen fixation, age of population, sediments	US	VA	37.32496	-75.79965	Primary/White	research	Field	observational	Zostera marina				pre or pre vs post, nitrogen fixation, sediment cores	Nitrogen fixation rates were measured in an area devoid of seagrass. Seagrass was restored in this area and Nitrogen fixation rates were measured again. Restored meadows of different ages were also compared to nearby bare sediment sites.	shoot counts not as density (e.g. per PU), shoot density, leaf length, leaf width, sediment organic matter content, dry weight of growths	This paper provides information on the nitrogen fixation in restored eelgrass habitats. Nitrogen fixation rates in older meadows were 2.7 times more than younger meadows and 28 times more than bare sediments. Sediment and epiphyte nitrogen fixation were strongly related to Zostera marina density.
47802	Cole	2011	Inputs and fluxes of nitrogen in the Virginia coastal bays: Effects of newly-restored seagrasses on the nitrogen cycle	nitrogen levels, absorption, age of population	US	VA	37.32496	-75.79965	Primary/White	research	Field	experimental	Zostera marina				pre or pre vs post, nitrogen fixation	Increased Nitrogen levels in restored seagrass and compared it to bare sediments.	sediment organic matter content	This paper provides information on the effect increased nitrogen levels have on restored seagrass beds. The older seagrass bed absorbed more nitrogen in the sediments then the younger bed, and both had higher nitrogen than bare sediments. This supports the concept of seagrass beds as nutrient "sponges".

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48105	Conklin	2009	Restoration of a seagrass bed in Hawai'i: Understanding the phylogeography of the native red alga, Spyridia filamentosa, and its role in seagrass bed succession	algae, red algae, green algae, substrate	US	HI	21.27435	-157.74998	Theses/ Dissertations	research	Field	experimental	Halophila hawaiiana				monitoring, algae	removed invasive algae and introduced native algae to attempt to recruit seagrass.	video, digitization, image classification	This paper provides information on the potential for algae to prime substrate for seagrass re-establishment. The red algae Spyridia filamentosa was introduced to a site following the removal of the invasive green algae, Avrainvillea amadelpha. Spyridia filamentosa was unsuccessful at priming the substrate for seagrass re-establishment and the site returned to its previous algal-dominated state.
44582	Courchene	2009	Essential fish habitat restoration: effectiveness of SCUBA techniques for eelgrass transplantation in Gloucester, MA	mitigation, sewer, outfall, diving, transplantation	US	MA	42.59544	-70.65489	Conference proceedings	mitigation	Field		Zostera marina	162	6480	skewers	planting, shoot harvesting	Harvested shoots and tied to bamboo skewers. Planted the same day in 28 plots measuring 3x4 m2. Shoots were bundled into 10 clumps of 5 shoots per quadrat (24 quadrats within each plot).	shoot counts not as density (e.g. per PU), biomass (above or below), patch size or perimeter, canopy height	This paper provides information on a seagrass mitigation project performed for after the installation of a sewer outfall. SCUBA diving was an effective method for transplanting eelgrass from the donor sites to the restored sites. Seagrass density was the only criteria that was unsuccessful after one year, although reduced densities were also observed in reference sites. Lateral recruitment and canopy height was higher at the restored site than at reference site.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
46843	Davenport	2012	Modeling Geomorphic Effects on Eelgrass (Zostera marina) Distribution Before and After Restoration, Nisqually Delta, Washington	image classification, digitization, mapping, tides	US	WA	47.13644	-122.67132	Theses/ Dissertations	monitoring/ followup, methods development	Field	observational	Zostera marina				mapping	Compared image classification and digitization mapping methods,		This paper provides guidelines on the use of two mapping methods for monitoring seagrass distribution over time. Image classification underestimated eelgrass presence, while digitization overestimated eelgrass distribution. Tidal fluxuations affected the accuracy of mapping techniques and it was suggested to map using similar low tides to be consistent.
45096	Davis	1998	Quantifying the effects of green crab damage to eelgrass transplants	green crabs, damage, bioturbation, site selection	US	NH	43.06853	-70.87763	Primary/White	research	Laboratory	mesocosm	Zostera marina				fauna, bioturbation	Introduced different densities of green crabs into mesocosms with eelgrass shoots	shoot counts not as density (e.g. per PU), fauna densities	This paper provides information on the indirect negative effect green crabs have on restored Zostera marina beds. The number of shoots damaged was higher in tanks with moderate, high, or very high crab densities, meaning these crabs can significantly decrease transplant survival through bioturbation. Site selection for seagrass restoration should take the influence of biological components into consideration.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48142	Davis	1999	The effect of physical and biological site characteristics on the survival and expansion of transplanted eelgrass (Zostera marina L.)	bioturbation, survival, green crabs, clam worms, site selection	US	NH	43.10373	-70.79317	Theses/ Dissertations, Abstract	research	Field, Laboratory	mesocosm	Zostera marina				fauna, bioturbation, model	Green crabs tested in mesocosms and clam worm studied in the field showed that bioturbation of these species had a negative effect on seagrass suvival. Created transplant site selection model		This paper provides information on the negative effects of bioturbation on seagrass transplant survival. Bioturbation by green crabs and clam worms was shown to have a negative effect on seagrass transplant survival, and protecting seagrass from these species increased survival. This shows the importance of site selection before transplantation; a transplant site selection model was also created in this paper.
47271	Tuxbury	2004	Eelgrass, Zostera marina, recovery in Narragansett Bay: Lessons and success of a eutrophic estuary restoration	planting methods, costs	US	RI	41.62067	-71.35274	Abstract	methods development	Field	experimental	Zostera marina	70,820		grid/TERF, hand planting	method, planting	Planted seagrass and tested different methods for success.		This paper provides guidelines for planting Zostera marina using different planting techniques. The benefits and costs of each technique were compared to determine the most effective method for restoration.
44596	Di Carlo	2008	Evaluation of aboveground and belowground biomass recovery in physically disturbed seagrass beds	biomass, recovery, tropical, subtropical, damaged beds	US	FL, PR	24.69700	-81.24184	Primary/White	research	Field	observational	Halodule wrightii, Halophila decipiens, Halophila engelmannii, Syringodium filiforme, Thalassia testudinum				sediment cores	Observed the recovery of disturbed seagrass beds at different grounding sites. In the Puetro Rico sites, sediments were not redistributed like they were in Florida. All disturbed sites were compared to undisturbed natural sites.	shoot density, seagrass percent cover, biomass (above or below)	This paper provides information on the recovery of damaged seagrass beds in tropical and subtropical environments. Seagrasses have a faster aboveground recovery than belowground. The paper suggests the importance of belowground biomass in assessing the recovery of damaged seagrass beds.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48089	Eddings	2012	Geographic Information Systems Eelgrass (Zostera marina) Habitat Restoration Suitability Model Long Island Sound, USA - A 'Sound-Wide' Model	GIS, model, water depth, site selection	US	CT, NY	41.05693	-72.95935	Theses/ Dissertations	restoration	Field	observational	Zostera marina				mapping, model	GIS model using environmental factors to find potential areas for eelgrass restoration.	temperature, salinity, oxygen, water depth, pH, sediment organic matter content, sediment partical size, nitrogen, phosphorus, suspended solids/ turbidity, chlorophyll a	This paper provides information on potential eelgrass restoration areas using a GIS model. Water depth was added as the first parameter then 11 other environmental factors were added to see where eelgrass growth would be likely. After the model determined the selected areas, field testing should be done to verify and decide if the area is ready for restoration.
48008	Farrer	2010	N-Control seagrass restoration monitoring report monitoring events 2003-2008, Florida Keys National Marine Sanctuary, Monroe County, Florida	grounding, planting, succession, recovery	US	FL	24.70429	-81.20086	Technical Reports	monitoring/ follow up	Field	experimental	Halodule wrightii, Syringodium filiforme, Thalassia testudinum	44	44		monitoring, planting, recovery	Restored and monitored a seagrass bed damaged from a grounding. Planted H. wrightii and S. filiforme and monitored for survival.	percent survival (of planting units), shoot density, seagrass percent cover, video, aerial coverage	This paper provides information in the restoration and monitoring of a seagrass bed damaged by a grounding. Halodule wrightii and Syringodium filiforme were initially planted at the damaged site, but after 5.5 years, Thalassia testudinum became the dominant species. This suggests seagrass succession is common in mixed seagrass habitats. The paper suggests that restoration decreases recovery times of injured seagrass habitats.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48048	FDOT	2003	Johnson's seagrass transplanting studies	lab cultured, planting, season, sedimentation	US	FL	26.11026	-80.10987	Technical Reports	restoration	Field, Laboratory	experimental	Halophila decipiens, Halophila johnsonii		514	plug, staple	monitoring, planting, lab cultivated	Cultivate both types of seagrass in the lab, plant in the field, and monitor for survival	seagrass percent cover, temperature, salinity, light	This paper provides guidelines for the cultivation of Halophila johnsonii and Halophila decipiens in the lab to be used for planting at restoration sites. The collection, cultivation, and planting of seagrass was successful, however it was suggested to avoid planting during colder months and in areas of high sedimentation. This method could be useful for cultivating large quantities of seagrass for a restoration project.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45214	Fonseca	2002	Seagrasses	site selection, costs, transplanting methods, monitoring	US	FL	24.70429	-81.20086	Book	restoration	Review or case study	observational	Enhalus acoroides, Halodule pinifolia, Halodule uninervis, Halodule wrightii, Halophila beccarii, Halophila decipiens, Halophila engelmannii, Halophila hawaiiana, Halophila johnsonii, Halophila minor, Halophila nipponica, Halophila ovalis, Halophila stipulacea, Phyllospadix torreyi, Posidonia angustifolia, Posidonia australis, Posidonia coriacea, Posidonia oceanica, Posidonia sinuosa, Syringodium filiforme, Thalassia testudinum, Zostera asiatica, Zostera capricorni, Zostera caulescens, Zostera japonica, Zostera marina, Zostera noltii, Zostera tasmanica							This paper provides information on techniques and recommendations for successful seagrass restoration. Site selection, costs, transplanting methodology and monitoring are discussed.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
47307	Granger	2002	A practical guide for the use of seeds in eelgrass (Zostera marina L.) restoration. Part I: collection, processing, and storage	seeds, biology, reproductive stalk	US	RI	41.61795	-71.35324	Technical Reports	guideline, restoration	Field	experimental	Zostera marina				seed harvesting	Divers collected reproductive stalks of eelgrass from donor beds in July. The seagrass was filtered several times to separate the seeds from the eelgrass and to remove detritus.		This paper provides guidelines for collecting and separating eelgrass seeds to be used in restoration projects and additional background on the biology of eelgrass. The reproductive stalk of the eelgrass was collected and filtered several times to separate the eelgrass seeds. Because of the small size of the seeds, the amount collected had to be estimated by the weight.
45205	Greiner	2013	Seagrass Restoration Enhances "Blue Carbon" Sequestration in Coastal Waters	carbon accumulation, restored beds, age of bed, carbon dioxide	US	VA	38.47535	-75.06509	Theses/ Dissertations	research	Field	experimental	Zostera marina				sediment cores	Core sampling to measure carbon	shoot density	This paper provides information on carbon accumulation in restored seagrass habitats. The older the restored seagrass habitat, the more carbon it was able to accumulate and had levels similar to natural seagrass habitats. Results from this paper suggest that restored seagrass habitats may be a mitigation tool for atmospheric carbon dioxide emmissions.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48055	Hall	2002	Fragments of the seagrasses Halodule wrightii and Halophila johnsonii as potential recruits in Indan River Lagoon, Florida	seagrass fragments, dispersal range, viability, spring, fall	US	FL	27.84261	-80.47900	Primary/White	research	Laboratory	mesocosm	Halodule wrightii, Halophila johnsonii				season, shoot harvesting	Seagrass were collected from donor sites and transported to outdoor mesocosms. Spring and fall seasons were compared to see the effects on viability. The effects of plant source on fragment viability was compared between two donor sites.	shoot counts not as density (e.g. per PU), leaf length, leaf width, rhizome internode #, temperature, salinity, rhizome diameter	This paper provides information on the viability of seagrass fragments as a dispersal method for restoration. H. johnsonii remained viable for 8 days in the fall and had a shorter viability period in the spring. H. wrightii remained viable for up to 4 weeks of drifting and had a longer period of viability in the spring. This suggests that H. johnsonii fragments require rapid settlement times which limits the dispersal range, whereas H. wrightii have longer viability periods and therefore a wider dispersal range. Both seagrass fragments were able to settle and root in mesocosms, indicating fragmentation as a useful mechanism for recruitment.
45145	Hammerstrom	2007	Response and recovery dynamics of seagrasses Thalassia testudinum and Syringodium filiforme and macroalgae in experimental motor vessel disturbances	prop scars, recovery, disturbance cepth, recolonize,	US	FL	24.72049	-81.08591	Primary/White	recovery	Field	experimental	Syringodium filiforme, Thalassia testudinum				filled sediment, excavation	2 Experiments: 1) Excavated seagrass to resemble prop scars, 2) excavated to 30cm then filled with limestone pea rock to grade. Monitored the recovery of both sites	shoot counts not as density (e.g. per PU), aerial coverage, excavation depth	This paper provides information on the recovery of seagrass beds damaged from propellar scars. T. testudinum was more sensitive to disturbance depth and was able to recolonized over the fill material. The deeper the excavation the longer the seagrass bed took to recover.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44453	Harwell	1999	Eelgrass (Zostera marina L.) seed protection for field experiments and implications for large-scale restoration	protected seeds, seeds, survival, buried	US	VA	37.24262	-76.41979	Primary/White	restoration	Field, Laboratory	experimental	Zostera marina				seed dispersal, lab cultivated, protected vs unprotected	Protected Zostera marina seeds in burlap bags both in the field and laboratory and compared survival to unprotected seeds.	percent survival (of planting units), temperature, salinity, suspended solids/ turbidity	This paper provides information on the planting of Zostera marina seeds for use in restoration projects. Protected seeds had a higher survival rate than the unprotected seeds in the lab and in the field. However the protected seeds were in bags anchored to the bottom and caused sand accumulation which buried the seedlings.
48076	Janicki	1999	Development of a process to track the status of chlorophyll and light attenuation to support seagrass restoration goals in Tampa Bay	chlorophyll, light attenuation, model,	US	FL	27.73311	-82.58254	Technical Reports	restoration	Review or case study	model	Unspecified							This paper provided a process to track the status chlorophyll and light attenuation in seagrass habitats. A model was created to determine different outcomes based on the magnitude and duration of changes occuring within a seagrass bed.
48060	Johnson's Seagrass	2002	Final recovery plan for Johnson's seagrass (Halophila johnsonii Eiseman)	monitoring, restoration, protection	US	FL	26.72713	-80.04583	Technical Reports	recovery	Field	observational	Halophila johnsonii							This paper provides guidelines for the recovery of Halophila johnsonii species and the preservation of its critical habitat. The paper suggests increased monitoring of existing seagrass beds and restoration techniques to enhance seagrass distribution.
48073	Kenworthy	2000	A comparison of two methods for enhancing the recovery of seagrasses into propellor scars: mechanical injection of a nutrient and growth hormone solution vs. defecation by roosting seabirds	fertilization, bird stakes, prop scars	US	FL	24.89447	-80.69520	Technical Reports	methods development, recovery	Field	experimental	Halodule wrightii, Thalassia testudinum			staple, bare root	fertilization, bird stakes, transplanting techniques, nutrient injection	Transplanted seagrass into propeller scars, then compared mechanical injection of nutrients and defecation via birdstakes for recovery of seagrass beds. An undisturbed bed was sampled at the same time as the recovering beds.	shoot counts not as density (e.g. per PU), seagrass percent cover, video, algae percent cover, excavation depth, scar width	This paper provides guidelines for the recovery of seagrass beds following damage by propellers. The use of bird stakes as a fertilizing method for seagrass recovery was highly effective. In addition, the higher the number of shoots per planting unit the higher the survival rate.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44349	Kenworthy	2014	Dependence of eelgrass (Zostera marina) light requirements on sediment organic matter in Massachusetts coastal bays: Implications for remediation and restoration	water quality, sediment, light requirements, site selection	US	MA	42.29159	-70.92011	Primary/White	research	Field	observational	Zostera marina				light, water quality, model	Used a model to test areas where eelgrass could survive based on water quality and light, and identified light requirements for eelgrass		This paper provides guidelines on the conditions required to support successful eelgrass growth. Seagrasses in turbid conditions with poor water and sediment quality have higher light requirements. When restoring eelgrass beds, light availability should be considered before planting.
	Luckenbach	2011	Evaluation of the Effectiveness of SAV Restoration Approaches in the Chesapeake Bay	temperature, stressor, extreme conditions	US	VA	37.91737	-76.15291	Technical Reports	restoration	Review or case study	experimental	Ruppia maritima, Zostera marina	607028			planting, model	Planted seagrass within sites selected by GIS technology factoring in site-specific specifications for SAV survival.		This paper provides guidelines for evaluating the success and failure of SAV restoration. A major limitation in the success of the restoration efforts was not including temperature as a stressor, and only relying on average water quality parameters rather than accounting for interannual variablity and exteme environmental conditions.
