INVASIVE AQUATIC SPECIES OF EUROPE DISTRIBUTION, IMPACTS AND MANAGEMENT pdf

1: Benthic zone (habitat)

This book is the first attempt to provide an overall picture of aquatic species invasions in Europe. Its geographical scope stretches from Irish waters in the west to Volga River and the Caspian Sea in the east, and from Mediterranean in the south up to the Arctic coast of Europe.

A Patch of floating water chestnut Trapa natans leaves. The European water chestnut scientific name Trapa natans, or T. It must be pointed out that this plant species is not the same as the water chestnut which can be purchased in cans at the supermarket. The fruits of T. In its native habitat, the plant is kept in check by native insect parasites. These insects are not present in North America and the plant, once released into the wild, is free to reproduce rapidly. It is known to have been planted in other ponds in that area, as well, and also in Concord, MA, in a pond near the Sudbury River. The plant escaped cultivation and was found growing in the Charles River by The plant was introduced into Collins Lake near Scotia, NY in the Hudson River-Mohawk River drainage basin around , possibly as an intentional introduction for waterfowl food or possibly as a water garden escapee. By the early part of the s, water chestnut was established in the Hudson River. A major infestation of more than acres exists throughout some 55 miles of Lake Champlain between New York and Vermont. The North American distribution of water chestnut now extends throughout New England, south as far as Virginia, California, and in the Canadian Province of Quebec in a tributary of the Richelieu River. The plant has the potential to spread into the warmer regions of the U. North American Distribution of water chestnut as of September Re-growth is by means of seeds that germinate in the spring. Each seed produces 10 to 15 stems with submerged and floating leaves, terminating in floating rosettes. The feathery submersed leaves can be up to six inches 15 cm long, and are alternate on the stem forming whorls around the stem. The three-quarter to one and a half inch 2 â€” 4 cm glossy green floating leaves are triangular with toothed edges and form rosettes around the end of the stem. The floating leaves also have prominent veins and short, stiff hairs on their lower surface. The petioles the stalks attaching the leaf blade to the stem; the transition between the stem and the leaf blade of the floating leaves are two to eight feet 0. Stems can reach lengths of up to 16 feet 4. The stems are anchored to the bed of the waterbody by numerous branched roots. Single small, white flowers with four one-third inch 8. Each rosette is capable of producing up to 20 hard, nut-like fruits. Water chestnut starts to produce fruits in July; the fruits, which ripen in about a month, each contain a single seed. The 1 to 1. Water chestnut seeds generally fall almost directly beneath their parent plants and serve to propagate the parent colony. Population overwintering is accomplished through mature, greenish brown nuts sinking to the bottom where they can remain viable in the sediment for up to 12 years. Some seeds, however, or plant parts floating rosettes that still contain nuts, may be moved downstream in currents. Old nuts, black in color, will float, and are not viable. When deposited in shallow water or on the shore, water chestnut nuts can lead to injuries if stepped on. The plant can form nearly impenetrable floating mats of vegetation. These mats create a hazard for boaters and other water recreators. The density of the mats can severely limit light penetration into the water and reduce or eliminate the growth of native aquatic plants beneath the canopy. The reduced plant growth combined with the decomposition of the water chestnut plants which die back each year can result in reduced levels of dissolved oxygen in the water, impact other aquatic organisms, and potentially lead to fish kills. The rapid and abundant growth of water chestnut can also out-compete both submerged and emergent native aquatic vegetation. Water chestnut infestation on Lake Champlain Water chestnut has little nutritional or habitat value to fish or waterfowl and can have a significant impact on the use of an infested area by native species. Some of the potentially impacted invasive plant species might include: Eurasian watermilfoil Myriophyllum spicatum , curly pondweed Potamogeton crispus , and Eurasian or brittle water-nymph Najas minor. It is not yet known in a match up of T. Because of its invasiveness and severity of its impacts, T. A massive riverine infestation of water chestnut. Untreated populations of such an aquatic invasive species also can result in losses to shoreline property values and, as a result, to local government

