Table S1. Manipulative field experiments testing for impacts of nonindigenous macroalgal species on native species and assemblage structures. NIS = nonindigenous species; NIS- = absence of NIS; NIS+ = presence of NIS.

Study, NIS, and native test species	Location and habitat	Methods, experimental design, and data extraction for meta-analysis	Key results: *P*-values and conclusions
Ambrose and Nelson 1982 *Sargassum muticum* *Macrocystis pyrifera*	USA, California, Santa Catalina, Fisherman Cove, Bird Rock. Rocky coast. 3–7 m depth.	Removals. 2 NIS levels (± monthly removal of *Sargassum* until June 1979) × 2–3 site transects (3 2×15 m removal transects and two 10–13 m control transect) × 20–30 subreplicates per transect. Initiated January 1979 and terminated September 1979. Initial *Sargassum* density = 56.9 m^{-2}. Data extraction: table 1.	*Macrocystis* recruit densities: June: Site 1: *P*<0.001 (NIS+ < NIS-). Site 2a: *P*<0.001 (NIS+ < NIS-). Site 2b: *P*>0.05. September: Site 1: *P*<0.001 (NIS+ < NIS-). Site 2a: *P*<0.05 (NIS+ < NIS-). Site 2b: *P*>0.05. Conclusion: NIS reduced kelp recruitment. Absence of kelp recruits in September, after seasonal NIS dieback, indicated that NIS prevents recruitment.
Airoldi 2000 *Womersleyella setacea* Encrusting algae	Italy, Ligurian Sea, Calafuria. Wave-exposed rocky cliff. 10–18 m depth.	Removals. 4 NIS levels (initial removal; repeated removal; repeated thinning; control) × 4 sites × 3 replicates (0.01 m^2 plots). Three subreplicates were sampled for “biomass” and “fertility.” Initiated September 1995 and terminated October 1996. Data extraction: figure 10.	Encrusting algae biomass: *P*<0.05 (initial NIS- = repeated NIS- = thinning NIS- > NIS+). Encrusting percent cover, encrusting mortality and encrusting fertility: *P*>0.05. Conclusion: NIS reduced biomass of encrusting algae, but not cover, mortality or fertility.

Britton-Simmons 2004 *Sargassum muticum* Algae and invertebrate assemblages	USA, Washington State, San Juan Island, Friday Harbor. 2 MPA sites: Collins cove and Point George. Rocky coast 2 m below MLLW.	Removals. 2 NIS levels (± repeated removals in 50 cm^2 plots with 50 cm buffer zone) × 2 sites × 5 replicates × 3–7 sampling dates (1 before and 2–6 after experimental start). Initiated July 1999 and terminated July 2002. Data extraction: figures 1, 2, 3, 5, 6; table 2.	Canopy algae cover: P=0.000 (NIS+ < NIS-). Understory algae cover: P=0.009 (NIS+ < NIS-). Canopy algae richness: P=0.001 (NIS+ < NIS-). *Laminaria*: *Agarium* ratio: P<0.01 (NIS+ < NIS-). Urchin density: P<0.001 (NIS+ < NIS-; only at Point George). Kelp growth: P<0.001 (NIS+ < NIS-). Crustose coralline cover, filamentous/turf algae cover, herbivore mollusk density, detrivore density, and invertebrate richness: P>0.05. Conclusion: NIS reduced canopy algae, understory algae, urchins, algae richness, *Laminaria*:*Agarium* ratio and kelp growth, but did not impact invertebrate richness, or abundance of herbivore mollusks, detrivores or crustose coralline or filamentous/turf algae.
Bulleri et al. 2006 *Codium fragile* *Mytilus galloprovincialis*	Italy, Adriatic Sea, Cesenatico, on leeward side of man-made carbonate breakwaters. 0.2–0 m depth above MLLW.	Removals. 2 NIS levels (± removal of 100% cover of *Codium* canopy in 900 cm^2 plots) × 2 breakwaters × 3 blocks × 3 within-block replicates (10 cm^2 in plot centers). Initiated May 2004 and terminated in July 2004 (3 extra blocks were initially manipulated to be sampled in September, but storms destroyed most). Data extraction: figures 3, 4.	*Mytilus* recruit density: P<0.05 (NIS+ > NIS-). *Mytilus* shell length: P>0.05. Conclusion: NIS increased survival and recruitment, but not growth, of mussels.
Casas et al. 2004 *Undaria pinnatifida* Algae assemblages	Argentina, Nuevo Gulf, Central Patagonia, Puerto Madryn, Cuevas point. Rocky coast. 6	Removals. 2 NIS levels (± monthly removals of *Undaria* in 0.25 m^2 plots) × 10 replicates. Initiated April 2001 (with high *Undaria* recruitment) and terminated December 2001 (before summer	Algae richness: P<0.001 (NIS+ < NIS-). Algae diversity: P=0.013 (NIS+ < NIS-). Algae evenness: P=0.028 (NIS+ < NIS-) *Codium vermilaria*: P=0.54.