44630	Marion	2010	Factors Influencing Seedling Establishment Rates in Zostera marina and Their Implications for Seagrass Restoration	seeds, seed placement, vegetated, unvegetated, seed burial	US	VA	37.91737	-76.15291	Primary/White	restoration	Field	experimental	Zostera marina	103	49060	peat pot, pipet, surface dispersal	season, burial recovery, planting, seed dispersal, protected vs unprotected	Planted seeds at different seasons, in unvegetated areas vs. established seagrass habitat, buried vs. unburied, and protected vs. unprotected in packets.	seedling counts	This paper provides information on how to use Zostera marina seeds efficiently for restoration. Seeds placed in existing established seagrass beds had less survival than seeds placed in unvegetated areas. The results indicated effective Zostera marina seed establishment should be in unvegetated areas after summertime, and that direct seed burial may enhance establishment.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44798	Marion	2010	Innovative Techniques for Large-scale Seagrass Restoration Using Zostera marina (eelgrass) Seeds	seeds, storage, mechanical harvesting	US	VA	37.52207	-76.34636	Primary/White	restoration	Field	experimental	Zostera marina	3222	130,000	mechanical boat, buoy seed dispersal, hand broadcasting	planting, seed storage, seed dispersal, lab cultivated, seed harvesting	Mechanically harvested seeds from donor beds and stored them in the lab and inspected the quality. Planted the seeds mechanically and also using the buoy deployed seed disperal method.	temperature, salinity, seedling counts	This paper provides information on the use of Zostera marina seeds for large-scale restoration efforts. Zostera marina seeds have a high survival rate when being stored over 3 months. Mechanical seed harvesting was effective whereas mechanical planting did not enhance seedling establishment.
46242	McGlathery	2012	Recovery trajectories during state change from bare sediment to eelgrass dominance	seeds, aerial production, ammonium, water depth	US	VA	37.44067	-75.75498	Primary/White	recovery	Field	observational	Zostera marina				monitoring	Observed previously seeded plots for recovery at different stages of maturity	percent survival (of planting units), shoot density, leaf length, leaf width, water depth, aerial coverage, chlorophyll content, sediment organic matter content, sediment partical size, dry weight of growths	This paper provides information on the progression of Zostera marina maturation after seed planting. A 4-year lag was observed in shoot density, aerial production, sediment organic content, and exchangeable ammonium before changes were seen compared to the bare sediment. Results suggest that at least a decade is required for Zostera marina seagrass habitats to be fully restored. Zostera marina was shown to survive at a maximum depth of 1.6 m, any deeper the survival was negatively impacted.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45270	Milbrandt	2008	Short-term indicators of seagrass transplant stress in response to sediment bacterial community disruption	bacterial communities, transplants, autoclaved, stress	US	FL	26.44995	-82.07981	Primary/White	restoration	Field	experimental	Thalassia testudinum				planting, shoot harvesting, sediment bacteria	Collected and transplanted shoots of Thalassia testudinum with different bacterial compositions: sediments were either autoclaved, donor site, or transplant site.	leaf length, leaf width, leaves per shoot	This paper provides information on how the bacterial communities associated within the sediment affect seagrass transplantation. Transplants with the autoclaved sediments had lower bacterial diversity and a higher rate of mortality than transplants with the donor and transplant sediments. This suggests that bacterial communities are critical for reducing stress associated with seagrass transplantation.
46263	Milbrandt	2009	The Effects of Root Zone Manipulation on Microcosm Turtlegrass (Thalassia testudinum) Transplants	growth rate, survival, sediment, sulfide	US	FL	26.44995	-82.07981	Primary/White	restoration	Laboratory	microcosm	Thalassia testudinum				sediment bacteria, sulfide, sediment	Bare-root transplanted seagrass sediments were exposed to four treatments: plus sulfide and plus autoclave, minus sulfide and plus autoclave, plus sulfide only, and unmanipulated.	leaf length, leaf width, temperature, salinity, leaf growth rates, shoot to root ratio, light, wet weight	This paper provides information on the survival and growth rate of transplanted Thalassia testudinum shoots with the manipulation of the sediment. Sulfide treatments did not affect the seagrass growth rate whereas the autoclaved treatments grew slower than unmanipulated treatments. Suggests an intact sediment bacterial community supports transplantation success.
48030	Treat	2006	Seagrass restoration success, failure, and the cost of both : selected papers presented at a workshop, Mote Marine Laboratory, Sarasota, FL, March 11-12, 2003	restoration, budget, costs	US	ME, NH, MA, NJ, MD, VA, FL	27.34481	-82.56786	Primary/White	restoration	Review or case study		Halodule wrightii, Halophila decipiens, Halophila johnsonii, Syringodium filiforme, Thalassia testudinum, Zostera marina							This paper provides guidelines for a cost-analysis for budgeting seagrass restoration projects. A compilation of full papers discussing this topic are included.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44344	Morris	2004	The demise and recovery of seagrass in the northern Indian River Lagoon, Florida	detritus, Indian River Lagoon, decline, recovery	US	FL	28.05141	-80.57607	Primary/White	monitoring/ followup	Field	observational	Halodule wrightii, Ruppia maritima				monitoring, recovery, model	Monitored disturbed seagrass in Turnbull bay and used a model to predict recovery rates	seagrass percent cover, algae percent cover, porewater sulfide	This paper provides guidelines in explaining the natural cycle of seagrass decline and recovery in the Indian River Lagoon. Seagrass were covered by a thick layer of organic detritus and ooze resulting in a major decline of the seagrass population. The seagrass population recovered within 4 years showing that natural fluxuations in seagrass populations exist.
44423	Neckles	2005	Disturbance of eelgrass Zostera marina by commercial mussel Mytilus edulis harvesting in Maine: dragging impacts and habitat recovery	mussel dragging, drag wounds, growth, recovery, regulations	US	ME	43.84418	-70.01718	Primary/White	monitoring/ followup	Field	observational	Zostera marina				monitoring, recovery	Monitored 4 sites disturbed by mussel dragging	shoot density, biomass (above or below), photographs, video, shoot height	This paper provides information on the recovery of eelgrass bed damaged from mussel dragging. Recovery of eelgrass from drag wounds depends on the availability of favorable growth conditions. Regulations that protect seagrass beds from mussel dragging should be in place to successfully conserved seagrass.
44321	Ort	2014	Conservation of Eelgrass (Zostera marina) Genetic Diversity in a Mesocosm-Based Restoration Experiment	genetics, buoys, seeds, genetic diversity	US	CA	37.67181	-122.31075	Primary/White	restoration	Laboratory	mesocosm	Zostera marina				genetics	Tested genetic diveristy of seeds from three source populations in mesocosms. Seven polymorphic microsatellite loci compared diversity from 128 shoots from source populations.	heterozygote frequency	This paper tested the effectiveness of buoy-deployed seeding technique to maintain genetic diversity in restored seagrass beds. It proved that the seeding technique conserves the genetic diversity better than wholeshoot transplanation in eelgrass restoration

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45163	Orth	2000	A review of issues in seagrass seed dormancy and germination: implications for conservation and restoration	seeds, germination, seed banks	US				Primary/White	research	Review or case study		Amphibolis antarctica, Amphibolis griffithifif, Cymodocea nodosa, Cymodocea rotundata, Cymodocea serrulata, Enhalus acoroides, Halodule pinifolia, Halodule uninervis, Halodule wrightii, Halophila beccarii, Halophila decipiens, Halophila engelmannii, Halophila hawaiiana, Halophila johnsonii, Halophila minor, Halophila nipponica, Halophila ovalis, Halophila stipulacea, Heterozostera tasmanica, Phyllospadix scouleri, Phyllospadix serrulatus, Phyllospadix torreyi, Posidonia angustifolia, Posidonia australis, Posidonia coriacea, Posidonia oceanica, Posidonia sinuosa, Ruppia maritima, Syringodium filiforme, Thalassia hemprichii, Thalassia testudinum, Thalassodendron ciliatum, Zostera asiatica, Zostera capricorni, Zostera caulescens, Zostera japonica, Zostera marina, Zostera noltii, Zostera tasmanica								This paper provides guidelines on the seed dormancy, germination, and seed banks in a variety of seagrass species. Seed germination is dependent on many internal and external factors and may need more research to fully understand the germination specifications in every species.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44447	Orth	2006	Ecology of seagrass seeds and seagrass dispersal processes	seeds, germination, dispersal, recruitment	US				Primary/White	restoration	Review or case study	observational	Cymodocea nodosa, Cymodocea rotundata, Cymodocea serrulata, Enhalus acoroides, Halodule pinifolia, Halodule uninervis, Halodule wrightii, Halophila stipulacea, Phyllospadix torreyi, Posidonia australis, Posidonia coriacea, Posidonia oceanica, Ruppia maritima, Syringodium filiforme, Thalassia hemprichii, Thalassia testudinum, Zostera capricorni, Zostera caulescens, Zostera japonica, Zostera marina							This paper provides information on seed ecology of multiple seagrass species. Elaborated topics include seagrass seed production, germination, dispersal, and recruitment of seedlings. The paper suggests that conserving existing beds is crucial to the development of a seed bank, which could be cultivated and plant the seeds for seagrass restoration in other areas.
45245	Orth	2012	Seed addition facilitates eelgrass recovery in a coastal bay system	seed plots, extension rates, large-scale restoration	US	VA	37.39912	-75.78219	Primary/White	restoration	Field	experimental	Zostera marina	1251000	37800000	hand broadcasting	monitoring, planting, seed storage, seed dispersal, seed harvesting	Annual surveys of plots originally planted with Zostera marina seeds.	chlorophyll content, suspended solids/ turbidity	This paper provides information on the Zostera marina expansion from the original seed plots within 4 coastal bays in Virginia. Estimated annual extention rates varied from 10 to 36 cm per year for Zostera marina. This paper demonstrates successful large-scale seed restoration and reproduction.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44421	Peterson	2002	Disturbance and recovery following catastrophic grazing: studies of a successional chronosequence in a seagrass bed	sea urchins, algae, disturbed beds	US	FL	24.72933	-81.16706	Primary/White	recovery	Field	observational	Syringodium filiforme				fauna, monitoring	6 transects across disturbed and undisturbed seagrass to monitor progression of sea urchins		This paper describes a decline in seagrass population due to grazing of the common sea urchin. Impacted seagrass beds did not make a full recovery and opportunistic algae now co-exist with seagrass. Disturbed seagrass beds may not make a full recovery as anticipated.
46928	Pickerell	2005	Buoy-deployed seeding: Demonstration of a new eelgrass (Zostera marina L.) planting method	buoys, dispersal, seeds, recruitment	US	NY	40.9989839	-72.3210912	Primary/White	methods development	Field	experimental	Zostera marina				seed dispersal	Mature reproductive nets were collected and placed into mesh bags attached to a buoy so the seeds would disperse.	shoot counts not as density (e.g. per PU), shoots per genet, buoy position	This paper provides guidelines for a buoy deployed seed dispersal method for Zostera marina. A seedling recruitment of 6.9% was observed for the buoy deployed method. This technique eliminated the need to store seeds, was cost effective, and was simple enough for citizen involvement in restoration.
45314	Reed	1998	Studies on germination and root development in the surfgrass Phyllospadix torreyi: implications for habitat restoration	seeds, germination, root growth enhancement, temperature, nutrient	US	CA	34.40737	-119.84482	Primary/White	restoration	Laboratory	experimental	Phyllospadix torreyi				shading, seed storage, seed harvesting	Mature seeds were collected from female plants and placed in petri dishes in the lab. Some seeds were kept in the dark for periods of time to see if it prolonged dormancy and delayed germination. Then all the seeds were compared and germination times recorded.	seed counts, root counts, dry weight of roots	This paper provides information on factors affecting germination times and root growth enhancement for Phyllospadix torreyi. Seeds stored in cold, dark environments delayed germination for up to 83 days. A single application of the plant hormone resulted in a two-fold increase in the root mass to total mass ratio. The paper suggests that early life stages can be easily stored and grown in the laboratory and may be cost-effective for restoration.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44358	Short	2000	Developing success criteria for restored eelgrass, salt marsh and mud flat habitats	success criteria, model, site selection	US	NH	43.08318	-70.75930	Primary/White	methods development	Field	experimental	Zostera marina				success criteria	Testing success criteria for restoration validity at the Port Mitigation using new methodology		This paper provides guidelines on determining the success criteria for restored seagrass habitats. The paper discusses models used to develop a yardstick of habitat success for eelgrass, salt marsh, and mud flats. The model also gives feedback on different aspects of habitat development over time.
44307	Statton	2012	A comparative assessment of approaches and outcomes for seagrass revegetation in Shark Bay and Florida Bay	planting methods, costs	US	FL	24.95394	-80.68044	Primary/White	restoration	Review or case study		Amphibolis antarctica, Posidonia australis					Compared Shark Bay and Florida Bay revegetation projects	Plant unit density	This paper compared different planting techniques used in seagrass restoration. The results suggest that there is no discrete technique that can be used to ensure cost-effective, scalable revegetation. The appropriate planting technique depends on many independent variables involoved in seagrass restoration.
45324	Uhrin	2009	Survival and Expansion of Mechanically Transplanted Seagrass Sods	large planting units, establishment, transplantation	US	FL	27.37491	-82.58476	Primary/White	restoration	Field	experimental	Halodule wrightii, Thalassia testudinum	48.6	27	mechanical boat	transplanting techniques, large planting units	Transplanted large planting units (1.5 x 1.2 m) of H. wrightii and T. testudinum using a mechanical planting boat.	percent survival (of planting units), shoot density, patch expansion	This paper provides guidelines for transplanting larger planting units of H. wrightii and T. testudinum. After 3 years, 74.1% of the units survived; 67% of the H. wrightii shows substantial expansion, but the T. testudinum had less density and did not expand. This planting method proved effective for seagrass survival and quick initial establishment of H. wrightii.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48038	US Dept of Commerce	2004	Final programmatic environmental impact statement for seagrass restoration in the Florida Keys National Marine Sanctuary	Florida Keys, bird stakes, transplants, fertilizer, sediment, restoration	US	FL	24.51608	-81.80186	Technical Reports	restoration	Review or case study	observational	Halodule wrightii, Syringodium filiforme, Thalassia testudinum							This paper provides information on the different techniques available for seagrass restoration in the Florida Keys. Different alternatives for restoration included no action, seagrass transplants, bird stakes, fertilizer spikes, sediment fill, sediment tubes, berm redistribution, sod replacement, and exclusion cage. Each of these methods were discussed in detail with specific requirements needed. A regional restoration plan was described for this area.
48079	Wilber	1998	Goal setting and success criteria for coastal habitat restoration : invited papers from a symposium held in Charleston, South Carolina, USA January 13-15, 1998	success criteria, restoration	US	SC	32.76788	-79.92297	Primary/White	restoration	Review or case study	observational	Unspecified							This paper provides information on the success criteria for coastal habitat restoration and includes papers about restoration from a symposium.
46856	Evans	2010	Technical Guidelines for the Delineation, Restoration, and Monitoring of Eelgrass (Zostera marina) in Massachusetts Coastal Waters	monitoring, surveying, GIS, site selection, model	US	MA	42.29336	-70.97124	Technical Reports	restoration, mitigation, monitoring/ followup	Review or case study	observational	Zostera marina				method, monitoring, transplanting techniques, mapping, success criteria	Surveying, mitigation, restoration, and monitoring eelgrass	percent survival (of planting units), shoot density, seagrass percent cover, aerial coverage	This paper provides guidelines for methods in delineating eelgrass at a project site and conducting and monitoring seagrass restoration/mitigation efforts. Guidelines for mitigation include utilizing a GIS-based site selection model to determine the appropriate restoration site and using recommended restoration methods for eelgrass. Monitoring should also be established and assess the success criteria of the restoration project.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
46344	Fishman	2004	A Comparative Test of Mechanized and Manual Transplanting of Eelgrass, Zostera marina , in Chesapeake Bay	planting boat, planting methods, costs	US	VA	37.91737	-76.15291	Primary/White	restoration, methods development	Field	experimental	Zostera marina	480	1040	mechanical boat, hand planting	method, cost analysis, planting, transplanting techniques	Mechanical planting by boat and hand planting were compared to determine the most effective method	percent survival (of planting units)	This paper provides information on the success of two seagrass planting techniques to determine the more effective method. Initial planting success was lower for the planting boat, and very high for manual planting. It was determined that the mechanical planting boat had a higher cost associated with it to get the same number of surviving plants.
44804	Fonseca	2000	Integrating biology and economics in seagrass restoration: How much is enough and why?	injury, habitat restoration, recovery, replacement ratio	US	FL	24.70429	-81.20086	Primary/White	mitigation, recovery	Field	observational, model	Halodule wrightii, Syringodium filiforme, Thalassia testudinum				monitoring, recovery, success criteria	monitored injured seagrass beds for years and determined the intrinsic recovery rate to determine the replacement ratio.		This paper provides guidelines on how much habitat should be restored for every unit lost (the replacement ratio). The Habitat Equivalency Analysis was used to determine on-site injury lost against the difference between intrinsic recovery and recovery by restoration to get the replacement ratio.
48058	Jacobson	2002	Seagrass restoration at Lassing Park, St. Petersburg, Florida : analysis after 13.5 years	monitoring, long-term, water depth, succession	US	FL	27.76395	-82.62027	Theses/ Dissertations	monitoring/ follow up	Field		Halodule wrightii, Syringodium filiforme, Thalassia testudinum				species, monitoring, sediment cores	Compared a restored site to a similar reference site and a deeper reference site. 40 x 40 m areas were compared	shoot density, seagrass percent cover, leaf length, biomass (above or below), water depth, sediment organic matter content, sediment partical size	This paper provides information on the long-term monitoring of a restored seagrass habitat. The restored site resembled the reference site that had a similar depth, and did not resemble the deeper reference site. This suggests that water depth may be an important factor when considering site selection for the success of a restoration project.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48126	Gaeckle	2006	Eelgrass (Zostera marina L.) leaf growth and restoration ecology	sheath measurements, monitoring, transplants, fish	US				Theses/ Dissertations	restoration, monitoring/ followup, methods development, recovery	Field	experimental	Zostera marina			grid/TERF	method, planting unit spacing, monitoring, planting, large planting units	Three methods were compared to determine eelgrass leaf growth. Eelgrass sheath length was examined to calculate leaf growth. TERFS planting technique was used to transplant patches of different sizes and determine the effect on extension rates and fish.	faunal colonization, faunal counts, sheath length, fauna densities, leaf growth rates	This paper provides guidelines for monitoring and transplanting eelgrass. As opposed to destructive leaf growth measurements, leaf growth can be calculated by measuring sheath length. Small patches of eelgrass transplants had higher expansion rates and similar fish compared to medium and large patches.
