WELFARE FOR THE FUTURE
ICELAND'S NATIONAL STRATEGY FOR SUSTAINABLE DEVELOPMENT

STATISTICAL INDICATORS 2006

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STATISTICAL INDICATORS 2006

The Ministry for the Environment in Iceland

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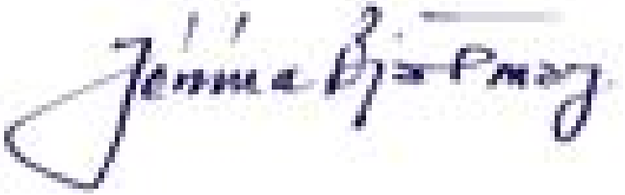
PREFACE

Discourse on environmental issues and sustainable development is often a passionate and emotional affair. This is normal and healthy, but such discourse must also be rooted in solid facts. This publication contains statistical indicators related to the goals that were set forth in the Icelandic government's policy on sustainable development in 2002, entitled "Welfare for the Future." Its aim is to make key facts on burning issues accessible and comprehensible.

Many of the indicators are the same as those presented at that time but have been updated to reflect current conditions. Others are new. When examined together, these statistical indicators should give some idea of the state of the environment, the pressures on nature, and governmental response to these. The indicators will be updated regularly, so that it is possible to determine the progress towards the set objectives. Attempts will also be made to develop new indicators that link environmental affairs to economic and social issues.

It is my hope that all those who are interested in sustainable development and environmental affairs in Iceland will acquaint themselves with the contents of this report. Reliable, well presented information creates a foundation for rational discourse and policy making. With effort and luck, indicators like these can function as signposts on the road to a better future.