	m depth.	senescence). Data extraction: table 1.	Conclusion: NIS reduced algae diversity, richness and evenness but did not affect abundance of second most common species in system (*C. vermilaria*).
Ceccherelli and Cinelli 1997 *Caulerpa taxifolia* *Cymodocea nodosa*	Italy, South coast of Elba Island, Gulf of Marina Di Campo, Galenzana Bay. Sandy seagrass bed. 1 m depth.	Removals. 2 NIS levels (± removal of *Caulerpa* every 3 weeks) × 3 replicated sites (16 m^2) × 2 nutrient levels (applied to sites) × 2 within-site plot replicates. Initiated June 1995 and terminated September 1995. Initial *Caulerpa* densities of 2–3,000 blades·m^{-2} of 4–8 cm length in the invaded plots. Data extraction: figure 3.	*Cymodocea* shoot density: P=0.02 (NIS+ < NIS-). *Cymodocea* leaf size: P>0.05. Conclusion: NIS reduced seagrass shoot density, both with and without nutrients, but did not affect leaf size.
Ceccherelli and Sechi 2002 *Caulerpa taxifolia* *Cymodocea nodosa*	As Ceccherelli and Cinelli (1997).	Removals. As Ceccherelli and Cinelli (1997), but extended 1 year. Initiated June 1995 and terminated September 1996. Data extraction: figure 2.	*Cymodocea* leaf size: P=0.0122 (NIS+ > NIS-). *Cymodocea* shoot density: P>0.05. Conclusion: NIS increased seagrass leaf size, but did not affect shoot density.

Ceccherelli and Campo 2002 *Caulerpa racemosa* *Cymodocea nodosa* and *Zostera noltii*	Italy, Mediterranean Sea, Tyrrhenian Sea, Tuscan coast, Antignano. Mixed sandy *Cymodocea nodosa-Zostera noltii* bed. No depth information.	Removals. 2 NIS levels × 2 areas (± biweekly removal of *C. racemosa* in 40 cm^2 plots) × 2 sites (within areas) × 8 replicates (within-sites). Initiated December 1997 and terminated February 1999. Shoots and reproductive structures counted in respectively 10 and 40 cm^2 quadrates. Data extraction: figures 1, 2, 3.	*Zostera* shoot density: *P*=0.0005 (NIS+ > NIS-). *Cymodocea* male flower density: *P*=0.0080 (NIS+ > NIS-). *Cymodocea* shoot density: *P*=0.1438. *Cymodocea* female flower density *P*=0.0561. Reproductive *Zostera* shoots: not tested due to variance heterogeneity. Conclusion: NIS increased *Zostera* shoots and *Cymodocea* male flower density (may imply stress). No tests were conducted of NIS impact in summer month (August 1999), but there appeared to be a negative effect on *Cymodocea* shoot density.
Chavanich and Harris 2004 *Codium fragile* *Lacuna vincta*	USA, Maine, Isle of Shoals and Cape Neddick. Rocky coast. 6 m depth.	Additions. 2 NIS levels (± addition of *Codium* or the native *Laminaria saccharina*) × 2 sites ("control" and "transplant") × 5–20 replicates (5 at controls site, 20 added to transplants site). Control and transplant sites were opposite for *Codium* and *Laminaria*. Initiated July 1999 and terminated July 1999 (2 weeks). Data extraction: figure 4.	*Lacuna* density: *P*=0.001 (Control *Laminaria* ≥ Transplant *Laminaria* ≥ Control *Codium* = Transplant *Codium*). *Lacuna* height: *P*>0.05. Conclusion: NIS reduced snail density, but not snail size.
Gribben and Wright 2006 *Caulerpa taxifolia* *Anadara trapezia*	Australia, New South Wales, Lake Conjola. 2 Sites: Sponge Bay and Yoorall Bay. Sandy *Caulerpa* meadows. 0–2 m	Removals. 2 NIS levels (± removal of *Caulerpa*) × 15 replicates (0.09 m^2 plots). Adult cockles with attached juveniles were added to plot centers and fish predation monitored for 15 min. Data extraction: text.	*Anadara* mortality: No formal tests. 100% mortality in NIS removal plots (predation by yellow bream predation, *Acanthopagrus australis*) vs. 0% mortality in *Caulerpa* meadow. Data without measures of dispersion, hence excluded from meta-analysis. Conclusion. NIS reduced cockle mortality.