46667	Gayaldo	2002	Transplantation and alteration of submarine environment for restoration of Zostera marina (eelgrass): A case study at Curtis Wharf (Port of Anacortes), Washington	mitigation, dock, shading, enhance, debris removal	US	WA	48.51210	-122.60130	Primary/White	mitigation	Field	experimental	Zostera marina	2.5 m2	100	plug	monitoring, planting, transplanting techniques, mapping	Removed debris on the substrate, removed shading dock, added reflective panels to existing dock, transplanted eelgrass from construction site, and monitored changes.	shoot density, leaf length, leaf width, biomass (above or below), PAR, aerial coverage, light	This paper provides information on the mitigation and transplantation of eelgrass from a potential construction site. An adjacent existing habitat was altered and enhanced to support eelgrass relocation. This mitigation project was suggested for different areas of the Puget Sound.
48136	Gayaldo	2002	Eelgrass (Zostera marina) restoration techniques	redox potentials, sediment, growth	US	WA	48.23907	-122.57016	Theses/ Dissertations	research, restoration, mitigation	Field, Laboratory	experimental	Zostera marina				planting, shading, transplanting techniques, redox	Altered the redox potentials in the seidment to determine growth impacts on transplanted eelgrass.	sediment organic matter content, sediment partical size, leaf growth rates	This paper provides information on the effects of altered redox potentials in the sediment on eelgrass growth rates. In the lab, a correlation was found between altered redox potentials and new growth characteristics. In situ, an increased redox potential in the sediment led to a higher transplant success rate.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44832	Golden	2010	Large-Scale Zostera marina (eelgrass) Restoration in Chesapeake Bay, Maryland, USA. Part II: A Comparison of Restoration Methods in the Patuxent and Potomac Rivers	seeds, dispersal, survival, establishment, success, site selection	US	MD	37.91737	-76.15291	Primary/White	restoration	Field	experimental	Zostera marina	243000	12100000	staple, skewers, buoy seed dispersal, hand broadcasting	pre or pre vs post, monitoring, seed dispersal, success criteria	Seeds were dispersed over 3 years in two rivers, twice as many seeds were dispersed in the Potomac River than the Patuxent River. Seedling survival was monitored.	percent survival (of planting units), shoot density, seedling counts, seed counts	This paper provides information on the restoration of eelgrass by seed dispersal in the Potomac and Patuxent Rivers. Eelgrass establishment and expansion was successful at the Potomac River but not at the Patuxent River. This suggests that site selection is an important factor in the success of eelgrass restoration.
48023	Grablow	2008	Recovery and restoration of the seagrass Halodule wrightii after boat propeller scar damage in a pole-troll zone in Mosquito Lagoon, Florida	recovery, restoration, prop scars, planting, severity	US	FL	28.77617	-80.75976	Technical Reports	restoration, recovery	Field	experimental	Halodule wrightii	160	160	staple	monitoring, planting, recovery, filled sediment, shoot harvesting, excavation	created prop scars that had different levels of severity (trench, roots, shoots present). Monitored for recovery in scars that had no treatment and documented the time. Planted seagrass in some scars to see if restoration improved recovery.	shoot density	This paper provides information on the ability of seagrass to recovery naturally or with the addition of restoration planting. The less severe scars recovered in 2 months whereas the more severe types did not recover within a year. Restoration techniques such as planting seagrass within the trench, filling the trench, or both did not increase recovery time. It was suggested that natural recovery, with dense adjacent beds, was more successful than restoration attempts.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45069	Hammerstrom	1998	Potential for seagrass restoration in Galveston Bay, Texas	transplanting methods, faunal cages, planting patterns	US	TX	29.47197	-94.76915	Primary/White	restoration, methods development	Field	experimental	Halodule wrightii, Ruppia maritima	114.6	617	plug, peat pot, staple, bare root	fauna, planting unit spacing, enclosure, bioturbation, species, herbivory assays, transplanting techniques, protected vs unprotected	Transplanted both seagrass species using plugs, and bare root. Faunal exclusion cages were added with varying mesh sizes to see the effect of transplant survival. Different plant spacing (0.5 vs. 1.0 m) and layout (square vs rectangle) were compared.	percent survival (of planting units), seagrass percent cover, leaf length, rhizome length, biomass (above or below), leaves per shoot, patch expansion, species, sediment organic matter content, suspended solids/ turbidity	This paper provides information on various transplanting methods to enhance transplant survival. Halodule plugs survived better than bare root transplants, and faunal exclusion cages were beneficial to these transplants when the mesh was small (< 3 cm). In order to aid transplants, the cages needed to protect the transplants for 60-90 days. There was no difference between plant unit spacing in the 0.5 m or 1 m centers, or between square and rectangle planting patterns.
47720	Hanisak	2014	After the Blooms: Is Seagrass Recovery in the Indian River Lagoon Recruitment Limited?	grazing, cage, grazer, herbivory, transplant, survival	US	FL	28.07619	-80.58544	Conference proceedings, Abstract	restoration, recovery	Field	experimental	Unspecified			plug	fauna, enclosure, planting, herbivory assays, protected vs unprotected	Planted seagrass at three sites with and without faunal exclusion cages.	percent survival (of planting units), shoot height	This paper provides information on a key limiting factor for recolonization of seagrass in the Indian River Lagoon. Seagrass was transplanted to different sites with and without faunal exclusion cages. Two of the sites may have a higher prevalence of grazers, since the unprotected plugs were grazed heavily. The third site did not show evidence of heavy grazing. All transplants protected by cages had 100% survival suggesting that this method may enhance survival of transplanted seagrass. The cages had a negative effect on seagrass survival and growth after 4 months.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
46258	Harbeson	2010	An investigation of nutrient transfer in a restored eelgrass, Zostera marina, meadow	isotope analysis, consumer, fatty acid, bacteria, biomarker, primary producer	US	VA	37.25069	-75.83630	Theses/ Dissertations	research	Field, Laboratory	experimental	Zostera marina				fatty acid, stable isotope	Stable isotope analysis and monitoring of primary producer fatty acids were examined in primary producers, consumers, and higher trophic fish within sites that had eelgrass and sites that were devoid of eelgrass.		This paper provides information on the consumer diets within a restored eelgrass bed. Stable isotope analysis did not provide any indication that consumers were directly consuming eelgrass, but did show a difference in the isotope values for fish in each of the habitats. High levels of bacterial fatty acid markers were present in all consumers, suggesting bacteria may be the reservoir for transferring eelgrass to consumers via detritus.
44590	Heise	1999	Estuarine artificial reefs to enhance seagrass planting and provide fish habitat	artificial reefs, fish, success, transplant	US	FL	30.43454	-86.34620	Primary/White	research, restoration	Field	experimental	Ruppia maritima	18.75	108	peat pellet	pre or pre vs post, planting	Deployed small artificial reefs in 1 m of water next to newly planted seagrass to see if it increased planting success.	percent survival (of planting units), temperature, salinity, faunal counts, aerial coverage, roving diver fish count survey, suspended solids/ turbidity	This paper provides information on the effect reefs have on seagrass habitats. The number and species of fish were higher in the seagrass beds adjacent to the artificial reef structures. The artificial reefs did not increase seagrass planting success, but did provide greater fish habitat.
44762	Hemming	2005	Implications of water and sediment quality distribution for seagrass restoration in West Bay of the St. Andrew Bay system	decline, sediment, water quality	US	FL	30.12469	-85.70576	Primary/White	research, restoration		observational	Unspecified				water quality, sediment	Used aerial photography and field observations to determine the cause of seagrass loss. Field observations consisted of a sediment quality survey, and a water column survey.	temperature, salinity, oxygen, pH, suspended solids/ turbidity, chlorophyll a	This paper provides information on the history of seagrass loss and potential factors that may have impacted the decline. Sediment contamination was not confirmed, but there were differences in turbidity, water clarity, and salinity in the water column survey. Differences in water quality are heavily dependent on the weather, tidal flows, and proximity to runoff and outfalls.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
47789	Herbert	2011	Projected Reorganization of Florida Bay Seagrass Communities in Response to the Increased Freshwater Inflow of Everglades Restoration	Florida Bay, historical, freshwater, salinity, FATHOM, model, inflow, estuarine, water changes	US	FL	24.95534	-80.67985	Primary/White	restoration		observational, model	Halodule wrightii, Thalassia testudinum				monitoring, model	Used two modeling approaches and long term monitoring data. FATHOM model- predict salinity changes from freshwater inflow, and compared different water quality variables with eight seagrass types.		This paper provides information on predicting the route of freshwater inflow from the Everglades into Florida Bay to restore it to its historic state. The FATHOM modeling system displayed that some parts of the bay were highly sensitive to changes in salinity, but other areas were very tolerant. With an increase in freshwater, the model predicted an increase in Halodule wrightii and a decrease in Thalassia testudinum, representing a return to the historical state.
45326	Holbrook	2002	Survival experiments with outplanted seedlings of surfgrass (Phyllospadix torreyi) to enhance establishment on artificial structures	seedlings, laboratory-reared, planted, natural recruitment	US	CA	34.39783	-119.70223	Primary/White	restoration	Field, Laboratory	experimental	Phyllospadix torreyi	3	1478	rope, nylon net	monitoring, planting, lab cultivated	Planted laboratory reared seedlings and compared survival with naturally recruited seedlings after 3 months.	percent survival (of planting units)	This paper provides information on the survival of laboratory reared seedlings compared to naturally recruited seedlings. A similar survival rate was observed between the two seedling types when the laboratory-reared seedling was hooked into the nylon rope that was attached to the bottom. The artificial host (nylon rope) was more successful than the natural algal hosts, suggesting this technique may be applicable to establish populations of P. torreyi.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44921	Jarvis	2014	Modeling loss and recovery of Zostera marina beds in the Chesapeake Bay: The role of seedlings and seed-bank viability	model, stressors, stress duration, sexual reproduction	US	VA	37.91737	-76.15291	Primary/White	monitoring/ followup	Review or case study	observational, model	Zostera marina				temperature, light, model, sexual reproduction	Ran model scenarios for 3 years: 1 year pre-decline and 2 years post-decline. Quantified effects of presence/absence of sexual reproduction, increased water temperatures, and effect of light and temperature on bed manintenance and re-establishment		This paper provides information on predicting the recovery and longevity of eelgrass in response to stressors using a model. After 2 consecutive years of temperature stress (1 degree Celcius increase) following decline, the model predicted a complete loss of biomass. Sexual reproduction, consecutive years of stress, and the effect of multiple stressors were important factor to incorporate in the model prediction of eelgrass recovery.
45170	Jarvis	2010	The role of seedlings and seed bank viability in the recovery of Chesapeake Bay, USA, Zostera marina populations following a large-scale decline	seed bank, viability, decline, stress, shoots, resiliency, recolonization, low light, consecutive stress	US	VA	37.91737	-76.15291	Primary/White	recovery	Field	observational	Zostera marina				monitoring	3 sites were monitored for changes in eelgrass abundance monthly folowing a large decline.	shoot density, seagrass percent cover, biomass (above or below), seed counts	This paper provides information on the recolonization of eelgrass following a large decline. Eelgrass began to recover and re-establish at all three sites. At the upriver site, consecutive low light conditions decreased eelgrass populations. Recovery was low at this site because seedlings did not have enough time from the initial decline to produce a viable seed bank. This suggests that repeated annual stress may may result in long term bed loss.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44627	Kaldy	2004	Factors controlling seagrass revegetation onto dredged material deposits: A case study in Lower Laguna Madre, Texas	site selection, light, suspended sediments, site history	US	TX	26.12966	-97.22700	Primary/White	restoration	Review or case study	experimental	Halodule wrightii	4,356	10000	peat pot	light intensity, light, monitoring, planting, water quality, success criteria, sediment	Monitored water quality and sediment chemistry at transplant sites and natural sites for 1 year. Transplanted sites had substrate composed of unconsolidated dredge materials.	shoot density, biomass (above or below), water depth, chlorophyll content, sediment organic matter content, sediment partical size, nitrogen, suspended solids/ turbidity, chlorophyll a, porewater sulfide, light	This paper provides guidelines for considerations for site selection when transplanting seagrass. The transplanted site had very low light levels from suspended sediments, increased water depth (30 cm) from erosion, and high NH4+ concentrations. With these conditions, none of the transplanted units survived at the transplant site, suggesting the importance of site history prior to transplanting.
47442	Kidder	2010	Fine-scale current mapping in Eastern Bay (upper Frenchman Bay) as a guide to eelgrass restoration	tides, currents, buoys, speed of tide	US	ME	44.44318	-68.28568	Abstract	guideline, research, restoration	Field	experimental	Zostera marina				tidal zone, monitoring, mapping, water flow	Measured surface currents using buoys with GPS during different tides cycles	buoy position, current	This paper provides information on the impact of tidal fluxuations and currents on seed dispersal by monitoring buoy positions in the bay. An easterly trend and maximum speed was observed in the current during the ebb tide. Tides and currents at restoration sites should be observed prior to relocation to maximize long-term survival.
48082	Roberts	1998	Evaluation of transplantation methods for the Seagrass Syringodium Filiforme in the Indian River Lagoon, Florida	transplantation methods, fertilizer, peat pot, staple, tanks, Indian River	US	FL	28.05420	-87.57570	Theses/ Dissertations	restoration, methods development	Field, Laboratory	experimental	Syringodium filiforme	64	144	peat pot, staple, hand planting	fertilization, sediment cores	Compared the addition of fertilizer and transplantation method (staple or peat pot) on transplanted seagrass in the lab. Compared staple method and peat pot transplantation methods both with and without fertilizer in the field.	shoot counts not as density (e.g. per PU), leaf length, rhizome length, rhizome internode #, leaves per shoot, sediment partical size, internodal length, wet weight	This paper provides guidelines for transplanting Syringodium filiforme for restoration projects. The transplants did not show a difference between the fertilizer types. The staple method was more effective than the peat pot method for seagrass growth after transplantation.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44914	Kirsch	2005	The mini-312 program - An expedited damage assessment and restoration process for seagrasses in the Florida Keys National Marine Sanctuary	damage assessment, restoration, planning, GIS, model, grounding, seagrass injury	US	FL	24.70458	-81.20515	Primary/White	restoration, economic analysis	Review or case study, Field	cost analysis, observational, model	Halodule wrightii, Syringodium filiforme, Thalassia testudinum				cost analysis, monitoring, recovery, mapping, model	Developed a standardized damage assessment and restoration planning and protocols.		This paper provides information on the restoration potential of seagrass beds injured from vessel groundings. NOAA's restoration protocol contains three components: GIS-based field assessment, model-based estimation of injury recovery rates, and calculation of compensation using Habitat Equivalency Analysis (HEA), By establishing these protocols, it has increased the number of cost-effective restoration projects performed annually.
45207	Kirschenfeld	1998	Seagrass restoration in Northwest Florida	planting, coconut fiber mats, sterilization, growth media,	US	ME, FL	30.41153	-87.16378	Primary/White	restoration	Field, Laboratory	experimental	Ruppia maritima	1	200	grid/TERF	planting	seagrass was collected in Maine then sterilized and put in growth media to produce more plants for transplantation in Florida. 1 or 2 plants attached to a mat to be prepared for transplantation.	patch expansion, patch size or perimeter	This paper provides information on cultivating seagrass in the lab and transplanting to the field. Collected donor plants were placed in growth media which quickly produced additional viable donor plants to be used for restoration. All the plants were attached to coconut mats and growth was successful after planting.
48026	Land	2007	Experiments to examine transplant procedures on the seagrass Halodule beaudettei	cultivation, water flow, sediment oxidation, reduction, tray, pot, light transmittance	US	TX	29.24564	-94.96127	Primary/White	research	Laboratory	experimental	Halophila engelmannii, Ruppia maritima, Thalassia testudinum, Halodule beaudettei				method, light intensity, sediment, water flow	Sediment oxidation state (high or reduced), sediment source (3 locations), container type (tray vs. pot), flow regime (flow vs. no flow), and light transmittance (low vs. high) were tested in the lab.	shoot counts not as density (e.g. per PU), seagrass percent cover	This paper provides information on the preferred conditions of certain seagrass types. No difference in seagrass growth was seen in the oxidized and reduced sediments or between the source of the sediment type. Seagrass preferred the tray planthing method intitially, flowing water, and lower light conditions.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
47909	Leschen	2009	Eelgrass Restoration Used As Construction Impact Mitigation in Boston Harbor, Massachusetts	mitigation, planting, shoots, seeds, Hubline, Boston Harbor,	US	MA	42.33974	-70.97573	Technical Reports	mitigation	Field		Zostera marina	20234	306400	grid/TERF, hand planting	planting, seed dispersal, seed harvesting, shoot harvesting	Planted seagrass using shoots and seeds	percent survival (of planting units), shoot density, patch expansion	This paper provides information on the mitigation of eelgrass in the Boston Harbor after water quality enhancements. Eelgrass was planted after careful site selection (especially due to poor sediment quality). After 2 years, planted beds approached or exceeded natural healthy beds.
45319	Leschen	2010	Successful Eelgrass (Zostera marina) Restoration in a Formerly Eutrophic Estuary (Boston Harbor) Supports the Use of a Multifaceted Watershed Approach to Mitigating Eelgrass Loss	Boston Harbor, donor bed, mitigation, site selection, water quality	US	MA	42.33974	-70.97573	Primary/White	mitigation	Field	experimental	Zostera marina	20234	306400	hand planting, hand broadcasting	planting unit spacing, planting	Site-selection and transplantation methods were evaluated before mitigation began. Shoots and seeds were planted once the site was deemed ideal for eelgrass survival.	shoot density, leaf length, leaf width, biomass (above or below), patch size or perimeter, faunal counts, canopy height	This paper provides information on the success of an eelgrass mitigation project in Boston Harbor. After 2 years, transplanted sites met and exceeded donor and reference bed habitat function. Intense site-selection and field verification was one main contributor to the success of the eelgrass transplantation. The paper suggests water quality as the leading cause of eelgrass dieoff and colonization.