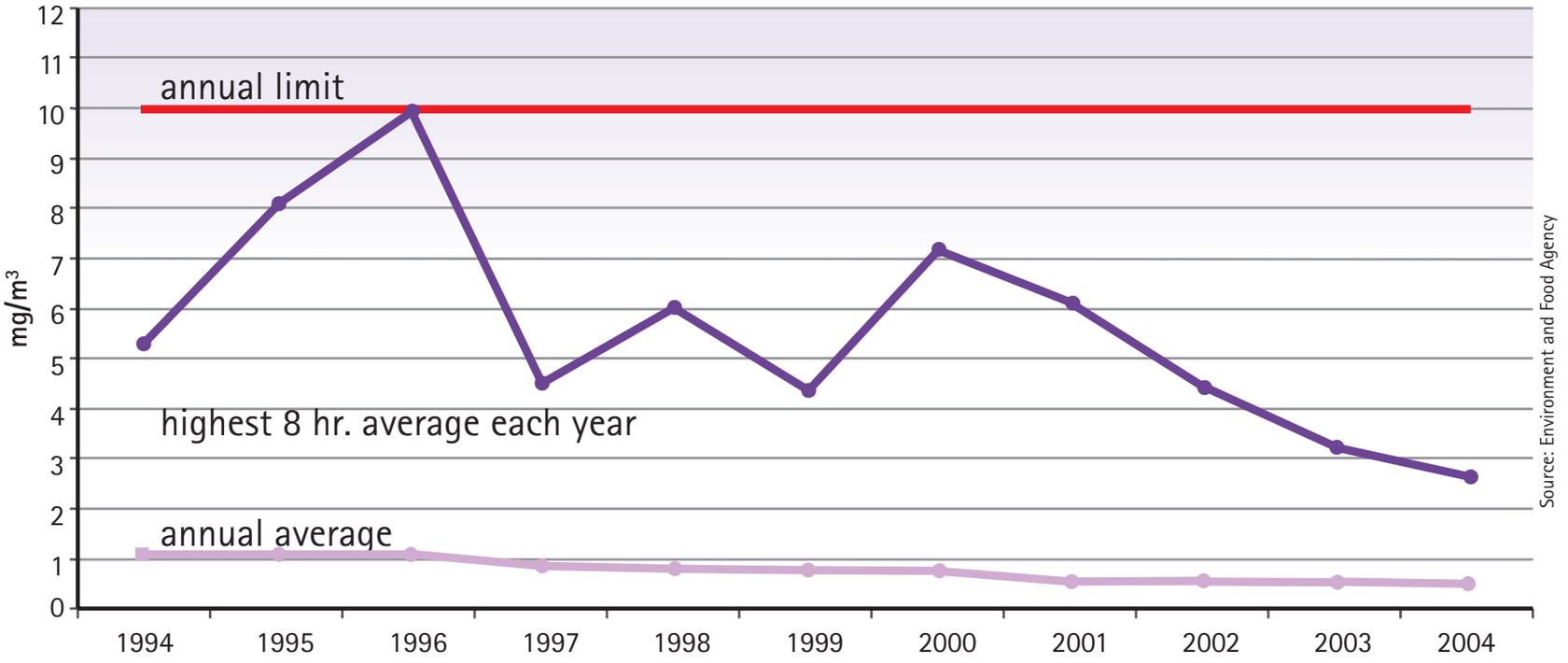
Minister for the Environment

TABLE OF CONTENTS

HEALTHY AND SAFE ENVIRONMENT

CLEAN AIR

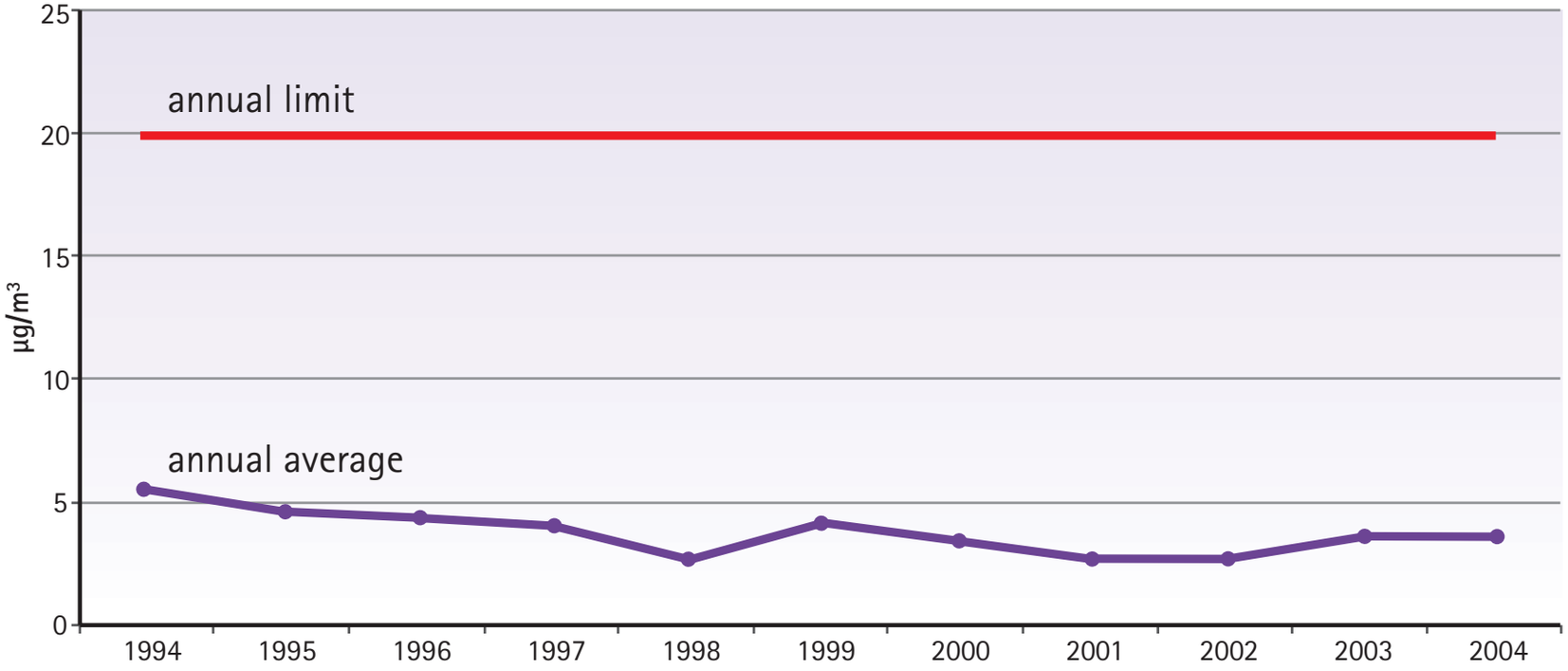
Atmospheric carbon monoxide concentrations near Grensásvegur in Reykjavík



Carbon monoxide, one of the most hazardous substances in automobile emissions, is formed as a result of incomplete combustion of fuel. The graph shows the annual concentration of carbon monoxide near Grensásvegur. The concentration of carbon monoxide in the air near Reykjavík's main traffic routes has dropped steadily in recent years and is now far below health protection limits. The requirement that all automobiles manufactured after 1995 be equipped with catalytic converters proved instrumental in bringing this about. Carbon monoxide reduces the ability of the blood to transport oxygen. Inhalation of large quantities can produce headaches, dizziness, and disturbances of hearing and vision. Prolonged exposure to air polluted with carbon monoxide can lead to a greater risk of cardiovascular disease.