	depth.		
Levin et al. 2002 *Codium fragile* *Laminaria saccharina* and mobile animals	USA, New England, Gulf of Maine, Isle of Shoals. Rocky coast. 4–7 m depth.	Exp. A: Removals. 2 NIS levels (± removals of *Codium* in 9 m^2 plots) × 3 sites × 4 replicated plots. Initiated June 1997 and terminated August 1998. Kelp recruits were counted 4 times on 2 center tiles per plot. Exp. B: Removals. Kelp growth and survival were measured over 19 days on two 30 cm kelps transplanted to each plots centers: 1 with >50% cover of the epiphytic bryozoan *Membranipora membranacea* and 1 with bryozoan removed. Exp. C: Additions. 2 NIS levels (adding 16 *Codium* vs. 16 *Laminaria saccharina* to 1 m^2 barren plots) × 6 replicates. Initiated June 1998 and terminated August 1998. Data extraction: Exp. A = figure 2; Exp. B = figures 3, 4; Exp. C = figure 6.	*Laminaria* recruitment: P=0.06. *Laminaria* growth: P>0.05. Crab (*Cancer*, *Carcinus*) and lobster (*Homarus*) density: P>0.05. Cunner juveniles (*Tautogolabrus adspersus*): P<0.005 (NIS+ < NIS-). *Laminaria* survival: P=0.015 (NIS+ < NIS-, but no effect on nonstressed bryozoa free kelps). These data do not have measures of dispersion and were excluded from meta-analysis. Conclusion: NIS reduced kelp survival (only kelps stressed by epiphytic bryozoa) and recruitment of cunner. NIS did not affect kelp recruitment (although graphical analysis indicated recruits were more abundant without NIS), kelp growth or larger mobile crustaceans.

Piazzi et al. 2005 *Caulerpa racemosa* Algae assemblages	Italy, Mediterranean Sea, Tyrrhenian Sea, Tuscan coast, South Leghourn. Rocky platform. 10 m depth.	Additions. 2 NIS levels (± addition of thirty 10 cm *Caulerpa* fragments) × 2 sedimentation levels (10 additions of 400 g) × 2 areas × 3 replicates (algae collected in 400 cm^2). Initiated July 2002 and terminated November 2003. Data extraction: figures 1, 3.	There were significant interactions between NIS and sediment, with $P>0.05$ for all treatments with added sediments (except assemblage structure). Below are P-values for NIS effects without sediments. Algae richness: $P<0.05$ (NIS+ < NIS-). Total algae cover: $P<0.05$ (NIS+ < NIS-). Prostate algae cover: $P<0.05$ (NIS+ < NIS-). Erect algae cover: $P<0.05$ (NIS+ < NIS-). Turf algae cover: $P>0.05$. Algae assemblage structure: $P<0.05$ for several combinations of NIS and sediment levels. Conclusion: NIS reduced algae richness, total cover, cover of prostrate and erect algae and changed the assemblage structure, but did not affect turf algae.
Piazzi and Ceccherelli 2006 *Caulerpa racemosa* Algae assemblages	Italy, Mediterranean Sea, Tyrrhenian Sea, Tuscan coast, South Leghourn. Rocky platform. No depth information.	Removal. 3 NIS levels (noninvaded control, invaded control, *Caulerpa* removed monthly) × 2 areas (of 25 m^2) × 3 replicates (of 400 cm^2 plots) × 2 sampling dates. Initiated October 2003 and terminated October 2004. Data extraction: figure 1.	Total algae cover: $P<0.05$ for NIS×time interaction (Time 1: NIS+ = NIS- < Control NIS-; Time 2: NIS+ < NIS- < Control NIS-). Algae richness: $P<0.05$ for NIS×time interaction (Time 1: NIS+ = NIS- < Control NIS-. Time 2: NIS+ < NIS- < Control NIS-). Encrusting algae cover: $P<0.05$ (NIS+ = NIS- < Control NIS-). Turf algae cover: $P<0.05$ (NIS+ = NIS- < Control NIS-). Erect algae cover: $P<0.05$ (NIS+ = NIS- < Control NIS-). Algae assemblage structure: $P<0.05$ (for NIS+ vs. Control NIS- and NIS- vs. Control NIS- in both 2003 and 2004). Conclusion: NIS did generally not affect native algae (little difference between NIS+ and NIS-) although algae cover and richness were larger effects in spatially separated noninvaded unmanipulated plots (Control NIS-).