47999	Montanio	2011	A concise environmental assessment (EA) for emergency restoration of seagrass impacts from the Deepwater Horizon oil spill response	oil spill, Deepwater Horizon, response	US	FL	29.99826	-85.53719	Technical Reports	restoration	Review or case study	observational	Halodule wrightii, Syringodium filiforme, Thalassia testudinum							This paper provides guidelines to restore seagrass beds damaged from the response activities of the Deepwater Horizon oil spill. The proposed action area was located in the northeast Gulf of Mexico off the coast of Florida.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44966	Olsen	2014	Numerous mitigation transplants of the eelgrass Zostera marina in southern California shuffle genetic diversity and may promote hybridization with Zostera pacifica	genetics, transplantation, hybridization,	US	CA	32.66690	-117.14129	Primary/White	monitoring/ followup	Field	observational	Zostera marina, Zostera pacifica				genetics	Analyzed genetic diversity and population structure of both species of seagrass at 36 transplant locations.	inbreeding frequency	This paper provides information on the genetic diversity of transplanted Zostera habitats. Zostera marina had moderate to high normalized allelic diveristy and high inbreeding coefficients. Hybridization between the two species occurred at two locations, exhibiting the need for separate management plans for each species.
45204	Onuf	2000	Seagrass responses to and recovery (?) from seven years of brown tide	light limiting, algal bloom, decline, response, recovery	US	TX	26.67550	-97.42827	Primary/White	monitoring/ followup, recovery	Field	observational	Halodule wrightii, Halophila engelmannii				light intensity, monitoring, mapping	Monitored a seagrass bed for changes during an intense algal bloom.		This paper provides information on the response of a seagrass bed to an intense light-limiting algal bloom. After the first three years of the bloom, seagrass declined and moved landward, leaving bare areas in deeper areas of the seagrass meadow. Halophila engelmannii revegetated some areas and the dominant species Halodule wrightii stopped regressing. The water clarity improved once the algal bloom cleared and seagrass recovery began. However, a resurgence of the algal bloom occurred and seagrass declined again.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
46953	Orth	2002	A perspective on two decades of policies and regulations influencing the protection and restoration of submerged aquatic vegetation in Chesapeake Bay, USA	water quality, management, protection, habitat,	US	MD, VA	37.91737	-76.15291	Primary/White	restoration, economic analysis	Review or case study	observational	Ruppia maritima, Zostera marina				monitoring	Cooperative efforts by scientists, politicians, federal and state resource managers, and the public have developed plans to protect and enhance SAV.		This paper provides information on the need for a management protocol for SAV enhancement and restoration in the Chesapeake Bay to its historic state. SAV is important habitat for many fish and shellfish, and management efforts have recognized the need to protect these environments. Improvements in water quality have been implemented to increase SAV abundance, since it is suspected to have a direct effect on SAV survival. Interactions between resource managers, scientists, politicians, and the public is imporant for the long-term survival and restoration of SAV.
47217	Orth	2008	Restoring Eelgrass (Zostera marina) from Seed: A Comparison of Planting Methods for Large-Scale Projects	large-scale restoration, planting, Chesapeake Bay	US	VA	37.91737	-76.15291	Technical Reports	restoration, methods development	Field	experimental	Zostera marina	540	162000	mechanical boat, hand broadcasting	method, planting, seed dispersal	Compared two methods of planting seeds, hand broadcasting and mechanical planting.	seedling counts	This paper provides guidelines for planting eelgrass seeds used in large-scale restoration projects.
45100	Orth	1999	A rapid and simple method for transplanting eelgrass using single, unanchored shoots	tranplanting, hand planting, unanchored, bare root, simple planting technique, Chesapeake Bay	US	VA	37.91737	-76.15291	Primary/White	restoration	Field	experimental	Zostera marina	3072	53760	hand planting, bare root	monitoring, planting, shoot harvesting	Harvested shoots and planted them unanchored just beneath the sediment.	percent survival (of planting units), shoot density, seagrass percent cover	This paper provides guideline for a simple planting technique for eelgrass shoots. Hand planting at an angle between 25 and 50 mm beneath the surface was successful for eelgrass restoration at 4 transplant sites. Shoot densities were similar to natural beds in less than a year. The paper suggests the use of this technique for other seagrass species.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45201	Orth	2006	Seagrass recovery in the Delmarva Coastal Bays, USA	seed, southern bays, recovery, water quality, mapping, seed dispersal, propagule supply, successful germination, pandemic wasting disease, hurricane,	US	DE, MD	37.39912	-75.78219	Primary/White	restoration, recovery	Field	experimental	Zostera marina	460000	24000000	hand broadcasting	water quality, mapping, seed harvesting	Dispersed seeds in the southern coastal bays where eelgrass recovery was not present. Monitored water quality to determine if it was the limiting factor	percent survival (of planting units), patch expansion	This paper provides information on the restoration and recovery of eelgrass beds in the southern coastal bays of Delmarva. The northern bays recovered naturally from reproductive shoots, seed dispersal, and expansion of the remaining beds, while eelgrass in the southern bays did not recover. Seeds were broadcast and resulted in successful growth and expansion of eelgrass. Water quality parameters were within the limits for eelgrass survival.
44594	Orth	2009	Evaluation of a mechanical seed planter for transplanting Zostera marina (eelgrass) seeds	machine planting, gel, planter, seed injection, seedling establishment, Chesapeake Bay	US	VA	37.91737	-76.15291	Primary/White	restoration	Field	experimental	Zostera marina	540	162000	mechanical boat, pipet, hand broadcasting	planting	Compared seedling establishment from mechanical planted seeds and hand broadcasted seeds.		This paper provides information on seedling establishment using different seed planting techniques in the Chesapeake Bay. The best planting method varied by site, suggesting site selection as the dominant factor in eelgrass establishment.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44452	Orth	2010	Eelgrass (Zostera marina L.) in the Chesapeake Bay Region of Mid-Atlantic Coast of the USA: Challenges in Conservation and Restoration	Chesapeake bay, mapping, distribution, patterns, abundance, scientific background, seagrass systems, water quality	US	VA	37.91737	-76.15291	Primary/White	guideline, research	Field	observational	Zostera marina				monitoring, water quality, mapping	eelgrass patterns of abundance, mapping and distribution throughout the bay.		This paper provides information on the abundance and distribution of eelgrass and the processes associated with the patterns observed. Declining water quality and increased temperatures may have an adverse effect on eelgrass abundance. This paper provides a scientific background for management strategies for protection and restoration of eelgrass habitats, while providing insight into restoration techniques that may be used for other seagrass species.
47150	Orth	2011	Eelgrass recovery in the coastal bays of the Virginia Coast Reserve, USA	seed, large-scale restoration, wasting disease, hurricane, recovery,	US	VA	37.42060	-75.68976	Primary/White	restoration, monitoring/ followup	Review or case study, Field	experimental	Zostera marina							This paper provides information on the restoration of eelgrass following decline in the Virginia Coast Reserve. Eelgrass declined due to wasting disease and hurricane damage and eelgrass populations were not able to recover naturally. Large-scale seeding and restoration efforts led to a recovery of the eelgrass population and changed the state of the bay.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48027	Pickerell	2006	Buoy-deployed seeding a new low-cost technique for restoration of submerged aquatic vegetation from seed	buoy, deployed, seeding, Chesapeake Bay, reproductive shoots	US	VA, PR	37.91737	-76.15291	Technical Reports	restoration, methods development	Field	experimental	Zostera marina			buoy seed dispersal	method, seed dispersal	Collected reproductive shoots and placed them in mesh nets attached to buoys for a more natural seed dispersal.	seedling counts	This paper provides guidelines for utilizing the buoy seed dispersal technique for eelgrass restoration. Reproductive shoots were harvested and placed in mesh nets attached to buoys so only the seeds would be dispersed. Monitoring of seedlings was difficult when the seedlings were less than 3 inches tall. This method had lower costs associated with it and provided a suitable alternative to planting eelgrass shoots. The paper states the importance of donor and restoration site selection and environmental considerations prior to restoration.
46918	Pondella	2006	Evaluation of Eelgrass Mitigation and Fishery Enhancement Structures in San Diego Bay, California	San Diego Bay, eelgrass, fisheries, mitigation,	US	CA	32.66715	-117.14341	Primary/White	restoration	Field	experimental	Zostera marina				monitoring, planting	Deployed artificial reef materials to enhance fisheries and compared fish levels on transplanted and reference eelgrass sites.	roving diver fish count survey, fauna densities	This paper provides information on enhancing fish habitat through eelgrass mitigation and artificial reef deployment. Eelgrass was transplanted to the western side of the bay. Fish levels in the newly transplanted eelgrass beds quickly resembled reference seagrass habitats.
47234	Quattrochi	2007	Urban Growth Impacts on Submerged Aquatic Vegetation, Restoration and Health in the Mobile Bay, Alabama Area (Formerly J1.5)	urban growth, water quality, development, model, predict, stressors, factors	US	AL	30.43135	-87.99156	Conference proceedings, Abstract	monitoring/ followup	Field	observational, model	Unspecified				light intensity, monitoring, water quality, mapping, model	Used a model to predict the effect of urban growth on stressors and controlling factors that negatively influence near-shore seagrass health.		This paper provides information on the effect of urban growth on near-shore seagrasses in Mobile Bay using a model. The goal of the study was to develop a data management system to establish a restoration prioritization system to restore and maintain seagrasses.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44459	Reynolds	2012	Eelgrass restoration by seed maintains genetic diversity: case study from a coastal bay system	seed, genetics, diversity, restoration, microsatellite markers, donor, recipient,	US	VA	37.91737	-76.15291	Primary/White	restoration	Field	observational	Zostera marina				donor survey, genetics, seed dispersal	Monitored the genetic diversity of restored eelgrass beds and compared them to donor beds.	inbreeding frequency	This paper provides information on the genetic diversity of restored eelgrass habitats. Natural eelgrass beds that surround the restored bed may be contributing to the genetic diversity of the restored bed. The paper suggests using seeds rather than plants provides a higher level of genetic diversity and resilience.
47994	Reynolds	2012	Genetic diversity and structure of natural and restored seagrass meadows on the Eastern Shore of Virginia causes and ecological consequences	restored meadow, seed planting, genetic diversity, genetics, donor bed, inbreeding, light, temperature, large-scale restoration	US	MA, VA, NC	37.91737	-76.15291	Theses/ Dissertations	restoration, economic analysis	Field	observational, experimental	Zostera marina	36566	914400	hand planting	cost analysis, genetics, recovery, shoot harvesting	Seeds were planted to restore eelgrass populations, and genetic diversity was observed after the bed established.	shoot counts not as density (e.g. per PU), shoot density, temperature, plant productivity, nitrogen, fauna densities, light	This paper provides information on the genetic diversity of a restored eelgrass bed and the ecological processes associated with the diversity. The paper highlights the importance of restoration projects using seeds harvested from different beds to maintain genetic diversity. Natural disturbances and environmental factors such as light, temperature, and nutrients have an effect on the seagrass density and therefore influence the genetic diversity.
44823	Rhode	2001	It's not the size of your grass, it's where you plant it: Local adaptation in Chesapeake Bay eelgrass	Chesapeake Bay, site selection, sexual fitness, vegetative fitness, adult plants, seeds	US	VA	37.91737	-76.15291	Abstract	restoration	Field	experimental	Zostera marina				sexual reproduction	Monitored transplanted adult plants and seeds from 4 different site for 1 or 2 years. Monitored for vegetative and sexual fitness to determine if site, source, or both factors affected eelgrass fitness.	temperature, sediment partical size, light	This paper provides information on the effects of site and source on the vegetative and sexual fitness of eelgrass transplants. After one year, differences in fitness were due to both site and source. After two years the site was the main factor for differences observed in fitness. The paper suggests careful site selection before conducting a restoration project.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48016	Robertson	2009	Spatial patterns of bacterial abundance in a seagrass restoration site on the Eastern Shore of Virginia (USA)	sediment, bacteria, abundance, water column, restored bed, cores,	US	VA	37.25346	-75.83620	Theses/ Dissertations	research	Field	observational	Zostera marina				water quality, sediment cores, sediment bacteria	Analyzed the bacterial abundance and sediment properties of a restored bed. Sediment cores and water samples were used to collect bacterial data Spatial correlations with these factors were compared to seagrass.	patch size or perimeter, sediment organic matter content, carbon, nitrogen	This paper provides information on the spatial patterns of bacterial abundance with seagrass presence. There was no spatial pattern in bacterial abundance in the water column. However, bacterial abundance in the sediment increased with vegetation.
45153	Rodriguez-Salinas	2010	Restoration experiment of Zostera marina L. in a subtropical coastal lagoon	small-scale restoration, seasons, transplanation, adult plants,	US	CA	32.64357	-117.19217	Primary/White	restoration	Field	experimental	Zostera marina			plug	season, planting, water quality, sediment cores	Planted adult plants during the winter and autumn at 2 sites to mitigate for impacts.	percent survival (of planting units), shoot counts not as density (e.g. per PU), shoot density, patch size or perimeter	This paper provides information on a small-scale restoration project that was planted during two seasons. A higher percent survival was observed in the transplants that were planted in the winter months, and no transplants survived the autumn planting.
48018	Shafer	2008	Large-scale submerged aquatic vegetation restoration in Chesapeake Bay : status report, 2003-2006	Chesapeake Bay, seed broadcasting, seed bags, seed planting, cost analysis, large-scale restoration, collection, harvesting, dispersal	US	MD, VA	37.91737	-76.15291	Technical Reports	restoration	Field	experimental	Ruppia maritima, Zostera marina	538232	16000000	mechanical boat, buoy seed dispersal, hand broadcasting	depth, cost analysis, seed storage, seed dispersal, water quality, seed harvesting	Harvested seeds using two methods: divers by hand and mechanical harvesting. Dispersed seeds using hand broadcasting, buoy dispersal, and seed sprayer.	percent survival (of planting units), seedling counts	This paper provides guidelines for large-scale restoration techniques involving seed harvesting and planting. Seedling establishment and survival was low at all sites planted and suggested that site selection may have been an overlooked component. Seed bag deployment was the most cost-effective technique because it eliminated the need for processing and storage.
44815	Shafer	2010	An Introduction to a Special Issue on Large-Scale Submerged Aquatic Vegetation Restoration Research in the Chesapeake Bay: 2003-2008	Chesapeake Bay, SAV, large-scale restoration, seeds, planting	US	MD, VA	37.91737	-76.15291	Primary/White	restoration	Field	experimental	Unspecified				method, monitoring, planting, transplanting techniques, seed dispersal, seed harvesting	Planted seeds for large-scale restoration.		This paper provides information on the large-scale restoration of the Chesapeake Bay.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45112	Sheridan	2004	Recovery of floral and faunal communities after placement of dredged material on seagrasses in Laguna Madre, Texas	dredge materials, seagrass recovery	US	TX	26.66684	-97.42166	Primary/White	monitoring/ followup, recovery	Field	experimental	Halodule wrightii, Halophila engelmannii				burial recovery, monitoring, recovery, filled sediment	the impacts of dredge materials on seagrass, sediments, water, benthos and nektons were monitored.	seagrass percent cover	This paper provides guidelines for the recolonization periods for seagrass beds impacted by dredge materials. Halophila engelmannii was the initial colonist, but then Halodule wrightii was the dominant species. In three years, the mean seagrass coverage of deposits was 48%, suggesting that the reccuring dredge cycle (2-5 years) does not allow enough time for seagrass ecosystems to fully recover.
47880	Sheridan	2004	Comparison of Restored and Natural Seagrass Beds Near Corpus Christi, Texas	water column, fauna, fish, benthic fauna, decapods, restored bed, density, restoration site, natural bed	US	TX	27.78073	-97.25844	Primary/White	monitoring/ followup	Field	observational	Unspecified				fauna, monitoring, water quality, sediment cores	Monitored restored and natural seagrass beds to determine the structural equivalence in seagrass, water column, sediment, and densities of fish, decapod, and benthic fauna. Used throw traps and cores to sample.		This paper provides information on comparing the structural equivalence of restored and natural seagrass beds. After 3-5 years, minimal quantitative differences were observed in community structure. Higher densities of Class Oligochaeta and Polychaeta were observed in the natural beds, suggesting this maybe an indicator of structural equivalence in restored beds.
47023	Sheridan	1999	Trajectory for structural equivalence of restored and natural Halodule wrightii beds in Texas	restored beds, natural beds, fauna	US	TX	29.27273	-94.92696	Abstract	restoration, monitoring/ followup	Field	observational	Halodule wrightii				fauna, sediment	Monitored structural similarityof seagrass, fauna, and sediments in restored and natural beds.	seagrass percent cover, biomass (above or below), shoot to root ratio	This paper provides information on the structural similarity of restored and natural seagrass beds. Seagrass biomasses and root to shoot ratios were initially higher in restored beds, but after 3 years were similar to natural beds.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44624	Sheridan	1998	Factors affecting restoration of Halodule wrightii to Galveston bay, Texas	restored beds, natural beds, Galveston Bay, spacing, site selection, growth, survival, fertilization	US	FL	29.23081	-94.96475	Primary/White	restoration, methods development	Field	experimental	Halodule wrightii	2592	10476	peat pot	depth, fertilization, planting unit spacing, planting, success criteria	Experimental restoration testing the effects of site selection, planting density, water depth, and fertilizer on seagrass survival and growth.	percent survival (of planting units), shoot density, seagrass percent cover, biomass (above or below), patch expansion, temperature, salinity, water depth, PAR, sediment organic matter content, sediment partical size, suspended solids/turbidity, shoot to root ratio, light	This paper provides guidelines for restoration projects and factors that may affect seagrass survival and growth. Site, planting density, and water depth had an impact on survival. Planting density of 0.25 or 0.5 m centers and shallower water depths resulted in higher survival rates. Fertilizer was shown to enhance propagation but not survival.
