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Appendix S1: List of species and their environmental and socio-economic impact

		Impact score		
Species	**Taxon group**	**Environmental**	**Socio-economic**	**Total**
Rattus norvegicus	Mammals	19	19	38
Branta canadensis	Birds	17	21	38
Dama dama	Mammals	17	16	33
Cervus nippon	Mammals	16	17	33
Ondatra zibethicus	Mammals	18	14	32
Lantana camara	Plants	17	14	31
Acridotheres tristis	Birds	16	15	31
Varroa destructor	Arthropods	15	16	31
Muntiacus reevesi	Mammals	16	14	30
Eichhornia crassipes	Plants	16	13	29
Cervus canadensis	Mammals	15	14	29
Axis axis	Mammals	13	16	29
Sciurus carolinensis	Mammals	17	11	28
Myocastor coypus	Mammals	15	13	28
Neovison vison	Mammals	21	4	25
Castor canadensis	Mammals	13	12	25
Carassius auratus	Fish	19	5	24
Elodea canadensis	Plants	15	8	23
Procyon lotor	Mammals	9	14	23
Crassula helmsii	Plants	12	10	22
Anoplophora chinensis	Arthropods	8	14	22
Heracleum mantegazzianum	Plants	13	8	21
Fallopia japonica	Plants	12	9	21
Robinia pseudoacacia	Plants	11	9	20
Arundo donax	Plants	13	6	19
Hydrocotyle ranunculoides	Plants	13	6	19
Eucalyptus globulus	Plants	14	4	18
Ammotragus lervia	Mammals	12	6	18
Bison bison	Mammals	12	6	18
Ambrosia artemisiifolia	Plants	10	8	18
Herpestes auropunctatus	Mammals	9	9	18
Pseudorasbora parva	Fish	13	4	17
Senecio mikanioides	Plants	13	4	17
Solidago canadensis	Plants	13	4	17
Linepithema humile	Arthropods	12	5	17
Prunus serotina	Plants	12	5	17
Harmonia axyridis	Arthropods	9	8	17
Odocoileus virginianus	Mammals	8	9	17
Anoplophora glabripennis	Arthropods	7	10	17
Psittacula krameri	Birds	6	11	17
Callosciurus finlaysonii	Mammals	6	11	17
Eucalyptus camaldulensis	Plants	14	2	16
Tradescantia fluminensis	Plants	14	2	16
Ctenopharyngodon idella	Fish	12	4	16
Eleagnus angustifolia	Plants	11	5	16
Nyctereutes procyonoides	Mammals	10	6	16
Ambrosia trifida	Plants	10	6	16
Threskiornis aethiopicus	Birds	9	7	16
Frankliniella occidentalis	Arthropods	8	8	16
Arctotheca calendula	Plants	7	9	16
Carpobrotus acinaciformis	Plants	15	0	15
Myriophyllum aquaticum	Plants	12	3	15

