**Supplementary Data:**

Ocean acidification may affect several ecosystems and their organisms that have biological and socio-economic importance.

**Table 1**

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| **Ecosystems and organisms likely to be affected by ocean acidification** | **Biological importance** | **Socio-economic importance** | **Impacts of ocean acidification** |
| Coral reefs | * Major marine ecosystem * Central role in sustaining the biodiversity in the oceans realm (host 1/3 of all marine life) * Nursery for numerous organisms * Carbon export to the open sea * Corals as major habitat builders (ecosystem engineer) | * Coastal protection * Provide various resources, including drugs (antibacterial, antimitotic…) * Materials for construction * Food source for about 500 M people * Tourism industry, recreational and leisure * Entertainment (e.g. films and documentaries) * Aquarium market * Recreational and commercial fisheries | Weakens carbonate skeletons and reduces coral growth, narrows distribution range, exacerbates temperature effects, shifts in species composition, |
| Coralligen  (gorgonians, red coral, crustose coralline algae…) | * High biological diversity * Habitat * Spawning site * Inducer for larval invertebrate settlement (crustose coralline algae) | * Ecosystem maintenance * Recreational fisheries * Recreational diving * Entertainment (e.g. films and documentaries) * Jewelry (red coral) * Use for construction and as a soil conditioner (crustose coralline algae) | Very few data available, potential effect by reduction of calcification |
| Pelagic ecosystems | * Very large ecosystems (open ocean) * Key element in ocean productivity and food webs * Very large reservoir of marine organisms * Very important carbon reservoir * Nutrient cycling * Biogas production and flux to atmosphere | * Globally important source of oxygen * Globally important source of primary production supporting major food webs * Source of genes and drugs * Commercial fisheries * Recreational fisheries * Carbon sequestration | Shifts in species composition, potential effect on plankton growth and productivity |
| Plankton species  (foraminifera, coccolithophores, pteropods) | * Major component of the food web * Major component of marine ecosystems * Large primary production * Major elements in the carbon cycle * Calcifier species are major elements for long-term landscape builders (sedimentary rocks) | * Globally important source of oxygen for some species * Carbon sequestration * Food source for fishes * Biofuels * Genetic resources, drugs… | Likely important, potential effect by change of calcification and productivity |
| Macroalgae and seagrass meadows | * *Seagrass* beds: spawning site, nursering grouds, high biodiversity * Oxygen production * Habitat, high biodiversity * Food supply for large grazers * High productivity * Nutrient cycling | * Food source * Biofuels, alginates and land fertilizer * Oxygen production * Sediment stabilization * Commercially harvested species * Coastal protection (by reducing water currents) * Water purification * Recreational and commercial fisheries * Ecosystem maintenance * Recreational diving | CO2 entichment has fertilizing effect but alteration of species composition and biodiversity could occur.  Some species may benefit from OA (increase in productivity) |
| Estuarine environment | * Interface between land and sea leading to an highly variable environment * Important habitat for birds (particularly migratory birds) | * Nursery for commercial fish and invertebrates * Key transport hubs * Commercial, industrial, recreational fisheries * Aquaculture activities * Bird watching * Ecotourism * Most preferred residential locations and harbours | Vulnerable to multiple stressors including acidification from freshwater input, ocean acidification will be stronger in low salinity waters |
| Deep-sea | * Largest (but yet least-known) habitat on earth * Largest store of carbon (apart from rocks) on planet * High biodiversity * Important endemic / specific organisms * Cold-water corals as ecosystem engineer and support of deep-water ecosystems * Important part of food web * Important in remineralization of organic matter and nutrient recycling, important carbon sink role | * Habits for deep-sea fishes (nursery) * Source of new genes, enzymes, chemicals and drugs * Commercial fisheries * Entertainment (e.g. films and documentaries) | Weakens carbonate skeletons and reduces coral growth, shifts in species composition, change in nutrient cycles |
| Polar regions | * Original ecosystems with highly specific (endemic) organisms * Significant carbon cycling role (Southern Ocean) | * Source of new genes and drugs * Tourism, touristic cruise * Commercial fisheries * Entertainment (e.g. films and documentaries) * Home to charismatic species such as polar bears | Ocean acidification will be stronger in cold waters, but only few data on sensitivity of polar organisms |
| Mollusks (oysters, musels, scallops, nudibranchs, sea snails, limpets, squids…) | * Second largest [marine](http://en.wikipedia.org/wiki/Marine_biology) phylum (about 17% of all the known marine [organisms](http://en.wikipedia.org/wiki/Organism)) * Important part of food web * Landscape builders | * Important human food source (sea foods: oysters, mussels, scallops…) * Aquaculture * Jewelry (pearls, mother-of-pearl) * Source of drugs (antibacterial, antifungal, anti-inflammatory, antimitotic…) * Genetic resources * Source of textile fibers * Aquariology | Weakens carbonate shells and reducesreproduction, growth, shifts in species composition |
| Echinoderms (Sea urchins, sea cucumbers, starfish…) | * Important part of food web * Keystone species and ecosystem engineers | * Human food source (sea urchins, sea cucumbers * Genetic resources * Major animal model for developmental biology and regenerative medicine (sea urchins, starfish) | Weakens carbonate skeletons and reduces growth, possible total extinction of some species (brittlestars) |
| Sponges | * Ecosystem engineer, landscape formation, habitat for important fish species * Water filtration | * Sponge culture * Important source of drugs * Recreational diving * Genetic resources, enzymes antibacterial compounds | Weakens carbonate skeletons and reduces growth |
| Crustaceans  (crabs, prawns, lobsters, crayfish…) | * First largest animal phylum * Important part of food web | * Important human food source * Use in aquaria * Source of drugs and chitin | Inhibition to stimulation of growth according to species, shifts in species composition |
| Marine mammals (whales, dolphins, seals…) | * Plankton-eaters and source of carbon for deep-sea ecosystems (carcass) * Top predators and food source * Role in nutrient cycle (e.g. Southern Ocean | * Cultural role (charismatic species) * Ecotourism such as whale watching * Fishes by some cultures * Entertainment (e.g. films and documentaries) | Possible indirect effects by change in the food web |
| Fishes  (herrings, sardines, anchovies, tunas, cods, flounders, sharks…) | * Important part of food web * Forage species for top predators * Some are top predators | * Commercial fisheries * Aquaculture * Human food (almost 80% of the world catch) * Oil production * Fish meal provision * Recreational fisheries * Cultural role (charismatic species and cultural heritage) * Entertainment (e.g. stories, films and documentaries) | Effects uncertain, disturbances reported in development, behaviours and predation abilities |
| Bacterial community | * Drivers of major biogeochemical cycles (decomposition of organic matter, nutrient regeneration…) * Most production is cycled through the microbial loop * Some are major actor in O2 production and marine productivity * Food source for small heterotrophic zooplankton and benthic feeders | * Ecosystem maintenance * Nutrient cycling * Sewage treatment * Source of new genes and drugs | Potential alteration of microbial processes, potential impact on biogeochemical cycles and climate regulation |
| Jellyfish | * Important part of food web * Biological model for medical research | * Commercial fisheries * Competitors with fishermen * Obstacle for beach activities, no swimmers * Genetic resources * Source of drugs and medical compounds | Few contrasting data available, possible indirect effects |