property tax revenues. As mentioned earlier, the sharp, spiny nuts can result in puncture injuries to swimmers and recreators walking along the shore of infested areas and can injure the feet of livestock and horses, as well. One example of the cost of managing T. Army Corps of Engineers; the U. Fish and Wildlife Service; the U. A combination of hand pulling and mechanical harvesting has been used on the lake since the earlys. Significant reductions of T. Lake Champlain, NY, water chestnut relative annual control costs, â€" Mechanical and Chemical Control It is much easier and less expensive to control newly introduced populations of T. Early detection of introductions and a rapid control response are key to preventing high-impact infestations. Small populations can be controlled by hand pulling working from canoes or kayaks. Large infestations usually require the use of mechanical harvesters or the application of aquatic herbicides. Regardless of treatment type, it should ideally take place before the fruit has ripened and dropped to the bottom forming a long-term seed bank. Because of the potential of unintentional spread of floating plant parts offsite, mechanical harvesting should be undertaken only by trained and certified equipment operators. Since water chestnut overwinters entirely by seeds that may remain viable in the sediment for up to 12 years, repeated annual control is critical to deplete the seed bank. Treatment generally is needed for five to twelve years to ensure complete eradication and can be very expensive see Economic Impact, above. Potential negative impacts to non-target species and public perceptions regarding the use of chemicals in recreational waters have limited chemical control of T. The herbicide 2,4-D has been tested and shown to be non-adverse on non-target species. Another herbicide that is effective on T. Application of aquatic herbicides requires both a licensed pesticide applicator and a permit from your state environmental regulatory agency. Biological Control The unfortunate fact is that for large infestations of water chestnut i. Scientists have now turned to the potential of biocontrol agents to serve as a long-term solution to water chestnut infestations. A number of potential biological control agents were found in field surveys in the native European and Asian ranges of water chestnut. The most promising biocontrol species appeared to be the leaf beetle Galerucella birmanica. Unfortunately, field observations in China suggested that G. This host non-specificity could be problematic to the use of the beetle for biocontrol in North America. Laboratory and field tests initially indicated that out of 19 different plant species in 13 different families, G. This preference continued even after the water chestnut was completely defoliated; adults resisted migrating to nearby water shield. While this is very promising news, additional studies on host specificity with additional North American aquatic plants are on-going. Host specificity and environmental impact of two leaf beetles Galerucella calmariensis and G. Deck J, Nosko P. Population establishment, dispersal, and impact of Galerucella pusilla and G. Chrysomelidae , a promising potential biological control agent of water chestnut, Trapa natans. American Book Company, N. New York Botanical Gardens, N. Seed production and growth of water chestnut as influenced by cutting. Exotic species in the Great Lakes: A history of biotic crises and anthropogenic introductions. Journal of Great Lakes Research The biology and management of water chestnut Trapa natans L. The ecology and management of water chestnut Trapa natans L. Hunt T, Marangelo P. Vermont Department of Environmental Conservation. Photo Credits Patch of floating water chestnut Trapa natans leaves. Randall, The Nature Conservancy, www. Accessed January North American distribution of water chestnut as of September Army Corps of Engineers, www. Mehrhoff, University of Connecticut, www. Data from Hunt T, Marangelo P. Water chestnut harvesting machine.

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2: Invasive Species Science | www.enganchecubano.com

The global scale of alien species invasions is becoming increasingly evident at the beginning of the new millennium. This book is the first attempt to provide an overall picture of aquatic species invasions in Europe.