Species	Taxon group	Impact score		
		Environmental	Socio-economic	Total
Acacia saligna	Plants	11	4	15
Cotula coronopifolia	Plants	11	4	15
Bemisia tabaci	Arthropods	8	7	15
Conyza canadensis	Plants	7	8	15
Carpobrotus edulis	Plants	14	0	14
Lupinus polyphyllus	Plants	11	3	14
Impatiens glandulifera	Plants	10	4	14
Lagarosiphon major	Plants	9	5	14
Oxalis pes-caprae	Plants	9	5	14
Aphis gossypii	Arthropods	8	6	14
Opuntia maxima	Plants	8	6	14
Tuta absoluta	Arthropods	5	9	14
Panonychus citri	Arthropods	3	11	14
Cyperus alternifolius	Plants	11	2	13
Rosa rugosa	Plants	10	3	13
Poecilia reticulata	Fish	9	4	13
Ailanthus altissima	Plants	9	4	13
Bidens frondosa	Plants	7	6	13
Paspalum distichum	Plants	7	6	13
Diabrotica virgifera	Arthropods	6	7	13
Callosciurus erythraeus	Mammals	5	8	13
Datura stramonium	Plants	5	8	13
Atlantoxerus getulus	Mammals	9	3	12
Amaranthus retroflexus	Plants	8	4	12
Fallopia x bohemica	Plants	8	4	12
Ovis orientalis	Mammals	7	5	12
Elodea nuttallii	Plants	6	6	12
Lepus capensis	Mammals	5	7	12
Aedes albopictus	Arthropods	4	8	12
Callosobruchus chinensis	Arthropods	4	8	12
Cyperus eragrostis	Plants	4	8	12
Ricinus communis	Plants	4	8	12
Buddleja davidii	Plants	11	0	11
Gambusia holbrooki	Fish	10	1	11
Salvelinus fontinalis	Fish	10	1	11
Acacia longifolia	Plants	9	2	11
Quercus rubra	Plants	9	2	11
Macrosiphum euphorbiae	Arthropods	6	5	11
Galinsoga parviflora	Plants	6	5	11
Rousettus aegyptiacus	Mammals	5	6	11
Grapholita molesta	Arthropods	4	7	11
Diaspidiotus perniciosus	Arthropods	4	7	11
Ceratitis capitata	Arthropods	4	7	11
Leptinotarsa decemlineata	Arthropods	4	7	11
Myiopsitta monachus	Birds	3	8	11
Sylvilagus floridanus	Mammals	3	8	11
Micropterus salmoides	Fish	9	1	10
Mimulus guttatus	Plants	9	1	10
Amelanchier spicata	Plants	8	2	10
Helianthus annuus	Plants	6	4	10
Acanthoscelides obtectus	Arthropods	5	5	10
Liriomyza huidobrensis	Arthropods	5	5	10
Amorpha fruticosa	Plants	5	5	10
Heliothrips haemorrhoidalis	Arthropods	4	6	10

Species	Taxon group	Impact score		
		Environmental	Socio-economic	Total
Bruchus pisorum	Arthropods	4	6	10
Eriosoma lanigerum	Arthropods	4	6	10
Sitophilus oryzae	Arthropods	3	7	10
Rhyzopertha dominica	Arthropods	2	8	10
Halophila stipulacea	Plants	9	0	9
Lepomis gibbosus	Fish	8	1	9
Ameiurus melas	Fish	8	1	9
Acacia dealbata	Plants	7	2	9
Solidago gigantea	Plants	7	2	9
Cairina moschata	Birds	6	3	9
Cygnus atratus	Birds	6	3	9
Cortaderia selloana	Plants	6	3	9
Amaranthus hybridus	Plants	5	4	9
Spodoptera littoralis	Arthropods	3	6	9
Helianthus tuberosus	Plants	3	6	9
Tamias sibiricus	Mammals	2	7	9
Oxyura jamaicensis	Birds	8	0	8
Aptenia cordifolia	Plants	8	0	8
Boussingaultia cordifolia	Plants	8	0	8
Impatiens parviflora	Plants	8	0	8
Pseudotsuga menziesii	Plants	8	0	8
Ameiurus nebulosus	Fish	7	1	8
Oncorhynchus mykiss	Fish	6	2	8
Oenothera biennis	Plants	5	3	8
Conyza bonariensis	Plants	4	4	8
Nicotiana glauca	Plants	4	4	8
Hyphantria cunea	Arthropods	3	5	8
Mesocricetus auratus	Mammals	2	6	8
Anser cygnoides	Birds	7	0	7
Caragana arborescens	Plants	7	0	7
Lonicera japonica	Plants	7	0	7
Populus x canadensis	Plants	7	0	7
Misgurnus anguillicaudatus	Fish	6	1	7
Gambusia affinis	Fish	6	1	7
Rosa multiflora	Plants	6	1	7
Pimephales promelas	Fish	5	2	7
Agave americana	Plants	5	2	7
Aster lanceolatus	Plants	5	2	7
Fallopia sachalinensis	Plants	5	2	7
Brevipalpus obovatus	Arthropods	4	3	7
Estrilda astrild	Birds	3	4	7
Conyza sumatrensis	Plants	3	4	7
Sitotroga cerealella	Arthropods	2	5	7
Saissetia oleae	Arthropods	2	5	7
Eleusine indica	Plants	2	5	7
Galinsoga quadriradiata	Plants	2	5	7
Gomphocarpus fruticosus	Plants	6	0	6
Anser caerulescens	Birds	5	1	6
Clarias gariepinus	Fish	5	1	6
Hypophthalmichthys molitrix	Fish	5	1	6
Hypophthalmichthys nobilis	Fish	5	1	6
Perccottus glenii	Fish	5	1	6
Ictalurus punctatus	Fish	4	2	6
Fraxinus pennsylvanica	Plants	4	2	6