Sánchez and Fernández *Sargassum muticum* Algae assemblages	Spain, East Atlantic, Aramar. Low-slope semiexposed rocky platform. 0.4–0.8 m above LT.	Removals. Exp. A: 2 NIS levels (± bimonthly removal of *Sargassum* in 50 cm^2 plot with 100 cm buffer zone) × 6 replicates × 13 sampling dates. Initiated January 2002 and terminated March 2004. Exp. B: Similar to Exp. A, except that plots were initially cleared for all algae. Following initial clearing *Sargassum* was removed bimonthly. Density of *Sargassum* (>5 cm) = 25 m^2; annual mean length = 25 cm; maximum summer length = 100 cm. Data extraction: Exp. A = figures 1, 2; Exp. B = figures 4, 5.	Exp. A: Algae assemblage structure, *Bifurcaria* cover*, Gelidium* cover, cover of other algae species, *Gelidium* biomass, algae richness (note P=0.061), and algae diversity: P>0.05. Exp. B: Algae assemblage structure, cover of *Ulva rigida*, *Stypocaulon scoparium*, *Cladostephus spongiosus*, *Jania rubens*, *Gelidium spinosum*, algae richness, algae diversity: P>0.05. Conclusion: NIS did not impact any measured response variables.
Scheibling and Gagnon 2006 *Codium fragile* *Laminaria, Desmarestia viridis*	Canada, Nova Scotia, Mouth of Mahone Bay, Lee of Little Duck Island. Rocky coast. 4 m depth.	Removals. Exp. A: Pulse-removals. 2 NIS levels (± removals of *Codium* in August 1997 and July 1998) × 5 replicates (1 × 1 m plots). Exp. B: Press-removals: 2 NIS levels (± monthly removals of *Codium* from July 1998 to August 1999) × 5 replicates (1 × 1 m plots). Initiated August 1997 and terminated August 1999. *Codium* abundance were ~35 ind. · m^{-2} and 4 kg WW · m^{-2} in July 1998 in pulse treatments, 36 and 8 in July 1998 in control plots, ~100 and 11 in August 1999 in pulse treatments, and ~95 and 13 in August 1999 in control plots. Data extraction: figures 1, 5, 6, 7.	Summer 1998. *Laminaria* cover: P=0.005 (NIS+ < NIS-). *Desmarestia* cover: P=0.001 (NIS+ < NIS-). Summer 1999. *Laminaria* cover: P=0.029 (NIS+ < NIS-). *Desmarestia* cover: p=0.001 (NIS+ < NIS-). August 1999. *Laminaria* density: P<0.001 (NIS+ < NIS-pulse < NIS-press). *Laminaria* biomass: P<0.01 (NIS+ < NIS-pulse = NIS- press). *Saccorhiza* biomass: P = 0.021 (NIS+ < NIS-pulse = NIS- press). *Desmarestia* biomass, *Saccorhiza* density: P >0.05. Conclusion: NIS decreased *Laminaria* cover and *Saccorhiza* biomass, but did not affect *Desmarestia* biomass or *Saccorhiza* density.