45272	Short	2002	Site-selection model for optimal transplantation of eelgrass Zostera marina in the northeastern US	site selection, model, transplant suitability index, priority sites,	US	NH, MA	41.63056	-70.91088	Primary/White	restoration	Field	experimental, model	Zostera marina	8094	640	grid/TERF, bare root	bioturbation, light	Used a model to predict the most successful sites for seagrass planting. Used environmental information, field measurements of light and bioturbation, and assessed the success of test transplants for model criteria.	percent survival (of planting units), leaf nutrients, leaf growth rates, shoot height	This paper provides information on using a model to predict the site with the highest probability of seagrass survival. High priority sites were field tested for seagrass survival and given a transplant suitability index (TSI). The New Bedford Harbor used this model for site selection which resulted in a seagrass success rate of 62% after 2 years.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45060	Smith	2007	A population genetic study of the Zostera marina (eelgrass) ecotypes of Barnegat Bay, New Jersey and implications for grass bed restoration	genetic diversity, populations, light stress, DNA markers	US	NJ	39.85579	-74.11320	Abstract	research	Field, Laboratory	observational	Zostera marina				genetics	Studied the genetic relationships between eelgrass populations in New Jersey using polymorphic satellite DNA markers.		This paper provides information on the genetic variation between seagrass populations and how it may impact restoration success. Light stressed populations clustered as a clade suggesting a possible genetic link among them. These differed greatly from sunlit seagrass populations. This suggests that seagrass transplants should be planted at sites that have similar site characteristics to the donor site.
44704	Tanner	2010	Growing Zostera marina (eelgrass) from Seeds in Land-Based Culture Systems for Use in Restoration Projects	seeds, germination period, summer, fall, seedlings	US	MD, VA	38.20038	-76.83348	Primary/White	research, restoration	Laboratory	mesocosm	Zostera marina		30000	skewers	season, planting, seed storage, lab cultivated, seed harvesting, nutrient injection, sediment	Harvested seeds and stored them in nutrient rich soil and no soil, with varying salinities and temperatures. Attempted to germinate seeds in the summer rather than the fall when it occurs naturally.	percent survival (of planting units), temperature, salinity, seedling counts	This paper provides information on altering germination rates in seeds, resulting in quickened seedling use in restoration projects. Germination was successfully induced in the summer; soil-less at 14 degrees C, and percent germination increased with lower salinities. Cold storage prior to planting resulted in higher survival rates. This paper suggests this approach as an alternative to harvesting plants from donor beds.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44591	Tanner	2010	Evaluating a Large-Scale Eelgrass Restoration Project in the Chesapeake Bay	Chesapeake Bay, preliminary transplant suitability index, spring, summer, survival, wave action	US	MD, VA	38.20038	-76.83348	Primary/White	restoration	Field	experimental	Zostera marina	66000	90000	skewers	monitoring, planting, shading, success criteria	Monitored habitat quality and restoration success of Piney Point (PP) planting site and compared to a nearby restoration site, St. George Island (SGI). Eelgrass planted in the fall wouldn't survive through the summer of the following year.	percent survival (of planting units), temperature, oxygen, epiphytes, light	This paper provides information on the factors contributing to mortality at an eelgrass restoration site. Eelgrass planted at PP in the fall wouldn't survive through the following summer, whereas restored eelgrass at SGI was surviving. PP had higher wave exposure that increased shading and epiphyte loads, creating a more stressful habitat for eelgrass. This suggests the importance of careful site selection, factoring in short and long-term changes in habitat.
45161	Thom	2012	Restoring Resiliency: Case Studies from Pacific Northwest Estuarine Eelgrass (Zostera marina L.) Ecosystems	planted plots, reference plots, recovery, stressors, resilience	US	WA	48.22632	-122.85502	Primary/White	restoration, monitoring/ followup, recovery	Field	observational	Zostera marina	1454	28000	metal anchor, bare root	recovery, success criteria	Monitored shoot density at planted and reference plots from 3 to 12 years.	shoot density, temperature, light, floral density	This paper provides information on the resilience of eelgrass to stressors in restored eelgrass beds. Eelgrass can recover from major shifts and natural disturbances, but multiple stressors cause cumulative negative effects and eelgrass decline. The paper recommends planning eight resilience-related elements to reduce stressors before eelgrass restoration.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
47745	Thom	2013	20% more eelgrass in Puget Sound by 2020: restoration site selection	site selection, models, test planting, stressors, improve conditions	US	WA	48.18202	-122.35941	Conference proceedings	restoration	Field	observational, experimental, model	Zostera marina				monitoring, planting, water quality, model	Used hydrodynamic, water quality, and eelgrass growth models with field observations, test plantings, spatial data, and stressor information to determine restoration sites.		This paper provides guidelines for determining site selection for eelgrass restoration using models, field observations, and anticipated stressors. The model predicted good growing conditions at 23 sites, and field observations were conducted. Of these sites, only 5 were chosen for test planting. This demonstrates the involved process of site selection that may increase restoration success.
44687	Travis	2006	Genetic structure of natural and restored shoalgrass Halodule wrightii populations in the NW Gulf of Mexico	restored beds, natural beds, clonal richness, genetic diversity	US	TX	29.45498	-94.77106	Primary/White	restoration	Field, Laboratory	observational	Halodule wrightii				genetics	Compared 4 natural and 7 restored populations of H. wrightii using molecular markers (amplified fragment length polymorphisms [AFLPs]).		This paper provdies information on the population genetic structure of restored and natural seagrass beds. Restored populations had intermediate to high clonal richness. Natural populations had genetic diversity that was defined as isolation by distance where as restored beds with donor material from these natural beds were undergoing rapid genetic convergence.
47268	Turner	2005	SAVing the Gulf: submerged aquatic vegetation, education, restoration, conservation	volunteers, benefits, SAV, protection	US	AL	30.44343	-87.99226	Primary/White	guideline	Review or case study	observational								The paper provides information on the environmental benefits of SAV in Mobile Bay, Alabama. It lists ways for volunteers to become involved in restoration and protection of seagrass beds.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
47950	Uhrim	2009	Preliminary Comparison of Natural Versus Model-Predicted Recovery of Vessel-Generated Seagrass Injuries in Florida Keys National Marine Sanctuary	cellular automata model, natural reovery, predicted recovery, groundings, recovery rates	US	FL	24.51608	-81.80186	Technical Reports	recovery	Field	observational, model	Halodule wrightii, Syringodium filiforme, Thalassia testudinum				monitoring, recovery, model	Used a model to predict injured seagrass recovery rates and compared it with the actual observed recovery rates in 30 different grounding sites.	patch expansion, species, scar width	This paper provides information on model predictions and field observations of recovery rates in seagrass beds injured by vessel groundings. Overall, the model predicted faster recovery rates than what was observed, which favors the Responsible Parties. Site location and the varying environmental conditions may have an effect on the recovery rate.
48061	Uhrin	2001	Effects of crab/lobster traps on seagrass beds of the Florida Keys National Marine Sanctuary (FKNMS) : damage assessment and evaluation of recovery : progress report #1	crab traps, lobster traps, recovery	US	FL	24.51608	-81.80186	Technical Reports	research, recovery	Field	experimental	Syringodium filiforme, Thalassia testudinum				monitoring, recovery	Placed traps on seagrass beds for different periods of time to determine the threshold for surviving injuries and recovery times.	percent survival (of planting units)	This paper provides information on the effect of crab/lobster traps on seagrass beds. The paper consists of introduction and methods sections along with references.
44469	Uhrin	2005	Effect of Caribbean spiny lobster traps on seagrass beds of the Florida keys national marine sanctuary: Damage assessment and evaluation recovery	lobster traps, damage assessment, recovery, fisheries, injury	US	FL	24.51608	-81.80186	Book	research, recovery	Field	experimental	Syringodium filiforme, Thalassia testudinum				monitoring, recovery, shading	30- 3x3 m squares at each of 3 monospecific seagrass beds (2-T.testudinum, 1-S. filiforme). 5 squares were controls, and the remaining squares received one trap. The traps were removed randomly at 5 different soak times (up to 24 weeks).	shoot density	This paper provides information on the impact of lobster trap duration on seagrass bed injury and the ablility to recover. Both species showed decreased densities after 6 and 24-week soak times. Results suggest that traps must be removed within a 6-week period to avoid long-term injury to seagrass beds. This soak time is in line with current standard fishing practices of < 5 weeks.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45370	Urhin	2011	Understanding uncertainty in seagrass injury recovery: an information-theoretic approach	groundings, sediment filling, colonization, injury, areal contraction, global model, injuy age, injury volume, wave energy	US	FL	24.51608	-81.80186	Primary/White	recovery	Field	observational, model	Thalassia testudinum				species, monitoring, recovery, filled sediment, model	Analyzed 30 groundings for injury recovery and designed a model with predictor variables of recovery.	patch size or perimeter	This paper provides information on the model predictions for injured seagrass recovery using predictor variables. Injury age and wave effects were positively related to seagrass recovery. Sediment in-filling is critical to seagrass recovery, suggesting that managers consider sediment in-filling for increased recovery rates.
44457	Vaudrey	2010	Eelgrass recovery after nutrient enrichment reversal	nutrient loading, decline, outfall, green algae	US	CT	41.32269	-72.01853	Primary/White	monitoring/ followup, recovery	Field	observational	Ruppia maritima, Zostera marina				species, monitoring, recovery, mapping	Monitored the recovery of Mumford Cove before, during and 15 years after outfall discharges.	seagrass percent cover, aerial coverage	This paper provides information on the decline and recovery of seagrass populations related to a wastewater discharge outfall. Eelgrass populations severely declined, and Ulva lactuca (green algae) became the dominant species because of excess nutrients from outfall discharges from 1945 to 1987. The outfall was relocated in 1987 and eelgrass populations began to recover. Fifteen years later, eelgrass is once again the dominant species in the cove.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45116	Whitfield	2004	Recruitment of Thalassia testudinum seedlings into physically disturbed seagrass beds	seedling recruitment, survival, growth, disturbed seagrasses	US	FL	24.69354	-81.22289	Primary/White	restoration, methods development	Field	experimental	Thalassia testudinum				monitoring, recovery	Collected seedlings in the large-scale project to determine the average density and rhizome elongation rate and monitored new seedlings in the small-scale project to compare.	percent survival (of planting units), shoot density, rhizome elongation rate	This paper provides information on the use of T. testudinum seedlings for restoration. Seedlings in the large-scale project determined the average density to be 1 m(-2) and rhizome elonation rate to be 6.6 cm per year. Seedlings in the small scale project had higher densities and elongation rates in the first year but then dropped along with survival rates in the second year. Seedlings from both sites suggest the use of T. testudinum seedlings as a reliable source for recruits.
45117	Williams	2001	Reduced genetic diversity in eelgrass transplantations affects both population growth and individual fitness	genetic diversity, genetics, variation, transplantation,	US	CA, NH, MD, VA	37.91737	-76.15291	Primary/White	restoration, mitigation	Field, Laboratory	observational, mesocosm	Zostera marina				donor survey, genetics, sexual reproduction	investigated genetic diversity by vegetative propagation and sexual reproduction to see the effects on short term population growth.	shoot density, heterozygote frequency, seed counts	This paper provides information on the importance of genetic diversity on the growth of transplanted seagrass populations. Selecting donor beds with a high genetic diversity is the main way to increase genetic diversity in transplanted beds. A genetically diverse, untransplanted population had more germinated seeds and a higher leaf shoot density than a transplanted population with low genetic diversity. This suggests the importance of genetically diverse transplants to increase population growth and viability.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44669	Williams	1998	Genetic diversity and structure of natural and transplanted eelgrass populations in the Chesapeake and Chincoteague bays	genetic diversity,	US	MD, VA	37.91737	-76.15291	Primary/White	research	Laboratory	observational	Zostera marina				genetics	Compared genetic diversity in natural and transplanted eelgrass populations.	inbreeding frequency	This paper provides information on genetic diversity of natural and transplanted eelgrass populations. Transplanted populations were planted with seeds and had a high genetic diversity comparable to natural beds. The paper suggests using seeds as the donor material to keep genetic diversity high.
48057	Franze	2002	Barrier island seagrass and geormorphic interactions : a case study of hurricane damage and efficacy of restoration efforts at the Chandeleur Islands	donor sites, planting patterns, age, volunteers	US	LA	29.83170	-88.84915	Theses/ Dissertations	restoration	Field	experimental	Halodule wrightii, Halophila engelmannii, Ruppia maritima, Syringodium filiforme, Thalassia testudinum	30000	14000	plug	sediment particle size, planting, sediment cores	Plugs from the donor site were taken to the restoration site and planted the same day using 4 different planting patterns. Biomass, age and sediments were compared between disturbed and undisturbed seagrass sites.	percent survival (of planting units), shoot counts not as density (e.g. per PU), seagrass percent cover, biomass (above or below), temperature, salinity, water depth, aerial coverage, leaf growth rates	This paper provides information on the resstoration of seagrass habitat after hurricane damage. Restoration was successful using volunteers at 5 different sites. Three of the four planting patterns were similar in survival numbers, and one was ineffective. Sediments were similar between disturbed and undisturbed sites.
44339	Walker	2006	Decline and recovery of seagrass ecosystems - The dynamics of change	Florida Bay, Cockburn Sound, change, decline, recovery,	US, Australia	FL	24.95620	-80.67997	Book	recovery	Review or case study	observational	Amphibolis griffithifif, Cymodocea nodosa, Halodule wrightii, Halophila engelmannii, Posidonia angustifolia, Posidonia australis, Posidonia coriacea, Posidonia sinuosa, Syringodium filiforme, Thalassia testudinum					Observed different case studies in Floriday Bay and Cockburn Sound.		This paper provides information on the decline and recovery of seagrass beds in Cockburn Sound and Florida Bay. Dominant seagrass species declined and changes in seagrass composition were observed during and after recovery. The paper has suggestions for maintaining seagrass populations and understanding the factors associated with loss for effective seagrass management.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48590	Orth	2000	Protection and restoration of seagrasses: Addressing global concerns from a local perspective in Chesapeake Bay, USA.	Chesapeake Bay,	US	MD, VA	37.91737	-76.15291	Primary/White	restoration	Review or case study	observational	Unspecified							This paper provides information on the management history within the Chesapeake Bay and the implementation of new policies that protect seagrass habitat. These management practices have focused on the importance of water quality conditions on seagrass habitat, as well as recognize seagrass habitat as a necessity to sustain fish and shellfish populations. Protection and restoration of seagrass in the bay and the collaboration of scientists and managers was suggested to elevate seagrass meadows to historic levels.
45113	Bernard	2005	Recovery of the seagrass zostera marina in a disturbed Mediterranean lagoon (Etang de Berre, Bouches-du-Rhone, Southern France)	Berre lagoon, decline, recovery, eelgrass, freshwater inputs, recolonization	France		-36.43.46831	5.08121	Primary/White	recovery	Field	observational	Zostera marina				monitoring	Observational monitoring by snorkelling for 10 years.	shoot counts not as density (e.g. per PU), shoot density, patch size or perimeter	This paper provides information on the decline and recovery of eelgrass in the Berre lagoon. Eelgrass declined because of increased freshwater inputs which contributed to desalination of the lagoon. Three decades later, eelgrass patches were observed recolonizing, possibly due to improved water conditions.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45050	Bos	2007	Planting density, hydrodynamic exposure and mussel beds affect survival of transplanted intertidal eelgrass	recolonization, transplanation, wasting disease, seedlings,	Netherlands		52.92131	4.80663	Primary/White	research, restoration	Field	experimental	Zostera marina	33	1,221		planting unit spacing, tidal zone, protected vs unprotected, water flow	Seagrass was planted in high and low density planting units and were planted in areas with high, medium, or low wave activity.	percent survival (of planting units), shoot counts not as density (e.g. per PU), seagrass percent cover, leaf width, shoot height, floral density	This paper provides information on the effects of wave action on seagrass survival. Seagrass survival was negatively correlated with exposure to wave action; a lower survival rate was observed with increased exposure to wave action. A higher planting density was important for seagrass survival in areas of increased wave exposure. In addition, mussel beds were found to facilitate eelgrass survival; eelgrass planted within mussel beds had a higher survival rate than transplants planted seaward of the mussel bed.
44645	Campbell	2004	Flood related loss and recovery of intertidal seagrass meadows in southern Queensland, Australia	flooding, decline, recovery, germination, Great Sandy Strait	Australia		-25.35648	152.95850	Primary/White	monitoring/ followup, recovery	Field	observational	Zostera capricorni				monitoring, water quality, mapping, sediment	Monitored two existing Zostera meadows prior to and 3 occassions after widespread loss of seagrass.	suspended solids/ turbidity, light	This paper provides information on the decline and recovery of seagrass following the flooding of Mary River in 1999. About 90% of seagrass disappeared after the flooding most likely due to reduced light availability and increased turbidity. Full recovery to pre-flood condition took 3 years.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44440	Cardoso	2004	Dynamic changes in seagrass assemblages under eutrophication and implications for recovery	Mondego estuary, eutrophication, decline, herbivores	Portugal		40.38602	-8.04107	Primary/White	monitoring/ followup, recovery	Field	observational	Zostera noltii				fauna, monitoring, water quality, sediment cores	Took seagrass cores every 2 weeks for the first 18 months and then once a month for the remainder of the study.	biomass (above or below), temperature, salinity, oxygen, faunal counts, pH, sediment organic matter content, nitrogen, phosphorus	This paper provides information on the decline of seagrass in response to eutrophication in the Mondego estuary. Eutrophication led to an increase in primary producers and replacement of seagrass beds by courser sediments and macroalgae. Decreased herbivores and increased detritivores and invertebrates were observed with a decrease in seagrass. The paper suggests restoration efforts for the recovery of seagrass beds.