Alien Species in European Waters-- Leppakoski, et al. Assessing Invasion Impact and Scale-- Carlton. Who is Who Among Nonindigenous Species. History and Success of an Invasion into the Baltic Sea: The Polychaete Marenzelleria cf. Alien Crayfish in Europe: Teredo navalis - The Cryptogenic Shipworm-- Hoppe. Impacts and Spread-- Minchin, et al. Alien Freshwater Fishes of Europe-- Lehtonen. Genetics on Invasive Species-- Muller, Griebeler. Life in Ballast Tanks-- Gollasch, et al. Ballast Tanks Sediments-- Hamer. Invaders in the Caspian Sea-- Aladin, et al. The Rhine Delta-- van der Velde, et al. Biological Invasions into German Waters: Databases on Aquatic Alien Species: A Prospectus-- Ruiz, Hewitt. This book is the first attempt to provide an overall picture of aquatic species invasions in Europe. Its geographical scope stretches from Irish waters in the west to the Volga River and the Caspian Sea in the east, and from the Mediterranean Sea in the south up to the Arctic coast of Europe. Not all parts of the continent could be covered equally, as in some countries species invasions are not yet studied. The book represents the array of all major European aquatic systems in the broadest geographical and ecological scope possible, from fully saline seas, semi-enclosed brackish water bodies and coastal lagoons to freshwater lakes, major river systems and waterways. The key objectives include the present status and impacts on economy and environment caused by non-native aquatic species in European waters. Altogether more than scientists from 24 countries have joined together to synthesize the available information on bio-invasions. Nielsen Book Data Subjects.

INVASIVE AQUATIC SPECIES OF EUROPE DISTRIBUTION, IMPACTS AND MANAGEMENT pdf

3: Invasive aquatic species of Europe : distribution, impacts, and management in SearchWorks catalog

*Invasive Aquatic Species of Europe. Distribution, Impacts and Management [Erkki LeppÃ¤koski, Stephan Gollasch, Sergej Olenin] on www.enganchecubano.com *FREE* shipping on qualifying offers. The global scale of alien species invasions is becoming more and more evident in the beginning ofthe new millennium.*

Benthic zone habitat International Common Names English: However not all of the benthic habitats are equally susceptible to alien species invasion. The majority of established benthic invasives tend to occur in the coastal inlets, lagoons and gulfs. Almost no invasions are known to have occurred in the mid-ocean benthic habitats. Most likely this is due to the very specific physical, geochemical and biological characteristics of those environments. These organisms are called benthos, or bottom dwellers. There are those called infauna that live buried in the sand, shells or mud. Those that live attached to rocks or move over the surface of the ocean bottom are the epifauna. Benthos such as some shrimp and demersal flounder that live in the bottom but move with relative ease through the water above the ocean floor are the nektobenthos Thurman, Benthic organisms are different from those elsewhere in the water column. Many are adapted to live on the substrate bottom. In their habitats they can be considered as dominant creatures. Many organisms adapted to deep-water pressure cannot survive in the upper parts of the water column as the pressure difference can be very significant. Because light does not penetrate very deep ocean-water, the energy source for the benthic ecosystem is often organic matter from higher up in the water column which drifts down to the depths. This dead and decaying matter sustains the benthic food chain; most organisms in the benthic zone are scavengers or detritovores. Main ecological processes Benthic habitats are important for a variety of reasons. Estuarine and nearshore benthic habitats support a wide diversity of marine life by providing spawning, nursery, refuge, and foraging grounds for fisheries species. They function in nutrient cycling, and contribute to the removal of contaminants from the water column. Benthic organisms are also important members of the lower food web, consuming organic matter and phytoplankton and serving as food sources for higher-level consumers. Many benthic habitats for example, coral reefs, eelgrass beds, and kelp forests have three-dimensional structures that serve as shelter and provide storm protection by buffering wave action along coastlines. Benthic habitats can play an important role in maintaining water quality. Many benthic organisms, including filter feeders like hard clams, bay scallops, and mussels, obtain their food by taking in seawater. As the water flows through their bodies, sediments, organic matter, and pollutants are filtered out and ingested. This role makes these benthic communities good indicators of health in estuarine ecosystems. Benthic habitats play a critical role in the breakdown of organic matter, through the actions of scavengers, deposit-feeders, and bacteria. Succession and change Most of the benthic habitats are in deep, pressured areas of the ocean. Because of the high pressure and seclusion neither tidal changes nor human interference has had much of an effect on these areas, and the habitats have not changed much over the years. Many benthic organisms have retained their historic evolutionary characteristics; some organisms have significantly changed size. Human mediated history Most of the human mediated changes in benthic habitats occur in response to major disturbances of the substrate. These include natural conditions, such as reworking of sediments and till, turbidity flow and icescouring, and cultural factors, such as industrial pollution, dredging and deposition of mud. Benthic plants and animals will respond by re-colonizing the substrate. Submerged structures, such as shipwrecks, also provide substrate for the colonization of species. Commercial fishing is one of the most important human impacts on the benthic environment. One such impact is through disturbance to benthic habitats as fishing gear trawls and dredges are dragged across the seafloor. As the result, the bottom landscape, structure and characteristics of sediments and, finally, benthic communities are strongly affected and sometimes destroyed Thrush et al. The benthic sub-habitats are not evenly distributed over the world. The subneritic continental shelf zone is extended along the continental margins and its width may vary from 0 to km average about 80 km. In some regions the continental shelf is extremely wide or narrow: While along some African coasts, the width of the continental