Species	Taxon group	Impact score		
		Environmental	Socio-economic	Total
Acer negundo	Plants	3	3	6
Pseudococcus viburni	Arthropods	2	4	6
Oncorhynchus kisutch	Fish	2	4	6
Sylvilagus transitionalis	Mammals	2	4	6
Amaranthus muricatus	Plants	2	4	6
Monomorium pharaonis	Arthropods	1	5	6
Ptinus tectus	Arthropods	0	6	6
Periplaneta americana	Arthropods	0	6	6
Anser indicus	Birds	5	0	5
Syrmaticus reevesii	Birds	5	0	5
Ovibos moschatus	Mammals	4	1	5
Amaranthus caudatus	Plants	4	1	5
Tropaeolum majus	Plants	4	1	5
Aster novi-belgii	Plants	3	2	5
Sorghum bicolor	Plants	3	2	5
Parthenothrips dracaenae	Arthropods	2	3	5
Hydropotes inermis	Mammals	2	3	5
Ipomoea purpurea	Plants	2	3	5
Parthenocissus quinquefolia	Plants	1	4	5
Melia azedarach	Plants	0	5	5
Paspalum dilatatum	Plants	0	5	5
Chrysolophus pictus	Birds	4	0	4
Coturnix japonica	Birds	4	0	4
Phoenicopterus chilensis	Birds	4	0	4
Eschscholzia californica	Plants	4	0	4
Nosopsyllus fasciatus	Arthropods	3	1	4
Chaetosiphon fragaefolii	Arthropods	3	1	4
Aix galericulata	Birds	3	1	4
Zantedeschia aethiopica	Plants	3	1	4
Fallopia baldschuanica	Plants	2	2	4
Oxidus gracilis	Arthropods	1	3	4
Abutilon theophrasti	Plants	0	4	4
Amaranthus blitoides	Plants	0	4	4
Amaranthus deflexus	Plants	0	4	4
Panicum capillare	Plants	0	4	4
Estrilda troglodytes	Birds	3	0	3
Ictiobus cyprinellus	Fish	3	0	3
Culaea inconstans	Fish	3	0	3
Alcea rosea	Plants	3	0	3
Lysichiton americanus	Plants	3	0	3
Mirabilis jalapa	Plants	3	0	3
Pinus strobus	Plants	3	0	3
Rhopalosiphum maidis	Arthropods	2	1	3
Catostomus commersoni	Fish	2	1	3
Ictiobus bubalus	Fish	2	1	3
Oncorhynchus gorbuscha	Fish	2	1	3
Chromaphis juglandicola	Arthropods	1	2	3
Aspidiotus nerii	Arthropods	1	2	3
Obolodiplosis robiniae	Arthropods	1	2	3
Ambrosia coronopifolia	Plants	1	2	3
Solidago graminifolia	Plants	1	2	3
Amaranthus hypochondriacus	Plants	0	3	3
Ipomoea indica	Plants	0	3	3
Stictocephala bisonia	Arthropods	2	0	2