44422	Creed	1999	Disturbance and recovery of the macroflora of a seagrass (Halodule wrightii Ascherson) meadow in the Abrolhos Marine National Park, Brazil: an experimental evaluation of anchor damage	Abrolhos Marine National Park, anchor damage, disturbance, boat anchors, macroalgae	Brazil		-17.96550	-38.70551	Primary/White	recovery	Field	experimental	Halodule wrightii				season, species, monitoring, recovery	Monitored the recovery of seagrass and algae following experimental anchor clearing.	shoot density, rhizome length, biomass (above or below), algae percent cover	This paper provides information on the recovery of seagrass and macroalgae following anchor damage. Seagrass had a quicker recovery time than macroalgae and recovered within 9 months. Recovery of macroalgae was more dependent on the season.
44587	Cunha	2009	Estimation of available seagrass meadow area in Portugal for transplanting purposes	Gis, site selection, distribution	Portugal		38.47740	-8.96701	Primary/White	monitoring/ followup, methods development	Field	observational	Cymodocea nodosa, Zostera marina, Zostera noltii				species, mapping	Used GIS to predict sites for seagrass restoration. Selected sites were field assessed using 4 methods: shore line, free diving, scuba, and boat transects.	seagrass percent cover, species	This paper provides information on site selection for seagrass restoration projects using GIS mapping software. A total of 12,652 ha were assessed , 3,944 groundtruth points were recorded and 3 species were located. Ria Formosa had the largest area of seagrass distribution followed by Sado estuary.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45043	Curiel	2005	Pilot transplanting project of Cymodocea nodosa and Zostera marina in the Lagoon of Venice: Results and perspectives	Lagoon of Venice, transplant, planting units,	Italy		45.46887	12.32332	Primary/White	restoration, mitigation	Field	experimental	Cymodocea nodosa, Zostera marina	76.6	660	plug, bare root	monitoring, planting, large planting units	Compared two planting techniques, sod and bundles of rhizomes, with two species of seagrass to compare transplant success.	percent survival (of planting units), shoot density, seagrass percent cover, biomass (above or below), rhizome elongation rate, leaf growth rates	This paper provides information on the success of different transplanting techniques for use in restoration projects. The rhizome method was more effective than the sod method and produced almost three times more seagrass at the end of the study. C. nodosa biomass was the only factor that was higher using the sod method.
45053	de Jonge	2000	Policy plans and management measures to restore eelgrass (Zostera marina L.) in the Dutch Wadden Sea	Dutch Wadden Sea, change, decline, transplantation, site selection	Netherlands		53.28170	5.42211	Primary/White	guideline, restoration	Field	experimental	Zostera marina				monitoring, mapping, success criteria	Transplantation site selection was conducted using GIS that included sediment composition, exposure time, currents, and wave action as factors.	salinity, current	This paper provides information on the restoration techniques utilized to enhance seagrass populations in the Dutch Wadden Sea. A site selection process was performed using GIS selection criteria. Increasing the amount of freshwater in the sea was important for the growth and survival of eelgrass while waves were shown to negatively impact eelgrass transplant success.
45066	Deikmann	2010	The possible origin of Zostera noltii in the Canary Islands and guidelines for restoration	Canary Islands, decline, genetics	Spain		28.25697	-15.57894	Primary/White	guideline, restoration	Field, Laboratory	observational	Zostera noltii				genetics	An assignment test, using microsatellite data was used to locate the seagrass population of origin for the region.	heterozygote frequency, inbreeding frequency	This paper provides information on the genetics of seagrass populations within the Canary Islands. The more genetically related strands may be the most successful donor populations for restoration or transplantation.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44234	Duarte	2013	Assessing the CO2 capture potential of seagrass restoration projects	carbon, decline, climate change, mitigation					Primary/White	restoration, mitigation	Laboratory	model	Cymodocea nodosa, Halodule wrightii, Syringodium filiforme, Zostera marina, Zostera noltii				model	Used a model to predict long-term carbon sequestration for seagrass restoration projects. Patch growth, patch survival in planting projects, and estimates of seagrass CO2 sequestration per unit area were factors assessed in the model.		This paper provides information on the long-term carbon sequestration of restored seagrass populations to offset climate change. The amount of carbon sequestered increased with time and planting density up to 100 units per ha. In places with a carbon tax in place, the cost of seagrass restoration may be covered since they sequester carbon.
44890	Greve	2005	Means of rapid eelgrass (Zostera marina L.) recolonization in former dieback areas	recolonization, anoxia	Denmark		56.04349	10.68609	Primary/White	recovery	Field	observational	Zostera marina				monitoring	Monitored recolonization of eelgrass beds after anoxic conditions and compared seedlings establishment to expansion of existing beds.	patch expansion, seedling counts	This paper provides information on the recolonization of eelgrass beds following anoxia. Apical shoots were not present on existing beds, only rhizomes and roots remained. Seedlings were the main method of recolonization, but expension of existing beds also occurred. The paper suggests that expansion of existing beds is still valuable to recolonization of former dieback areas because of the faster elongation and branching rates and lower mortality rates compared to seedlings.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44763	Grilo	2012	Implications of Zostera noltii recolonization on Hydrobia ulvae population structure success	Mondego estuary, recolonization, macroalgae	Portugal		40.33824	-8.11930	Primary/White	recovery	Field	observational	Zostera noltii				sediment cores	6-10 sediment cores were taken on each monthly sampling event to a depth of 20 cm. Fauna, seagrass, and algae were examined.	faunal colonization, sediment organic matter content	This paper provides information on the recolonization of seagrass after 20 years of absence. Macroalgae and snails were the dominant species during the absence of seagrass when estuary conditions were poor. Estuary conditions began to improve and seagrass began to recolonized from seed banks further away. As the seagrass increased, macroalgae decreased until the estuary was seagrass dominated again.
47129	Gustafsson	2013	Influence of Neighboring Plants on Shading Stress Resistance and Recovery of Eelgrass, Zostera marina L. e64064	shading, monoculture, polyculture, recovery, resistance, mixed species	Finland		59.92700	21.76968	Primary/White	research, recovery	Field	experimental	Zostera marina	0.36	60	grid/TERF, hand planting	light, shading	Shaded eelgrass (using shading screens) in mono- and polycultures to examine resistance and recovery. 24 shoots of eelgrass for monocultures and 6 shoots of eelgrass with 18 other plants for polycultures.	shoot density, biomass (above or below), sediment organic matter content, carbon, nitrogen, light	This paper provides information on the resistance and recovery of eelgrass in response to shading. Eelgrass in polycultures had a greater resistance to shading and lost less biomass than monocultures. However, eelgrass in monocultures had a faster recovery and gained more biomass than polycultures. The paper suggests that plant species richness enhances the resistance of eelgrass through facilitative mechanisms.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48129	Hessing-Lewis	2005	Assessing the potential for eelgrass restoration in the Squamish Estuary, British Columbia	transplantation, sediment, water quality, monitoring	Canada		49.68016	-123.17413	Theses/ Dissertations	restoration	Field	experimental	Zostera marina		675	metal anchor	planting, water quality, sediment cores	Transplanted seagrass at two sites and monitored survival. Sediment and water quality were monitored at each site.	percent survival (of planting units), leaf length, temperature, salinity, oxygen, water depth, sediment organic matter content, sediment partical size	This paper provides information on the transplantation of eelgrass and potential environmental factors such as sediment characteristics and water quality that may influence survivorship. The transplantation was a success at both sites, and no difference was observed between the sites. A relationship was not observed between survivorship and environmental parameters.
46948	Hiraoka	2003	Changes in Environmental Factors and Expansion of Transplanted Eelgrass (Zostera marina L.) Bed by Construction of Breakwater	Seto Inland Sea, waves, breakwater, transplantation	Japan		33.59469	132.10750	Primary/White	restoration	Field	experimental	Zostera marina				monitoring, planting	Constructed a breakwater to reduce wave action and promote seagrass recruitment	percent survival (of planting units), patch expansion, water depth	This paper provides information on the effect of a breakwater structure on seagrass survival. Seagrass planted inside of the breakwater was protected from wave activity and had a high survival and expansion rate.
44437	Dolbeth	2013	Drivers of estuarine benthic species distribution patterns following a restoration of a seagrass bed: A functional trait analyses	benthic invertebrates, functional diversity, rhizomes,	Portugal		40.12597	-8.84427	Primary/White	restoration, recovery	Field	observational	Zostera noltii				mapping	Compared 3 sites for functional diversity of benthic inertebrates: muddy sediments with seagrass, a mudflat with some seagrass rhizomes, and a sandflat with macroalgae.	biomass (above or below)	This paper provides information on the functional diversity of benthic invertebrates within different seagrass habitats. The functional diversity increased with an increase in seagrass as the estuary recovered. The paper suggests restoring seagrass beds to increase functional diversity which would make the estuary more resilient to disturbances.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48020	Ganassin	2008	A review of seagrass planting as a means of habitat compensation following loss of seagrass meadow	New South Whales, seagrass habitat, restoration,	Australia		-33.84823	151.26099	Primary/White	restoration, mitigation	Review or case study	observational	Halophila ovalis, Posidonia australis, Zostera capricorni							This paper provides information on developments in seagrass habitat restoration techniques to be able to mitigate for developmental impacts on seagrass. Transplantation and restoration methods were listed by species of seagrass.
47199	Hizon-Fradejas	2009	Anchorage and resistance to uprooting forces of eelgrass (Zostera marina L.) shoots planted in slag substrates	slag, sediment, anchorage, rooted, current, resistance, Seto Island Sea	Japan		34.95208	136.66602	Primary/White	research	Field, Laboratory	experimental	Zostera marina				sediment, water flow	Examined different slag types (air-cooled, granulated, and carbonated granulated), particle size, and sedimentation to determine their effect on anchorage of eelgrass.	sediment partical size, current	This paper provides information on the effect different substrates have on the anchorage of eelgrass. Slag substrates were effective in anchoring eelgrass in high velocity currents. The finest particle size and granulated slag type were the two factors that provided the highest resistance to uprooting forces. Sedimentation improved root establishment, anchorage and extension, but too much sedimentation may harm the eelgrass plant.
48066	Hardegree	2001	Annual progress report : seagrass restoration project	Redfish Bay, planting, boat planting	US	TX	27.87236	-97.12014	Technical Reports	restoration	Field	experimental	Halodule pinifolia, Halodule uninervis, Halodule wrightii, Halodule beaudettei			peat pot, mechanical boat	fertilization, planting, filled sediment	Compared mechanical planting by boat with hand planting to determine which had a higher survival rate.	biomass (above or below), shoot to root ratio	This paper provides information on different methods of planting seagrass. The mechanical boat averaged a successful planting rate of 30%, whereas the hand planting was 100% successful. No seagrass was found from either planting method 3 months after planting.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45401	Inglis	2000	Variation in the recruitment behaviour of seagrass seeds: Implications for population dynamics and resource management	seeds, recruitment, model, genetics, dispersal	Australia				Primary/White	restoration	Review or case study	observational	Amphibolis antarctica, Amphibolis griffithifif, Cymodocea nodosa, Cymodocea rotundata, Cymodocea serrulata, Enhalus acoroides, Halodule pinifolia, Halodule uninervis, Halodule wrightii, Halophila beccarii, Halophila decipiens, Halophila engelmannii, Halophila hawaiiana, Halophila johnsonii, Halophila minor, Halophila nipponica, Halophila ovalis, Heterozostera tasmanica, Phyllospadix scouleri, Phyllospadix serrulatus, Phyllospadix torreyi, Posidonia angustifolia, Posidonia australis, Posidonia coriacea, Posidonia oceanica, Posidonia sinuosa, Syringodium filiforme, Thalassia hemprichii, Thalassia testudinum, Thalassodendron ciliatum, Zostera asiatica, Zostera capricorni, Zostera caulescens, Zostera japonica, Zostera marina, Zostera noltii, Zostera tasmanica, Halodule beaudettei, Zostera pacifica					Explains the variation in recruitment of seagrasses		This paper provides information on the recruitment and long-term dynamics of seagrass populations. The dormancy, dispersability, and germination requirements of seeds were examined in different seagrass species. Variation in seed size and dispersal patterns was related to variations in life history and recruitment rates. Seagrass genera with small seed with low dispersal ranges formed persistant seed reserves and had faster recruitment rates; whereas larger seeds with moderate dispersal ranges had slower recruitment rates.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48040	Collings	2008	Seagrass rehabilitation in metropolitan Adelaide coastal waters. V. Large scale recruitment trial	recruitment, sand bags, mesh, sediment	Australia		-34.89201	138.48014	Book	restoration	Field	experimental	Amphibolis antarctica, Halophila beccarii, Halophila decipiens, Halophila engelmannii, Halophila hawaiiana, Halophila johnsonii, Halophila minor, Halophila nipponica, Halophila ovalis, Halophila stipulacea, Heterozostera tasmanica, Posidonia sinuosa, Thalassia testudinum				filled sediment	Bags of sand covered in mesh rope were placed on the bottom at varying distances from a seagrass meadow to determine which distance had the highest recruitment.	stem length, seedling counts	This paper provides information on the effect of stable substrates on seagrass recruitment. The number of recruits was the approximately the same for all sand bags, the distance from the meadow did not affect recruitment numbers. An average of 1.35 individuals per bag was observed after 4 months; a significant increase in individuals occurred at 13 months.
48019	Murray-Jones	2008	Proceedings of the Second Seagrass Restoration Workshop, Armoury Room, South Australian Museum, Adelaide 7 April 2008	techniques, restoration, planting, loss	Australia				Conference proceedings	restoration	Review or case study	observational	Amphibolis antarctica, Amphibolis griffithifif, Heterozostera tasmanica, Posidonia angustifolia, Posidonia australis, Posidonia coriacea, Posidonia sinuosa, Halophila australis							This paper provides information on different restoration techniques with a variety of seagrass species. Multiple case studies were presented in this paper, some of which are stand alone published documents.
44729	Kemp	2004	Habitat requirements for submerged aquatic vegetation in Chesapeake Bay: Water quality, light regime, and physical-chemical factors	SAV, Chesapeake Bay, water quality, light, physical, chemical, epiphytes	US	MD, VA	37.91737	-76.15291	Primary/White	guideline, research	Field	observational	Ruppia maritima, Thalassia testudinum, Zostera marina				light, monitoring, water quality, model	monitored water quality and predicted the availability of light that reaches seagrass blades.	water depth, suspended solids/turbidity, porewater sulfide, light	This paper provides information on the use of water quality data to predict the potential availability of light for supporting SAV growth. Minimum light requirments were estimated for SAV survival as a percentage of light passing through the water column to the desired depth and as a percentage of light reaching the leaves (through epiphyte layer).

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
48029	Horn	2006	The measurement of seagrass photosynthesis using pulse amplitude modulated (PAM) fluorometry and its practical applications, specifically in regard to transplantation	photosynthesis, Cockburn Sound	Australia		-32.25362	115.72206	Theses/ Dissertations	restoration	Field	observational	Halophila ovalis, Posidonia australis, Posidonia sinuosa				light, monitoring	compared the photosynthetic activity of transplanted and non-transplanted sseagrass	PAM fluorometer, light	This paper provides information on the changes in photosynthetic activity associated with transplantation. Desiccation was the main cause of seagrass transplantation failure, the paper suggests keeping the seagrass submerged at all times when transplanting.
44569	Hughes	2000	The effects of the polychaete Nereis diversicolor on the distribution and transplanting success of Zostera noltii	transplantation, polychaete, protected, fauna	United Kingdom		51.72761	0.81432	Primary/White	restoration	Field, Laboratory	experimental	Zostera noltii				fauna, enclosure, planting, protected vs unprotected	transplanted seagrass and protected it from the polychaete Nereis. Also monitored the feeding of Nereis on confined seagrass cores to determine the extent of the damage to the roots.	percent survival (of planting units), biomass (above or below), scar width, root counts	This paper provides information on the effect of the polychaete Nereis on transplanted seagrass. The transplanted seagrass that were protected from the polychaete had a higher survival rate, less root damage, and greater biomass than the unprotected seagrass. The paper suggests Nereis polychaetes may be responsible for limiting seagrass transplant success.
45321	Kishima	2011	Suitable water temperature for seed storage of Zostera japonica for subtropical seagrass bed restoration	temperature, seed, storage, germination	Japan		38.35298	141.07541	Primary/White	restoration	Laboratory	experimental	Zostera japonica				seed storage	Preserved seeds for different lengths of time to determine if they would survive. Examined storage at different temperatures to determine if it had an effect on germination.	temperature, seed counts	This paper provides information on the effect of different seed storage techniques on germination. Seeds stored at 4 degrees C germinated and were still viable after a long storage duration, while seeds at 23 degrees C were degraded. Low temperatures were effective at preserving germination potential in Zostera japonica seeds and were consistant with previous reports with Zostera marina seeds.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44488	Lee	2008	An effective transplanting technique using shells for restoration of Zostera marina habitats	transplantation, oyster shells, planting, large scale, Koje Bay	Korea		35.01064	128.54266	Primary/White	restoration, methods development	Field	experimental	Zostera marina	16	640	other	method, planting, transplanting techniques, shoot harvesting	Attached 2 shoots to an oyster shell and dropped the shell in the water from a boat.	shoot density, leaf growth rates, shoot height	This paper provided guidelines for a unique transplanting technique using oyster shells as an anchoring method for eelgrass shoots. This technique was successful and new lateral shoots were observed in the transplanted eelgrass. In 7 months, plant size and leaf productivity were similar to existing natural populations. The shell method was cost effective and did not create additional waste since the oyster shells are native to marine environments.