shelf does not exceed 2 km Duxbury, The bathyal zone is a substantial part of the ocean, being larger than the shallow shelf zone, including the sublittoral. However this zone does not form a continuous belt. In some places it is interrupted by steep continental rises or deep-sea trenches on the edge of the continental slope. The largest area of the ocean floor is occupied by the abyssal zone. It includes the abyssal hills and abyssal plains. Abyssal hills or mid-ocean ridges are present in all the oceans. They cover an area of about 55 million square kilometers of the ocean floor. Abyssal plains are separated from each other by deep-sea trenches or seamount ridges. These landscape forms are poorly pronounced in the Pacific Ocean, where the most deep-sea troughs and longest island chains are situated. The hadal zone is a restricted environment, found only in the trenches along the margins of continents Thurman, However not all of these possible impacts are equally typical for benthic invaders. The most abundant are habitat change, benthic-pelagic coupling and community dominance. Among these, habitat change or habitat engineering should be emphasized as one of the most important, as it may be relevant to many ecosystem functions and elements. As reported by Vitousek , invasive habitat engineer species have much larger effects on their new community than non-engineer species, since both biological and physical characteristics of the environment will be altered. On the other hand, the combination of invasive species and habitat modification is often considered as a presage for new invasions Cuddington and Hastings, Impacts on biodiversity are revealed mostly through aggressive predation and grazing mechanisms. This is particularly important for benthic ecosystems that are not able to adjust as fast to alien species, as alien species can do. Economic and social impacts It is easier to assess and evaluate the economic impact of an invasive species than its impact on ecosystem functioning. Yet these impacts are closely related to each other. Among the benthic invasive species, the biggest economical losses are caused by fouling organisms, e. Balanus improvisus [Amphibalanus improvisus], Dreissena polymorpha, Dreissena bugensis, some seaweed species. Their ability to settle down on almost every substrate together with rapid growth may cause clogging of water abstraction pipes, fouling of ship hulls and underwater harbour constructions, and deterioration of recreational areas Eno et al. Another side of the problem is a lack of management mechanisms for an established nuisance species. Most of the techniques applied are not efficient and are rather expensive. The predatory benthic species, like Asterias amurensis northern Pacific seastar eating almost anything it can find, including dead fish and fish waste, is considered a serious aquaculture pest.

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4: Journal "Aquatic Invasions" - Personalia - Vadim Panov

Invasive Aquatic Species of Europe. Distribution, Impacts and Management. Genetics on Invasive Species. an overall picture of aquatic species invasions in.