Species	Taxon group	Impact score		
		Environmental	Socio-economic	Total
Aix sponsa	Birds	2	0	2
Salvelinus namaycush	Fish	2	0	2
Umbra pygmaea	Fish	2	0	2
Chenopodium ambrosioides	Plants	2	0	2
Cornus sericea	Plants	2	0	2
Duchesnea indica	Plants	2	0	2
Epilobium ciliatum	Plants	2	0	2
Mahonia aquifolium	Plants	2	0	2
Macrosiphoniella sanborni	Arthropods	1	1	2
Myzus ornatus	Arthropods	1	1	2
Myzus varians	Arthropods	1	1	2
Bruchus rufimanus	Arthropods	1	1	2
Amandava amandava	Birds	1	1	2
Callipepla californica	Birds	1	1	2
Acipenser transmontanus	Fish	1	1	2
Odontesthes bonariensis	Fish	1	1	2
Hemichromis fasciatus	Fish	1	1	2
Liza haematocheila	Fish	1	1	2
Hemiechinus auritus	Mammals	1	1	2
Tamias striatus	Mammals	1	1	2
Lycopersicon esculentum	Plants	1	1	2
Phytolacca americana	Plants	1	1	2
Megastigmus spermotrophus	Arthropods	0	2	2
Omonadus floralis	Arthropods	0	2	2
Macropus rufogriseus	Mammals	0	2	2
Fagopyrum esculentum	Plants	0	2	2
Hordeum jubatum	Plants	0	2	2
Lepidium densiflorum	Plants	0	2	2
Lepidium sativum	Plants	0	2	2
Persicaria wallichii	Plants	0	2	2
Rudbeckia laciniata	Plants	0	2	2
Solanum sodomaeum	Plants	0	2	2
Symphoricarpos albus	Plants	0	2	2
Encarsia formosa	Arthropods	1	0	1
Aphytis mytilaspidis	Arthropods	1	0	1
Myzus ascalonicus	Arthropods	1	0	1
Panaphis juglandis	Arthropods	1	0	1
Alectoris barbara	Birds	1	0	1
Micropercops cinctus	Fish	1	0	1
Aloe vera	Plants	1	0	1
Echinocystis lobata	Plants	1	0	1
Oenothera glazioviana	Plants	1	0	1
Hypoponera punctatissima	Arthropods	0	1	1
Aphis spiraephaga	Arthropods	0	1	1
Rhodobium porosum	Arthropods	0	1	1
Coccus hesperidum	Arthropods	0	1	1
Carpophilus marginellus	Arthropods	0	1	1
Glischrochilus quadrisignatus	Arthropods	0	1	1
Urophorus humeralis	Arthropods	0	1	1
Sciurus anomalus	Mammals	0	1	1
Amaranthus crispus	Plants	0	1	1
Nicandra physalodes	Plants	0	1	1
Solanum tuberosum	Plants	0	1	1
Lamyctes emarginatus	Arthropods	0	0	0

Species	Taxon group	Impact score		
		Environmental	Socio-economic	Total
Tinea translucens	Arthropods	0	0	0
Copidosoma floridanum	Arthropods	0	0	0
Leptomastix dactylopii	Arthropods	0	0	0
Acyrthosiphon caraganae	Arthropods	0	0	0
Neomyzus circumflexus	Arthropods	0	0	0
Rhopalosiphum insertum	Arthropods	0	0	0
Uroleucon erigeronense	Arthropods	0	0	0
Pulvinaria hydrangeae	Arthropods	0	0	0
Megaselia gregaria	Arthropods	0	0	0
Stricticomus tobias	Arthropods	0	0	0
Trechicus nigriceps	Arthropods	0	0	0
Caenoscelis subdeplanata	Arthropods	0	0	0
Cartodere nodifer	Arthropods	0	0	0
Carpophilus bifenestratus	Arthropods	0	0	0
Carpophilus nepos	Arthropods	0	0	0
Philonthus rectangulus	Arthropods	0	0	0
Colinus virginianus	Birds	0	0	0
Francolinus erckelii	Birds	0	0	0
Meleagris gallopavo	Birds	0	0	0
Perdix dauurica	Birds	0	0	0
Oryzias sinensis	Fish	0	0	0
Ictiobus niger	Fish	0	0	0
Hemichromis letourneauxi	Fish	0	0	0
Funambulus pennanti	Mammals	0	0	0
Citrullus lanatus	Plants	0	0	0
Elaeagnus commutata	Plants	0	0	0
Juncus tenuis	Plants	0	0	0
Phacelia tanacetifolia	Plants	0	0	0
Physocarpus opulifolius	Plants	0	0	0
Solanum cornutum	Plants	0	0	0
Sorbaria sorbifolia	Plants	0	0	0
Spiraea chamaedryfolia	Plants	0	0	0