Schmidt and Scheibling 2007 *Codium fragile* Mobile invertebrates, fish and turf-algae	Canada, Nova Scotia, Cranberry Cove. Rocky moderately exposed coast. 6 m depth.	Removals. 2 NIS levels (± monthly removal of *Codium*) × 4 replicate strips (4 × 10 m) × 2 subreplicates (1 m^2 within a strip). Initialized June 2003 and terminated November 2004. Monthly nondestructive sampling of canopy algae and invertebrates. Turf algae collected in 0.1 m^2 in November 2004. A similar experiment was done in a spatially separated native *Laminaria* stand. Data extraction: figures 6, 7, 8; table 3.	Juvenile fish: $P>0.19$. Assemblages: $P = 0.21$. Reanalysis on sample dates with *Codium* >50% cover. Mobile invertebrate assemblage structure: $P= 0.03$. *Asterias* spp.: $P=0.036$ (NIS+ > NIS-). *Cancer irroratus*: $P= 0.007$. (NIS+ > NIS-). *Pagurus* spp.: $P= 0.012$ (NIS+ > NIS-). *Pholis gunnellus*: $P=0.008$ (NIS+ > NIS-). *Littorina littorea*, *Myoxocephalus Scorpius*, *Henricia sanguinolenta*, biomass coarsely branched algae, biomass jointed calcareous algae, *Codium* recruits, *Laminaria* recruits: $P>0.05$. Conclusion: Average NIS abundances did not affect any measured response variables. High NIS abundances increased the abundances of some fish, crabs, hermit crabs and sea stars.
Valentine and Johnson 2005 *Undaria pinnatifida* Algae assemblages	Australia, Tasmania, Mercury Passage, Lord Bluff, Rocky coast. 7–12 m depth.	Removals. 2 NIS levels (± removal of *Undaria* in 4 m^2 plots) × 2 sea urchin levels (± removals, every 4–6 weeks) × 2 native algae propagules (± addition of spore inoculums) × 4 replicates. Initialized June 1999 and terminated November 2001. There were no effects of propagule addition, and these data were therefore pooled (data not shown and therefore not included in meta-analysis). Data extraction: figures 3, 4.	November 2000: Cover of total algae cover, red algae, canopy-algae: $P>0.05$. Brown turf algae cover: $P=0.014$ (NIS+ < NIS-). Green algae cover: $P=0.032$ (for NIS×Urchin interaction; in NIS+ and urchin free plots cover was 1%–2% higher compared to 3 other NIS-urchin combinations). November 2001: Cover of total algae, red algae, canopy algae, brown algae, turf algae, and green algae: $P>0.05$. Conclusion: NIS did not affect native algae (except for a slight decrease in turf algae cover).

Viejo 1997 *Sargassum muticum* Algae assemblages	Spain, Oleiros. Tide-pools. Moderately exposed rocky platform. 1.5 m above mean sea level.	Removals. 2 NIS levels (+/- removals of *Sargassum*) × 3 sites (Site 1 = 20%–80% cover of *Sargassum*, Site 2 = 5%–25%, Site 3 = 20%–100%) × 4 replicated tide-pools. Initialized May 1992 and terminated May 1995 (last removal in May 1994). Data extraction: figures 2, 3, 4; table 7.	Crustose algae cover: *P*>0.05. Total algae cover: November 1992: *P*>0.05. Total algae cover: Average over 2 years Site 1 & 2: *P*>0.05. Site 3. *P*<0.05 (NIS+ < NIS-). Leathery algae cover: Average over 2 years Site 1 & 2: *P*>0.05. Site 3. *P*<0.05 (NIS+ < NIS-). Correlations 1995: *Sargassum* cover was positively correlated with cover of foliose algae (*r*=0.71) and negatively correlated with cover of *Bifurcaria bifurcata* (*r*=–0.84) at sites 1 and 2 (pooled data). Conclusion: NIS decreased leathery algae (mainly *Bifurcaria*) and total algae cover, increased foliose algae cover, but did not affect crust algae.