Management of Biological Invasions 7 2: Pathways and gateways of freshwater invasions in Europe. Aquatic Invasions 10 4: A new international journal on biological invasions. BioInvasions Records 1 1: Open-access journal Aquatic Invasions: An important part of the developing European information and early warning system on invasive alien species. Aquatic Invasions 6 1: Atlas of Biodiversity Risk. Assessing the risks of aquatic species invasions via European inland waterways: Alien invertebrates and fish in European inland waters. Key role of the amphipod Gmelinoides fasciatus in reed beds of Lake Ladoga. Boreal Environmental Research Alien species in a warmer world â€" risks and opportunities. Trends in Ecology and Evolution Grasping at the routes of biological invasions: Journal of Applied Ecology 45 2: Assessment of biocontamination of benthic macroinvertebrate communities in European inland waterways. Aquatic Invasions 3 2: New records of the Chinese mitten crab, Eriocheir sinensis H. Milne Edwards, , from the Volga River, Russia. Aquatic Invasions 2 3: A risk assessment of biological invasions: Francesca Gherardi ed Freshwater bioinvaders: Waterways as invasion highways â€" Impact of climate change and globalization. Chinese mitten crab Eriocheir sinensis in the Baltic Sea: Role of diapause in dispersal of aquatic invertebrates. Diapause in Aquatic Invertebrates: Theory and Human Use. Monographiae Biologicae 84, Springer, Netherlands, pp. Invasion biology of Ponto-Caspian onychopod cladocerans Crustacea: Molecular ecology of zebra mussel invasions. Aquatic Invasions â€" the new European journal of applied research on biological invasions in aquatic ecosystems. Aquatic Invasions 1 1: First record of the Chinese mitten crab, Eriocheir sinensis H. Role of diapause in dispersal and invasion success by aquatic invertebrates. Journal of Limnology, 63 Suppl. Internet-based information resources on aquatic alien species relevant to the Ponto-Caspian Region. Informational resources on aquatic alien species in Europe on the internet: Distribution, population structure and salinity tolerance of the invasive amphipod Gmelinoides fasciatus Stebbing in the Neva Estuary Gulf of Finland, Baltic Sea. Alien species introductions in the eastern Gulf of Finland: Establishment of new gammarid species in the eastern Gulf of Finland Baltic Sea and their effects on littoral communities. International cooperation in aquatic invasive species research, information exchange and management in Europe. Aquatic Invaders 13 4: Invasion history, biology and impacts of the Baikalian amphipod Gmelinoides fasciatus. Environmental problems and challenges for the coastal zone management in the Neva estuary eastern Gulf of Finland. Structure, Function and Coastal Zone Management. Freshwater Biology 47 2: The Baltic - a sea of invaders. Canadian Journal of Fisheries and Aquatic Sciences 59 7: Current status of an introduced Baikalian amphipod Gmelinoides fasciatus Stebbing, in the littoral communities of Lake Peipsi. Nordic Council of Ministers, Copenhagen, pp. Canadian Journal of Fisheries and Aquatic Sciences Resting eggs in the life cycle of Cercopagis pengoi, a recent invader of the Baltic Sea. Effects of temperature on individual growth rates and body size of a freshwater amphipod. Canadian Journal of Zoology Establishment of the Baikalian endemic amphipod Gmelinoides fasciatus in Lake Ladoga.

5: List of invasive species in Europe - Wikipedia

The global scale of alien species invasions is becoming more and more evident in the beginning of the new millennium. Though the problem of biological invasions became a rapidly growing research.

6: Water Chestnut â€“ New York Invasive Species Information

The key objectives include the present status and impacts on economy and environment caused by non-native aquatic

species in European waters. Altogether more than scientists from 24 countries have joined together to synthesize the available information on bio-invasions.

7: DAISIE - Species Factsheet

Invasive aquatic species of Europe: distribution, impacts, and management. up-to-date review of aquatic species invasions in Europe. distribution, impacts.

8: Invasive Aquatic Species of Europe: Distribution, Impacts and Management.

As the editors note, Invasive aquatic species of Europe is 'the first attempt to provide an overall picture of aquatic species invasions in Europe'. This book is an edited volume of 53 chapters, divided into sections focusing on species or community case studies, vectors of introduction, regional overviews, impacts from introductions, risk.

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