Appendix S2: Generic Impact Scoring System (GISS)
Detailed description of impact categories. An updated Excel version is available from the authors on request.

1 Environmental impacts

1.1 Impacts on plants or vegetation

Impacts concern single or a few plant species (e.g. by changes in reproduction, survival, growth, abundance). In the case of plants, impacts may consist of allelopathy or the release of plant exudates such as oxygen or salt. In the case of animals, impacts include herbivory, grazing, bark stripping, antler rubbing, feeding on algae, or uprooting of aquatic macrophytes. Impacts also include restrictions in establishment, pollination, or seed dispersal of native species. Impacts range from population decline to population loss, and also include minor changes to the food web.

0 No impacts known or detectable.
1 Minor impacts, in the range of native species, only locally or on abundant species.
2 Minor impacts, in the range of native species, not only locally or on abundant species.
3 Medium impacts, large-scale, several species concerned, relevant decline (this includes decrease in species richness or diversity).
4 Major small-scale destruction of the vegetation, decrease of species of concern.
5 Major large-scale destruction of the vegetation, threat to species of concern, including local extinctions.

1.2 Impacts on animals through predation or parasitism

Impacts may concern single animal species or a guild, e.g. through predation, parasitation, or intoxication of eggs, juveniles or adults, measurable for example as changes in reproduction, survival, growth, or abundance. When the alien species is a plant, the impact can be due to a change in food availability or palatability (e.g. fruits, forage or flowers affecting pollinators), and the uptake of secondary plant compounds or toxic compounds by animals. Impacts may act on different levels, ranging from population decline to population loss, and also include minor changes to the food web.

0 No impacts known or detectable.
1 Minor impacts, in the range of native species, only locally or on abundant species.
2 Minor impacts, in the range of native species, not only locally or on abundant species.
3 Medium impacts, large-scale, several species concerned, relevant decline (this includes decrease in species richness or diversity).
4 Major small-scale impacts on target species, decrease of species of concern.
5 Major large-scale impacts on target species, threat to species of concern, including local extinctions.

1.3 Impacts on species through competition

Impacts may concern single species, a group or a community, e.g. by competition for nutrients, food, water, space or other resources, including competition for pollinators which might affect plant fecundity (i.e. fruit or seed set). Often, the alien species outcompetes native species due to higher reproduction, resistance or longevity. In the beginning, this impact may be inconspicuous and only recognizable as a slow change in species abundance which finally may lead to the disappearance of a native species. It includes behavioural changes in outcompeted species, and ranges from population decline to population loss.

0 No impacts known or detectable.
1 Minor impacts, in the range of native species, only locally or on abundant species.
2 Minor impacts, in the range of native species, not only locally or on abundant species.
3 Medium impacts, large-scale, several species concerned, relevant decline.
4 Major small-scale impacts on target species, decrease of species of concern.
5 Major large-scale impacts on target species, threat to species of concern, including local extinctions.

1.4 Impacts through transmission of diseases or parasites to native species

Host or alternate host for diseases (viruses, fungi, protozoans or other pathogens) or parasites, impact on native species by transmission of diseases or parasites.

0 No impacts known or detectable.
1 Occasional transmission to native species. No impacts on native species detectable.
2 Occasional transmission to native species. Only minor impacts on native species detectable.
3 Regular transmission to native species. Minor population decline in native species.
4 Transmission to native species and/or species of concern, decline of these species but no extinction.
5 Transmission to native species and/or species of concern, serious decline of these species and/or local extinction.