45105	Lee	2007	Recolonization of Zostera marina following destruction caused by a red tide algal bloom: the role of new shoot recruitment from seed banks	red tide, seed bank, recruitment, algae bloom	Korea		35.01064	128.54266	Primary/White	monitoring/ followup, recovery	Field	observational	Zostera marina				monitoring, recovery, algae	Monitored eelgrass before, during, and after a microalgal bloom.	shoot density	This paper provided information on the effects of a microalgal bloom on an eelgrass meadow and the subsequent recovery. Almost all eelgrass shoots in the meadow disappeared because of the reduction of light and a layer of mucilaginous material from the microalgae. Seedlings were recruited from the seed bank and recolonized the die-off area in less than 1 year after the decline. During the second year of recolonization, asexual reproduction from lateral shoots was the main method of recolonization. The paper suggests that shoot density affects the the rates of seed germinationand seedling establishment.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44231	Li	2010	Assessing establishment success of Zostera marina transplants through measurements of shoot morphology and growth	transplantation, new environment, Jindong Bay	Korea		35.10333	128.49133	Primary/White	restoration	Field	experimental	Zostera marina	70	1120	staple	monitoring, planting	Transplanted eelgrass to a new site and monitored the transplant success compared to a local reference meadow. Morphological characteristics, shoot density and weight of transplanted and reference eelgrass were monitored for 13 months.	percent survival (of planting units), shoot density, leaf width, plant productivity, rhizome diameter, shoot height, wet weight	This paper provides information on the success of eelgrass shoots transplanted to a new environment. Transplanted eelgrass started with lower levels of all monitoring parameters but rapidly exceeded the reference plants 5 months after transplantation. These results determined that eelgrass transplants established successfully in the new environment in 5-6 months and that monitoring shoot morphology and growth were effective monitoring criteria.
44609	Li	2013	An examination of photoacclimatory responses of Zostera marina transplants along a depth gradient for transplant-site selection in a disturbed estuary	Taehwa River, photosynthesis, transplantation, depth	Korea		35.54331	129.36280	Primary/White	research, restoration	Field	experimental	Zostera marina	121	3900	staple	monitoring, planting	Planted eelgrass in shallow (0.5 m), intermediate (1.5 m), and deep (2.5 m) water depths and monitored survival to determine the ideal water depth for successful transplantation.	percent survival (of planting units), water depth	This paper provided information on eelgrass transplant survival at different water depths. Initially, the shallow site had higher shoot densities and growth rates in the first 3 months, but then rapidly declined. The intermediate and deep sites had higher long-term survival and growth rates than the shallow site, suggesting these depths were favorable for transplantation.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44207	Li	2010	Adaptation success of Zostera marina to a new transplant environment	Jindong Bay, Koje Bay, transplantation	Korea		35.10333	128.49133	Primary/White	research, restoration	Field	experimental	Zostera marina				season, donor survey, planting	Transplanted seagrass from one bay to another bay. Four years after transplanting a survey of the donor and recipient sites was conducted.	shoot counts not as density (e.g. per PU), leaf width, rhizome internode #, plant productivity, rhizome diameter, shoot to root ratio, shoot height, wet weight	This paper provides information on Zostera marina's adaptation to transplantation. The transplant site had higher shoot height, shoot weight, and leaf productivity. The donor site had a higher below/aboveground tissue ratio. The peak season for lateral shoot recruitment was late winter for both sites. Phenotypic variations were observed between the two sites suggesting that different environmental conditions may be responsible.
44290	Li	2010	Chlorophyll a fluorescence as an indicator of establishment of Zostera marina transplants on the southern coast of Korea	Jindong Bay, PAM, photosynthesis, transplantation,	Korea		35.10333	128.49133	Primary/White	monitoring/ followup	Field	observational	Zostera marina				light, monitoring	Monitored chlorophyll a fluorescence in transplanted and reference seagrass using a fluorometer.	PAM fluorometer, plant productivity, chlorophyll a, light, shoot height	This paper provides information on using chlorophyll a fluorescence as an indicator for assessing the establishment success of seagrass transplants. The results indicated that seagrass photosynthesis recovered quicker than shoot morphology, biobass, or productivity and could be used for early assessment of transplants.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
46694	Longstaff	1999	Effects of light deprivation on the survival and recovery of the seagrass Halophila ovalis (R.Br.) Hook	light deprivation, recovery, monitoring, Queensland	Australia		-21.34579	149.38149	Primary/White	research, recovery	Field, Laboratory	experimental	Halophila ovalis				light, monitoring, recovery	Light deprivation experiments were carried out in an aquarium and in situ at two depths. Seagrass was deprived of light and the recovery processes were observed.	biomass (above or below), plant productivity, chlorophyll content, chlorophyll a	This paper provides information on the survival and recovery of seagrass during and after light deprivation. Biomass declined after 3-6 days in the dark and plant death occurred after 30 days. Biomass continued to decline for a short period during the recovery period then stabilized. Sugar concentrations declined rapidly during light deprivation, stabilized, then increased rapidly during recovery.
46946	Macinnis-Ng	2003	Short-term response and recovery of Zostera capricorni photosynthesis after herbicide exposure	Paradise Beach, recovery, photosynthesis, herbicide,	Australia		-38.19796	147.42190	Primary/White	research, recovery	Field, Laboratory	experimental	Zostera capricorni				fertilization, enclosure, light, monitoring	The effects of three different herbicides (Atrazine, Diuron, and Irgarol 1051) was examined. Seagrasses were exposed to large amounts of herbicides for 10 hours and chlorophyll a levels were monitored during recovery.	chlorophyll content, chlorophyll a	This paper provides information on the effect of prolonged duration of herbicides on the photosynthetic activity of seagrass. All laboratory samples were severly damaged and most samples did not fully recover. Field samples were more severly impacted by Irgarol and Diuron exposure, but were able to completely recover from Atrazine exposure at the same concentrations as laboratory experiments. Total chlorophyll concentrations showed only limitied impact.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45139	Macreadie	2014	Resilience of Zostera muelleri seagrass to small-scale disturbances: the relative importance of asexual versus sexual recovery	disturbance, recovery, resilience, genotypic diversity	Australia		-33.08337	151.56584	Primary/White	recovery	Field	experimental	Zostera muelleri				genetics, monitoring, recovery, sexual reproduction	Monitored the recovery of seagrass to small scale disturbances of varying intensities. Seagrass above and/or below ground plant material removed, borders were placed to prevent clonal growth, and controls.	shoot density, seagrass percent cover, photographs, epiphytes, canopy height, fauna densities, floral density	This paper provides information on the recovery methods of seagrass to small-scale disturbances of varying intensities. Seagrass recovered quicker from lower intensity disturbances (shoot loss) than from higher intensity disturbances (prop scar). In addition, Z. muelleri was observed to use clonal growth as the primary method of recovery; sexual recovery from seeds was not observed. The paper suggests sexual reproduction is more effective for increasing the density of an established seagrass meadow, and asexual clonal growth is the primary method for establishing new seagrass meadows over bare substrate.
46624	Martins	2005	Seasonal variation in short-term survival of Zostera noltii transplants in a declining meadow in Portugal	Mondego Estuary, season, transplantation, growth	Portugal		40.33824	-8.11930	Primary/White	restoration	Field	experimental	Zostera noltii	11.25	720	hand planting	monitoring, planting	Planted seagrass during different seasons	shoot counts not as density (e.g. per PU), salinity, leaf growth rates, wet weight	This paper provides information on the success of seagrass transplantation during different seasons in the year. The amount of lost shoots was considerably higher in seagrass planted from spring to mid-autumn. Surviving shoots were negatively related to NH4 concentrations and salinity levels. Transplantation success was also higher when belowground biomass was higher than aboveground biomass. The paper suggests planting seagrass in the late autumn and winter for higher seagrass survival.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44402	McLennan	2005	The distribution of seagrasses and the viability of seagrass transplanting in the Broadwater, Gold Coast, Queensland	Broadwater, mapping, transplantation	Australia		-27.95668	153.41335	Primary/White	restoration	Field	experimental	Halophila ovalis, Zostera capricorni, Halophila spinulosa	72	121	plug	monitoring, planting	Planted mixed and pure plots of H. ovalis and Z. capricorni into an artificially disturbed habitat and monitored the site for 6 months	percent survival (of planting units)	This paper provides information on the transplantation of two seagrass species to a disturbed habitat. Survival was less than 50% for the seagrass planted, but natural colonization of a different seagrass species was observed. H. spinulosa was observed in high densities 8 months after the area was disturbed. Seagrass transplantation was not advised at this site due to high costs, lack of effectiveness and observed natural recolonization of damaged sites.
47803	Muth	2011	Disturbance and Recovery of Intertidal Mixed Seagrass Communities	Inhaca Island, recovery, intertidal, mixed species	Africa		-26.06617	32.93401	Theses/ Dissertations	recovery	Field	observational	Halodule uninervis, Halodule wrightii, Halophila ovalis, Syringodium filiforme, Thalassia testudinum, Thalassodendron ciliatum				sediment cores	observed the recovery of seagrasses to natural disturbances.	leaf nutrients, species, pH, sediment organic matter content, carbon, nitrogen, phosphorus, porewater sulfide	This paper provides information on the response of mixed-species intertidal seagrass communities to disturbances. Infauna abundance and distribution to pre-disturbance levels takes longer than seagrass recovery, indicating that habitat recovery will take longer than seagrass recovery. Changes in sediment organic content were not found to have an effect on seagrass recovery at a small-scale disturbance level.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45103	Olesen	2004	Recolonization dynamics in a mixed seagrass meadow: The role of clonal versus sexual processes	recolonization, clonal growth, sexual reproduction	Phillipines		13.66506	121.71437	Primary/White	restoration, recovery	Field	observational	Cymodocea rotundata, Enhalus acoroides, Halodule uninervis, Thalassia hemprichii				monitoring	Monitored the recolonization method of a mixed species seagrass meadow for 2.5 years.	rhizome elongation rate, species, seedling counts	This paper provides information on the recolonization of a large disturbed area within a mixed species seagrass meadow. Larger, slow growing species that produced large, broadly dispersed seeds dominated sexual colonization. These species accelerate colonization from farther distances from established meadows. Smaller seagrass species with faster elongation rates, low reproductive output, and limited seed dispersal utilized lateral extension as the dominant colonization method.
46512	Pan	2014	An Effective Method for Collecting and Storing Seeds from Zostera marina (Eelgrass) in the Yellow Sea, China	Yellow Sea, seeds, collection, storage	China		31.96004	121.85011	Primary/White	restoration	Field, Laboratory	experimental	Zostera marina				seed storage, seed harvesting	Developed an effective method for collecting, processing, and storing seeds.	temperature, salinity, seed counts	This paper provides guidelines for the collection, processing, and storage of Zostera marina seeds for use in large scale restoration projects. Salinity and temperature significantly affected germination rate and seed viability. A temperature of 4 degrees C and a salinity of 44.5 psu had the highest viability and germination rate. The paper suggests that using seeds was more cost effective than transplanting adult plants.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44616	Park	2013	An Experimental Transplantation to Select the Optimal Site for Restoration of the Eelgrass Zostera marina in the Taehwa River Estuary	Taehwa River, transplantation, site selection, irradiance	Korea		35.54331	129.36280	Primary/White	restoration	Field	experimental	Zostera marina	34	544	staple	planting, shoot harvesting, sediment cores	Transplanted eelgrass at 3 sites to compare success rates.	shoot density, leaf width, temperature, salinity, plant productivity, sediment organic matter content, rhizome diameter, porewater sulfide, light, shoot height	This paper provides guidelines for eelgrass transplantation and site selection considerations. Sites 2 and 3 were successful for eelgrass transplantation and had a 180% increase in seagrass density. Site 1 had an increase in density the first month then most of the transplants died. This may have been attributed to the large decrease in underwater irradiance reaching the leaves for 2 months. This suggests the importance of researching a proposed transplant site and determining the site selection criteria prior to transplanting.
46921	Park	2005	Selection of the Optimal Transplanting Method and Time for Restoration of Zostera marina Habitats	Jindong Bay, Kosung Bay, Dadae Bay, transplantation, methods, seasons	Korea		35.10333	128.49133	Primary/White	restoration	Field	experimental	Zostera marina			grid/TERF, staple, other	season, planting, transplanting techniques, shoot harvesting	Tested 3 planting techniques (staple, TERF, and shell) to determine which was best suited for eelgrass transplantation. Also planted during different seasons to determine the ideal planting time.	shoot density	This paper provides guidelines for eelgrass transplantation methods and planting seasons for increased success. The staple method had the highest survival rate for the transplants. The shell method had a high success rate over muddy substrates, but not over sandy substrates. Planting in the fall had the highest transplant survival rate while planting in the summer was unsuccesssful for transplant survival. The paper suggests examining the sediment composition to determine the optimal planting technique.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44359	Park	2010	Development of transplantation method for the restoration of surfgrass, Phyllospadix japonicus, in an exposed rocky shore using an artificial underwater structure	Phyllospadix transplant system, transplantation, methods,	Korea		35.10333	128.49133	Primary/White	restoration	Field	experimental	Phyllospadix japonicus	2.88	1600	other	planting, transplanting techniques	Transplanted seagrass using the Phyllospadix Transplant System (PTS), and underwater structure on which transplants were attached by rope to screws on the structure. Transplants were monitored with natural beds for 2 years.	shoot density, rhizome elongation rate, sheath length, leaf growth rates, shoot height	The paper provides guidelines for transplanting Phyllospadix japonicus using a new transplantation technique. The transplants did not experience an intial shoot loss and density increased gradually. In about one year, the transplant shoot heights and sheath lengths were similar to natural beds. The PTS technique was successful at planting surfgrass to the rocky shoreline.
45273	Park	2007	Site-specific success of three transplanting methods and the effect of planting time on the establishment of Zostera marina transplants	Jindong Bay, Koje Bay, Kosung Bay, transplantation, sediment type, season, methods	Korea		35.10333	128.49133	Primary/White	restoration	Field	experimental	Zostera marina	10.32	1164	grid/TERF, staple, other	method, season, planting, transplanting techniques, sediment	Tested 3 planting techniques (staple, TERF, and shell) to determine which was best suited for eelgrass transplantation. Also planted during different seasons to determine the ideal planting time.	shoot density, temperature, water depth, sediment organic matter content	Updated version of 2005 paper: This paper provides guidelines for eelgrass transplantation methods and planting seasons for increased success. The staple method had the highest survival rate for the transplants. The shell method had a high success rate over muddy substrates, but not over sandy substrates. Planting in the fall had the highest transplant survival rate while planting in the summer was unsuccesssful due to high water temperatures.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44334	Park	2009	Current status and ecological roles of Zostera marina after recovery from large-scale reclamation in the Nakdong River estuary, Korea	Nakdong River, recovery, decline, persistent meadows	Korea		35.05149	128.92251	Primary/White	recovery	Field	observational	Zostera marina				monitoring, recovery	Compared a local recolonized eelgrass meadow to other persistant meadows in similar geographical areas.	shoot density, biomass (above or below), plant productivity, carbon, nitrogen, shoot height	This paper provides the status of a recovering eelgrass meadow following a decline compared with persistent meadows in the same area. Shoot density and biomass in the recovering meadow was similar to the persistent meadows and annual leaf production was higher in the recovering meadow. These results suggest that the recovering meadow has adjusted to the local environmental conditions.
46232	Park	2011	Rapid recovery of the intertidal seagrass Zostera japonica following intense Manila clam (Ruditapes philippinarum) harvesting activity in Korea	Koje Bay, Manila clam, recovery, decline, disturbance	Korea		35.01466	128.56835	Primary/White	recovery	Field	observational	Zostera japonica				monitoring, recovery	Monitored a seagrass bed before, during and after Manila clam harvesting took place.	shoot density, leaf width, rhizome internode #, biomass (above or below), leaves per shoot, temperature, plant productivity, sheath length, rhizome diameter, shoot height	This paper provides information on the recovery of a Zostera japonica bed after Manila clam harvesting. Immediately after the clamming activity, no shoots were present in the seagrass beds. A few shoots were present 3 months after the clamming activity and after 5 months shoot density and biomass were almost recovered to the levels they were before clamming activities. Asexual reproduction was responsible for initial revegetation of the seagrass, but more energy was allocated to sexual reproduction because a longer fertile period was observed after the disturbance.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
46357	Peralta	2003	On the use of sediment fertilization for seagrass restoration: a mesocosm study on Zostera marina L	sediment fertilization, nitrogen, phosphorus	Netherlands				Primary/White	research	Laboratory	mesocosm	Zostera marina				fertilization, light, monitoring, nutrient injection, sediment	Tested the effect of different levels of N and P sediment fertilization on eelgrass.	biomass (above or below), leaf nutrients, leaf growth rates, porewater sulfide, light	This paper provides information on the sediment fertilization of Zostera marina with nitrogen and phosphorus. The sediment fertilization was effective for eelgrass and had a positive response with high tolerance to extensive porewater enrichment. Plant inhibition was observed when levels of porewater concentration exceeded 30 mM.
45106	Rasheed	2004	Recovery and succession in a multi-species tropical seagrass meadow following experimental disturbance: the role of sexual and asexual reproduction	Green Island, succession, recovery, recolonization, reproduction	Australia		-16.75686	145.97036	Primary/White	recovery	Field	experimental	Halophila ovalis, Syringodium isoetifolium				species, monitoring, recovery	50x50 cm gaps were created in the seagrass meadow and the recovery process was monitored for 26 months.	shoot density, biomass (above or below), rhizome elongation rate, seed counts	This paper provides information on the recovery process of a mixed-specied seagrass meadow. Initial recolonization was dominated by S. isoetifolium via asexual reproduction and faster horizontal rhizome growth rates than other species. Density and biomass of disturbed areas were equal to undisturbed areas in under a year, but the initial dominating species, S. iosetifolium, remained dominant throughout the study. This indicates that small disturbances in the meadow lead to long term changes in seagrass community composition.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45111	Rasheed	1999	Recovery of experimentally created gaps within a tropical Zostera capricorni (Aschers.) seagrass meadow, Queensland Australia	recovery, cleared plots, recolonization	Australia		-16.88376	145.77676	Primary/White	recovery	Field	experimental	Zostera capricorni				monitoring, recovery	gaps were created in a seagrass meadow and the recovery and recolonization process was monitored for 1 year.	shoot density, biomass (above or below)	This paper provides information on the recovery process of Zostera capricorni following disturbances. Recolonization primarily occurred by asexual growth from surrounding rhizomes. Sexual reproduction was not observed in the recovery process. After 1 year, biomass and shoot density in cleared plots recovered to the level of uncleared controls. The rate of asexual recovery slowed in autumn, but rapidly increased in late winter and spring.