1.5 Impacts through hybridization

Impacts through hybridization with native species, usually closely related, leading to a loss of reproduction capability, sterile or fertile hybrid offspring, gradual loss of the genetic identity of a species, and/or disappearance of a native species, i.e. local extinction.

0 No impacts known or detectable.
1 Hybridization possible in ornamental breeding or captivity, but not or only rarely in the wild.
2 Hybridization common in the wild, no hybrid offspring, constraints to normal reproduction.
3 Hybridization common, with sterile offspring.
4 Hybridization common with fertile offspring, growing hybrid populations.
5 Hybridization common with fertile offspring, predominant hybrid populations, increasing loss of the genetic identity of a native species, local extinction of the native species.

1.6 Impacts on ecosystems

Impacts on characteristic properties of an ecosystem, its nutritional status (e.g. changes in nutrient pools and fluxes, which may be caused by nitrogen-fixating symbionts, increased turbidity or pollution), modification of soil properties (e.g. soil moisture, pH, C/N ratio, salinity, eutrophication), and disturbance regimes (vegetation flammability, changes in erosion or soil compacting), changes in ecosystem services (e.g. pollination or decomposition). Impacts on ecosystems include modification of successional processes. Such habitat modifications may lead to reduced suitability (e.g. shelter) for other species, thus causing their disappearance. Impacts also include the need for applying pesticides which due to their low selectivity have side-effects on non-target organisms.

0 No impacts known or detectable.
1 Minor impacts, only locally, only few species affected.
2 Minor impacts, not only locally, e.g. impact on a particular ecosystem parameter.
3 Medium impacts, large-scale, damage of sites of conservation importance, relevant ecosystem modifications, impact on several ecosystem properties, pesticide applications needed, relevant changes in species composition.
4 Major small-scale effects, damage of sites of conservation importance, changes in soil properties, major changes in ecosystem services, decrease in species of concern.
5 Major large-scale effects, damage of sites of conservation importance, changes in disturbance regimes, threat to species of concern, including local extinctions.

2. Socio-economic impacts

2.1 Impacts on agricultural production

Impacts through damage to crops or plantations, but also to horticultural and stored products. Impacts include competition with weeds, direct feeding damage (from feeding traces which reduce marketability to complete production loss) but also reduced accessibility, usability or marketability through contamination. Impacts include the need for applying pesticides which involve additional costs, also by reducing market quality. Impacts usually lead to an economic loss.

0 No impacts known or detectable.
1 Minor impacts, in the range of native species, only locally, negligible economic loss.
2 Minor impacts, in the range of native species, but more wide-spread, minor economic loss.
3 Medium impacts, large-scale or frequently, pesticide application necessary, medium economic loss.
4 Major impacts with high damage, often occurring or with high probability, major economic loss.
5 Major impacts with complete destruction and economic loss.

2.2 Impacts on animal production

Impacts through competition with livestock, transmission of diseases or parasites to livestock and predation of livestock. Intoxication of livestock through changes in food palatability, secondary plant compounds or toxins, weakening or injuring livestock, e.g. by stinging or biting. Also impacts on livestock environment such as pollution by droppings on farmland which domestic stock are then reluctant to graze. Hybridization with livestock. Impacts include the need for applying pesticides which involve additional costs, also by reducing market quality. Impacts usually lead to an economic loss.

0 No impacts known or detectable.
1 Minor impacts, in the range of native species, only locally, negligible economic loss.
2 Minor impacts, in the range of native species, but more wide-spread, minor economic loss.
3 Medium impacts, large-scale or frequently, pesticide application necessary, medium economic loss.
4 Major impacts with high damage, often occurring or with high probability, major economic loss.
5 Major impacts with complete destruction and economic loss.

2.3 Impacts on forestry production

Impacts on forests or forest products through plant competition, parasitism, diseases, herbivory, effects on tree or forest growth and on seed dispersal. Impacts may affect forest regeneration through browsing on young trees, bark gnawing or stripping and antler rubbing. Damage includes felling trees, defoliating them for nesting material or causing floods. Impacts include the need for applying pesticides which involve additional costs, also by reducing market quality. Impacts usually lead to an economic loss.

0 No impacts known or detectable.
1 Minor impacts, in the range of native species, only locally, negligible economic loss.
2 Minor impacts, in the range of native species, but more wide-spread, minor economic loss.
3 Medium impacts, effects on forest regeneration, large-scale or frequently, pesticide application necessary, medium economic loss.
4 Major impacts with high damage, often occurring or with high probability, major economic loss.
5 Major impacts with complete destruction and economic loss.

2.4 Impacts on human infrastructure and administration

Impacts include damage to human infrastructure, such as roads and other traffic infrastructure, buildings, damps, docks, fences, electricity cables (e.g. by gnawing or nesting on them) or through pollution (e.g. by droppings). Impacts through root growth, plant cover in open water bodies or digging activities on watersides, roadside embankments and buildings may affect flood defence systems, traffic infrastructure or stability of buildings. Impacts may affect human safety and cause traffic accidents. Impacts include the need for applying pesticides, their development costs and further registration or administration costs, as well as costs for research and control. Impacts usually lead to an economic loss.

0 No impacts known or detectable.
1 Minor impacts, in the range of native species, only locally, negligible economic loss.
2 Minor impacts, in the range of native species, but more wide-spread, minor economic loss.
3 Medium impacts, large-scale or frequently, pesticide application necessary, medium economic loss.
4 Major impacts with high damage, often occurring or with high probability, major economic loss.
5 Major impacts with complete destruction and economic loss.

2.5 Impacts on human health

Injuries (e.g. bites, stings, scratches, rashes), transmission of diseases and parasites to humans, bioaccumulation of noxious substances, health hazard due to contamination with pathogens or parasites (e.g. of water, soil, food, or by faeces or droppings), as well as secondary plant compounds, toxins or allergen substances such as pollen. Impacts include the need for applying pesticides which due to their low selectivity and/or residues may have side-effects on humans. Via health costs, impacts usually lead to economic costs.

0 No impacts known or detectable.
1 Minor impacts, in the range of native species, only locally, negligible economic costs.
2 Minor impacts, in the range of native species, but more wide-spread, minor economic costs.
3 Medium impacts, large-scale or frequently, pesticide application necessary, medium economic costs.
4 Major impacts with high damage, often occurring or with high probability, but rarely fatal, major economic costs.
5 Major impacts, fatal issues, high economic costs.