44328	Rasheed	2014	Contrasting recovery of shallow and deep water seagrass communities following climate associated losses in tropical north Queensland, Australia	storm, recovery, shallow, deep,	Australia		-19.86297	147.99538	Primary/White	recovery	Field	observational	Halophila australis				species, monitoring, recovery	A deep and a shallow seagrass meadow were monitored following disturbance from a storm for 2 years	biomass (above or below), water depth, species	This paper provides information on the recovery of shallow and deep seagrass meadows following major decline from a storm. The deeper site recovered quickly via seed bank availability, with Halophila being the dominant species. Shallow sites did not have a seed bank supply and were only able to recover via asexual propogation which took much longer.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45202	Reise	2008	Seagrass recovery in the Northern Wadden Sea?	Northern Wadden Sea, aerial survey,	Germany		53.72242	8.00847	Primary/White	monitoring/ followup, recovery	Field	observational	Zostera marina				monitoring, mapping	Conducted aerial surveys on Zostera sp. at an altitude of 300 to 500 m above ground. Surveys were conducted in August which is seasonal maximum for seagrass.	patch size or perimeter	This paper provides information on the recovery of seagrass meadows from 1994 to 2006. A three to fourfold increase was observed in seagrass beds following aerial surveys, which contrasted globally observed trends. The paper suggests sediment stability is a key factor for seagrass success, since storms were less frequent. Error in the methodology includes the inability to distinguish algae from seagrass in areas, and less contrast for identifying seagrass in darker sediment types.
44327	Rollon	1998	Contrasting recolonization strategies in multi-species seagrass meadows	disturbance, species composition, succession	Phillipines		16.40096	119.90292	Primary/White	recovery	Field	experimental	Enhalus acoroides, Thalassia hemprichii, Syringodium isoetifolium				season, recovery	All seagrass plant material was accounted for and then removed from 3 quadrats (50x50 cm) during the rainy season and during the dry season. Sampling was done monthly and all new colonizers were counted.	shoot counts not as density (e.g. per PU)	This paper provides information on the recovery of mixed seagrass communities following disturbance. Recolonization was highly dependent on the densities of the seagrass adjacent to the disturbance, and the amount of sexual propagules was low. Thalassia was faster growing and fully recovered 2 years after the disturbance, whereas Enhalus grew much slower and may take up to 10 years to fully recover.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44300	Saunders	2013	Coastal retreat and improved water quality mitigate losses of seagrass from sea level rise	water quality, mitigation, sea level rise,	Australia		-27.21853	153.25130	Primary/White	mitigation	Review or case study	model	Cymodocea rotundata, Halodule uninervis, Halophila ovalis, Zostera muelleri, Halophila spinulosa, Syringodium isoetifolium				light, water quality, model	The effects of sea level rise, water clarity, and land use on future seagrass populations was examine using a model.	seagrass percent cover, water depth, light	This paper provides information on the predicted future seagrass population based on changes in sea level rise and land used. Water clarity was predicted to increase with a decrease in land use which increased seagrass habitat. As sea level rises, seagrasses will be deeper and good water clarity will be a necessity for adequate light to penetrate.
45026	Sharon	2009	Photosynthetic responses of Halophila stipulacea to a light gradient. II. Acclimations following transplantation	Gulf of Aqaba, transplantation, photosynthesis,	Israel		28.60479	34.69750	Primary/White	research	Field	experimental	Halophila stipulacea		6	other	light intensity, planting	Transplanted seagrass to shallow (8 m) and deep (33 m) depths and monitored photosynthetic rates to determine if it changed.	PAM fluorometer, water depth	This paper provides information on the ability of Halophila stipulacea to adapt to changes in light at different water depths. Transplanted seagrass adjusted to the new environment within 6 days of transplantation and had similar photosynthetic rates to native seagrass. This species is a highly adaptable to a wide range of irradiances, possibly resulting in a larger depth distribution.
44224	Sohma	2009	Application of an ecosystem model for the environmental assessment of the reclamation and mitigation plans for seagrass beds in Atsumi Bay	Atsumi Bay, model, water quality, mitigation	Japan		34.75492	137.25539	Primary/White	mitigation	Field	model	Zostera marina				water quality, model	Used a model to determine the effects of reclaimation and mitigation on seagrass. Examined the water quality, nutrient loads, and predicted growth of artificial seagrass.	water depth, nitrogen, phosphorus, fauna densities	This paper provides information on the effect of land reclaimation on natural beds and the predicted effects of seagrass bed mitigation. Suspension feeders contributed to increased water clarity and higher nutrient levels. Predicted growth levels of artificial seagrass beds was the same as natural seagrass beds at the same depth.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
47957	Takayama	2008	Field Study of Method of Transplanting Eelgrass that Doesn't Need Require Planting Shoots and Sowing seeds	Ago Bay, transplantation, methods	Japan		34.29247	136.80697	Primary/White	restoration, methods development	Field	experimental					method, planting, transplanting techniques	Used mats placed on the bottom near natural seagrass beds to collect seeds and seedlings naturally. Mats were then transplanted to a new site.		This paper provides guidelines for a mat transplantation technique that conserves natural seagrass beds during transplantation. This method requires less work underwater and therefore is more cost effective. Results of the field study indicate that using this method, seagrass grew and expanded equivalent to the natural eelgrass bed.
46634	Tanada	2005	Development of an eelgrass Zostera marina L. bed using a method of artificial seeding on 'gauze cloth and pebble mats' and limits to their use in areas of strong wave activity in winter	Seto Inland Sea, artificial seeding, seeds, waves	Japan		34.22778	134.56050	Primary/White	restoration, methods development	Field	experimental	Zostera marina		45		method, planting	artficial seeding on gauze cloth and pebble mats were planted with seeds and monitored for 2 years.	percent survival (of planting units), shoot density	This paper provides information on a transplantation technique that uses artificial seeding. Eelgrass was successful growing on these mats for 2 years, even under increased wave activity. Once shoot density reached a maximum, shoots began to die off and the few shoots remaining disappeared after a typhoon. These mats were effective for seed germination, seedling growth, and survival of adult plants, but may not be effective in areas prone to high wave activity.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44575	Tanaka	2004	Emergence stress and morphological constraints affect the species distribution and growth of subtropical intertidal seagrasses	Ishigaki Island, transplantation,	Japan		24.36593	124.25227	Primary/White	research	Field	experimental	Cymodocea rotundata, Cymodocea serrulata, Thalassia hemprichii	24	120	plug	tidal zone, species, monitoring, planting	Transplanted species of seagrass from subtidal to intertidal zones and monitored changes. A desiccation experiment was also done on each species.	percent survival (of planting units), shoot density, leaf length, rhizome length, sheath length, leaf growth rates	This paper provides information on the ability of different seagrass species to adapt to slightly different environments. C. rotundata and T. hemprichii had the same survival rate of 48% and was much higher than C. serrulata. In addition, the size of the leaves within these two species also decreased, approaching leaf size of the native intertidal leaves. T. hemprichii had higher water content than the other two species of seagrass. C. rotundata and T. hemprichii survive better in the intertidal areas because of their ability to adapt to different environments.
46635	Terawaki	2005	Excellent examples of eelgrass Zostera marina bed restoration continuing along the coast of Seto Inland Sea, Japan	Seto Island sea, restoration	Japan		34.22778	134.56050	Primary/ White, Abstract	restoration	Review or case study	observational	Zostera marina				monitoring, planting			This paper provides information on six successful restoration projects that occurred along the coast of the Seto Island Sea. These restoration projects enhanced or created substrate ideal for eelgrass growth and transplanted eelgrass to accelerate colonization. The restoration projects took into account the local limiting factors and provided sufficient mitigation for them.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45325	Thangaradjou	2008	Survival and growth of transplants of laboratory raised axenic seedlings of Enhalus acoroides (L.f.) Royle and field-collected plants of Syringodium isoetifolium, Thalassia hemprichii, and Halodule pinifolia	Gulf of Mannar, transplantation, methods	India		9.14107	79.18797	Primary/White	restoration	Field	experimental	Enhalus acoroides, Halodule pinifolia, Thalassia hemprichii, Syringodium isoetifolium	15.2	920	plug, turf, skewers	method, species, planting, transplanting techniques	Transplanted different species with different techniques: T. hemprichi - plug, S. isoetifolium and E. acoroides- skewer, and H. pinifolia - turfs.	percent survival (of planting units), shoot counts not as density (e.g. per PU), temperature, salinity, pH, nitrogen, phosphorus, leaf growth rates	This paper provides guidelines for different transplanting techniques for different seagrass species and the success of each technique. Seagrass decreased immediately after transplantation for the first few months using all transplantation methods. S. isoetifolium suffered a complete loss, E. acoroides declined to 30% survival, H. pinifolia declined to ~75% survival, and T. hemprichii declined to ~80% survival. Results suggest T. hemprichii (plug method) and H. pinifolia (turf method) were suggested for planting in this region with the same methods used.
46222	Tu Do	2012	Seagrass burial by dredged sediments: Benthic community alteration, secondary production loss, biotic index reaction and recovery possibility	Arcachon Bay, burial, recovery	France		44.68190	-1.15450	Primary/White	monitoring/ followup, recovery	Field	observational	Zostera noltii				burial recovery, monitoring	Monitored recovery of macrobenthos and seagrass after dredging activities.	seagrass percent cover	This paper provides information on the recovery of seagrass in the Arcachon Bay following dredging activities. After dredging, the area was divided into two different substrates, a sandflat and a mudflat. The sandflat area was not recolonized by seagrass and the fauna remained different, whereas the mudflat area recolonized similar to the adjacent seagrass areas. The macrobenthic community required 3 years to recover, and seagrass required 5 years to fully recover in the newly formed mudflat areas.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44270	Valdemarsen	2011	Burial of seeds and seedlings by the lugworm Arenicola marina hampers eelgrass (Zostera marina) recovery	Odense Fjord, water quality, nutrients, lugworms, recovery	Denmark		55.49159	10.52807	Primary/White	recovery	Field, Laboratory	experimental, mesocosm	Zostera marina				fauna, burial recovery, monitoring	Lugworm population and sediment reworking were observed at a site previously dominated by eelgrass. Eelgrass seeds and seedlings were placed in mesocosms with the lugworms	fauna densities, seedling counts, seed counts	This paper provides information on the effects of the lugworm, Arenicola marina, on eelgrass populations. Sediment reworking from lugworms led to rapid burial of eelgrass seeds (95%) and seedlings (75%) within 1-2 months. Lugworm populations at low densities may still have negative effects on eelgrass recovery, even when water quality favors eelgrass recolonization.
44726	Van Katwijk	2009	Guidelines for seagrass restoration: Importance of habitat selection and donor population, spreading of risks, and ecosystem engineering effects	Wadden Sea, restoration success	Netherlands		53.29848	5.36841	Primary/White	restoration	Review or case study		Unspecified				success criteria	reviewed studies in the Wadden Sea for seagrass restoration.		This paper provides information on requirements for successful seagrass restoration in the Wadden Sea. Planting at sites where seagrass had previously been reported, and selecting similar donor material were important for success. The paper reviews the importance of genetic variation from donor materials as well.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
44571	Van Katwijk	2000	Effects of water dynamics on Zostera marina: Transplantation experiments in the intertidal Dutch Wadden Sea	Dutch Wadden Sea, transplantation, water depth, waves	Denmark		53.73366	7.75868	Primary/White	restoration	Field	experimental	Zostera marina	96.5	122	bare root	depth, tidal zone, enclosure, bioturbation, planting, water flow	Planted seagrass at different tidal depths using a variety of treatments: shell armour sediment, exclosures, gauze, and plexiglas.	shoot counts not as density (e.g. per PU), leaf length, water depth, sheath length	This paper provides information on the effects of water depth, wave activity, herbivory, and substrate type on seagrass transplants. Transplants successfully established from 0 to -0.2 m tidal depths, without treatments and the shell sediment had a positive effect on seagrass transplantation success. From depths of -0.4 to -1.15 m seagrass establishment was not possible without treatments. When exclosures were removed, all seagrass disappeared from the transplant site due to impacts from water dynamics. The effects of water dynamics at the site must be observed before transplanting activities occur to increase success.
44730	Van Katwijk	2000	Habitat suitability of the Wadden Sea for restoration of Zostera marina beds	Wadden Sea, model, potential habitats, water dynamics, sedimentation	Netherlands		53.29848	5.36841	Primary/White	restoration	Field, Laboratory	model	Zostera marina				depth, recovery, model, sediment	Used a model to predict potential eelgrass habitats. Model criteria were dessication, turbidity, nutrients, salinity, and water dynamics.	salinity, water depth	This paper provides information on the potential habitats of eelgrass in the Wadden Sea using a model based on reported data. Increased sediment, nutrients, and water dynamics was the cause of the eelgrass decline. Eelgrass presence was negatively impacted by increases in water and sediment dynamics, nutrient load, turbidity, and dissication. Potential eelgrass habitats are located above -0.80 m mean sea level in sheltered locations with some freshwater input.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45320	Van Katwijk	1998	Suitability of Zostera marina populations for transplantation to the Wadden Sea as determined by a mesocosm shading experiment	Wadden Sea, shading, transplantation	Netherlands		53.29848	5.36841	Primary/White	restoration	Field	mesocosm	Zostera marina				planting unit spacing, planting, shading	Seagrass was transplanted from donor beds to mesocosms. Planting density and light reduction were examined on 5 eelgrass populations for 2 years. Percent light reduction observed was 75%, 89%, 95%, and 98%.	percent survival (of planting units)	This paper provides information on the effects of shading and planting density on five eelgrass populations. Planting density was initially positively correlated with success, but had no effect on transplantation success. Maximum light reduction tolerated was 75% and 89%, which corresponds to water depths between -0.45 m and -0.85 m. The only difference between populations was observed in the reproductive strategy which may be due to genetics; there was no difference in shading tolerance. The paper suggests that characteristics of a donor population must be carefully considered before transplanting.
45065	Van der Heide	2007	Positive feedbacks in seagrass ecosystems: Implications for success in conservation and restoration	Dutch Wadden Sea, model, turbidity, decline	Denmark		53.73366	7.75868	Primary/White	recovery	Field	model	Zostera marina				depth, model, sediment	Used a model to predict eelgrass recovery. Factors for the model were water depth common for eelgrass growth, and turbidity.	suspended solids/ turbidity	This paper provides information on the potential recolonization of eelgrass after a large decline. Model predictions indicated that recovery was impossible because turbidity was too high and was not being reduced due to a lack of seagrass. This positive feedback mechanism suggests why restoration attempts were unsuccessful and shows the resilience of this ecosystem.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45390	Widmer	2006	Using the precautionary principle to measure recovery of coastal habitats: The case of a seagrass bed	Sydney Harbour, recovery, corer, scars	Australia		-33.86008	151.23877	Primary/White	recovery	Field	experimental	Halophila ovalis				recovery	A corer was used to create gaps in the seagrass beds. 14 cores were taken at each of the 2 sites. Smapling occurred every 2 months after the clearing.	biomass (above or below), dry weight of growths, scar width, dry weight of roots	This paper provides information on the recovery of seagrass following small scale disturbances. After 6 months at Site 1, biomass values were about 85% of the reference sites. At Site 2, recovery occurred within 4 months for above-ground biomass. The paper suggests that H. ovalis may take longer than 6 months to recover and regulatory agencies should establish protocols to accurately assess recovery.
45158	Zhou	2014	Restoring Eelgrass (Zostera marina L.) Habitats Using a Simple and Effective Transplanting Technique	Huiquan Bay, stone anchor method, transplantation, method	China		36.05385	120.33564	Primary/White	restoration	Field	experimental	Zostera marina	1708	14175	other	method, planting, transplanting techniques	Used the stone anchoring method to plant seagrass. Several rhizomes were bound to a small elongate stone and tied with biodegradable string.	percent survival (of planting units), shoot density, biomass (above or below), sediment partical size, carbon, nitrogen, phosphorus, shoot height	This paper provides information on a new transplant technique for eelgrass restoration. Success was high using the stone anchoring method and resulted in survivorship of > 95% at the two transplant sites and after establishing were statistically equal to natural beds. Sexual production period was from April to August, and maximun shoot height and biomass were observed in June and July.

Ref ID	Firs Author	Pub Year	Title	Keywords	Country/ State	State	Latitude	Longitude	Literature Type	Study Purpose	Study Type1	Study Type2	Species	Area of Planted	# of PU	Planting Method	Exp. Param	Exp. Param Text	Mon Parameters	Annotation
45409	Zipperle	2010	Waterfowl grazing in autumn enhances spring seedling recruitment of intertidal Zostera noltii	Island of Sylt, waterfowl, grazing, recruitment	Germany		54.82670	8.37729	Primary/White	restoration	Field	experimental	Zostera noltii				fauna, seed dispersal, sexual reproduction	Treatment pits resembled natural feeding pits in two meadows to see if seedling density was effected. Treatments were placed at the center and at the edges of seagrass meadows.	seedling density	This paper provides information on the effect of waterfowl feeding on seed and seedling recruitment. Feeding pit treatments had a significantly higher seedling density than untreated controls. Treatments in the center also had a higher seedling density than treatments on the edge of the meadow. Waterfowl grazing has a positive effect on seed accumulation on the fall which facilitates a higher seedling density in the spring.