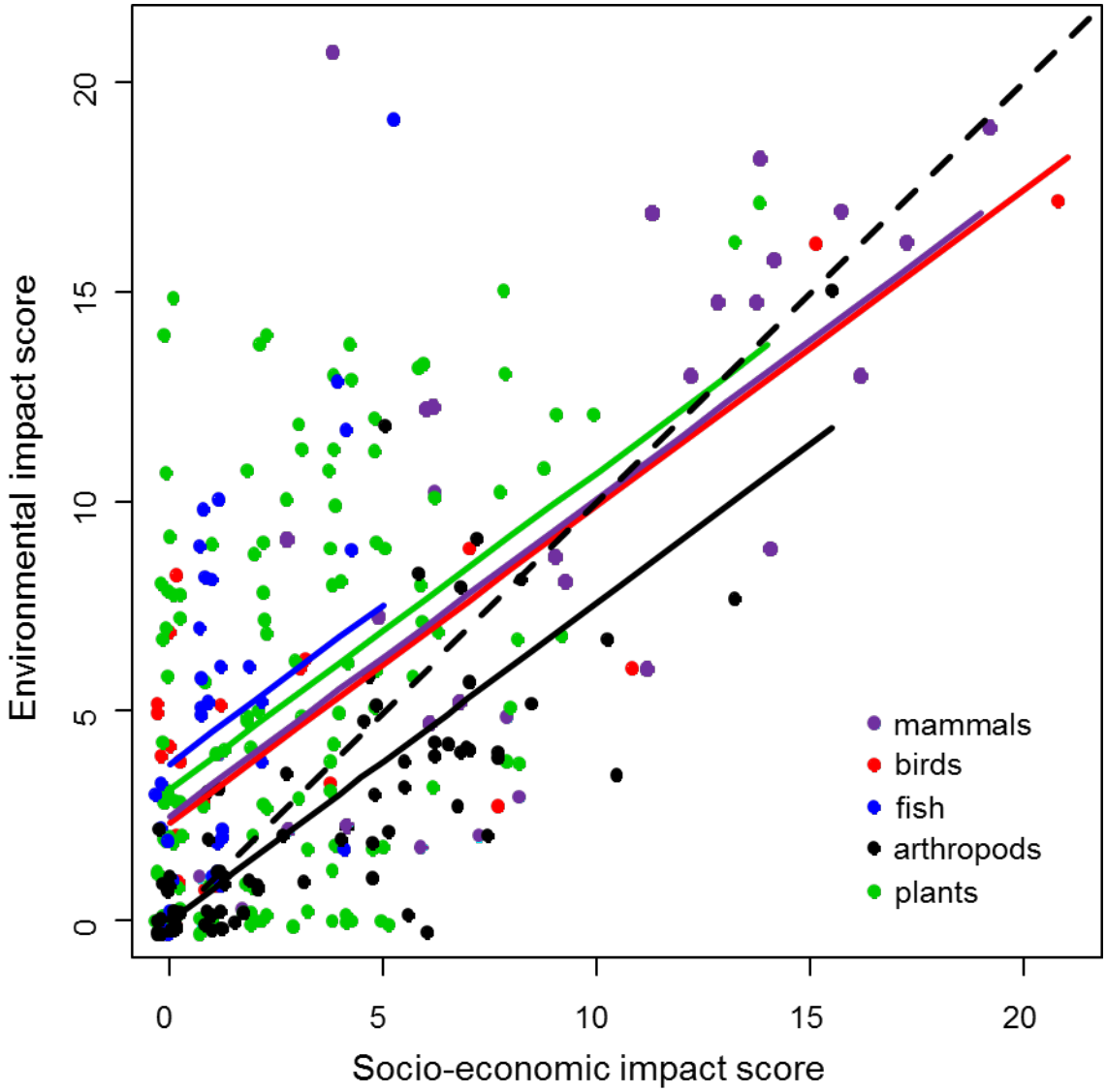
2.6 Impacts on human social life

Noise disturbance, pollution of recreational areas (water bodies, rural parks, golf courses or city parks), including fouling, eutrophication, damage by trampling and overgrazing, restrictions in accessibility (e.g. by thorns, other injuring structures, successional processes, or recent pesticide application) to habitats or landscapes of recreational value. Restrictions or loss of recreational activities.

0 No impacts known or detectable.
1 Minor impacts, in the range of native species, only locally, negligible economic loss.
2 Minor impacts, in the range of native species, but more wide-spread, minor economic loss.
3 Medium impacts, large-scale or frequently, pesticide application necessary, medium economic loss.
4 Major impacts with high damage, often occurring or with high probability, recreational value of a location strongly affected, major economic loss.
5 Major impacts with complete destruction and loss of recreational value, major economic loss.

Appendix S3: Socio-economic versus environmental impact

Dashed is the unity line and marks where socio-economic equals environmental impact. Data points were jittered for better visibility. The plot is based on data assuming that no information about impact means that the species does not have a measurable impact, but a plot excluding all cases where either environmental or socio-economic impact was unknown or zero gives qualitatively similar results (not shown).



Appendix S4: Impact in Europe versus impact elsewhere

Difference between a) environmental and b) socio-economic impact elsewhere (introduced range outside Europe) and Europe for mammal (blank squares) and bird (black circles) orders taking into account phylogenetic relatedness as random factor. Values on x-axes below zero show higher impact within Europe, and positive values higher impact outside Europe.