CLEAN AIR

Atmospheric sulphur dioxide concentrations near Grensásvegur in Reykjavík

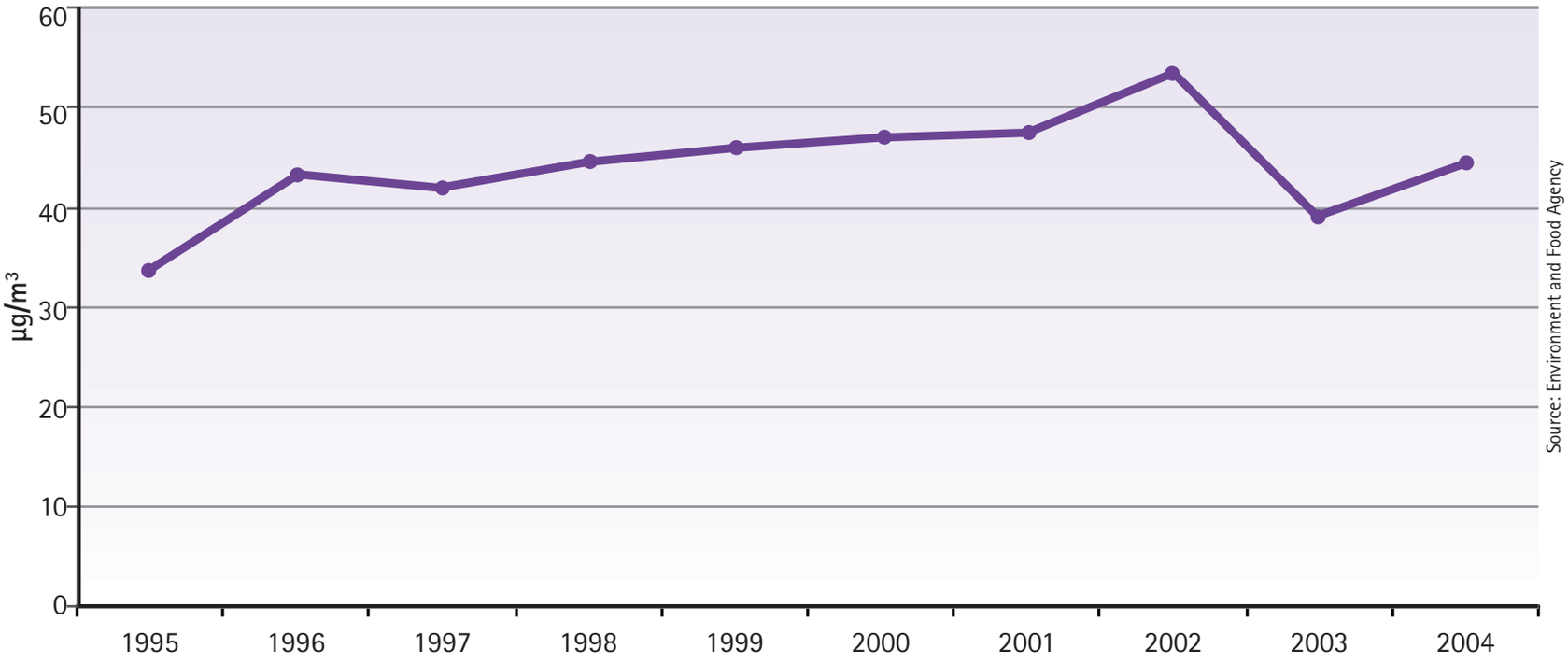


Source: Environment and Food Agency

Sulphur dioxide (SO_2) emitted into the atmosphere as a result of human activity is mainly created by the combustion of fuel. The graph shows the annual concentration of SO_2 near Grensásvegur. It can be seen that concentration levels have dropped over the last decade and are now far below vegetation protection limits in Reykjavík. A high concentration of SO_2 can inhibit breathing, irritate eyes, nose, and throat, and cause choking, coughing, respiratory ailments, and chest discomfort. Sulphur dioxide can also affect plant respiration, cause discomfort in animals, and corrode metals.

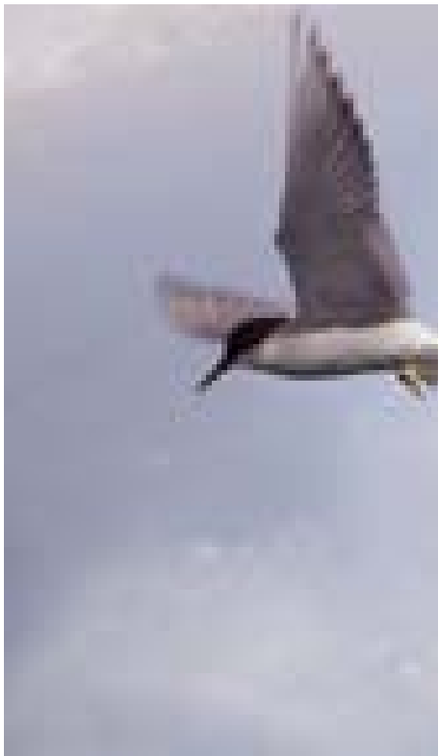
CLEAN AIR

Atmospheric ozone concentrations near Grensásvegur in Reykjavík



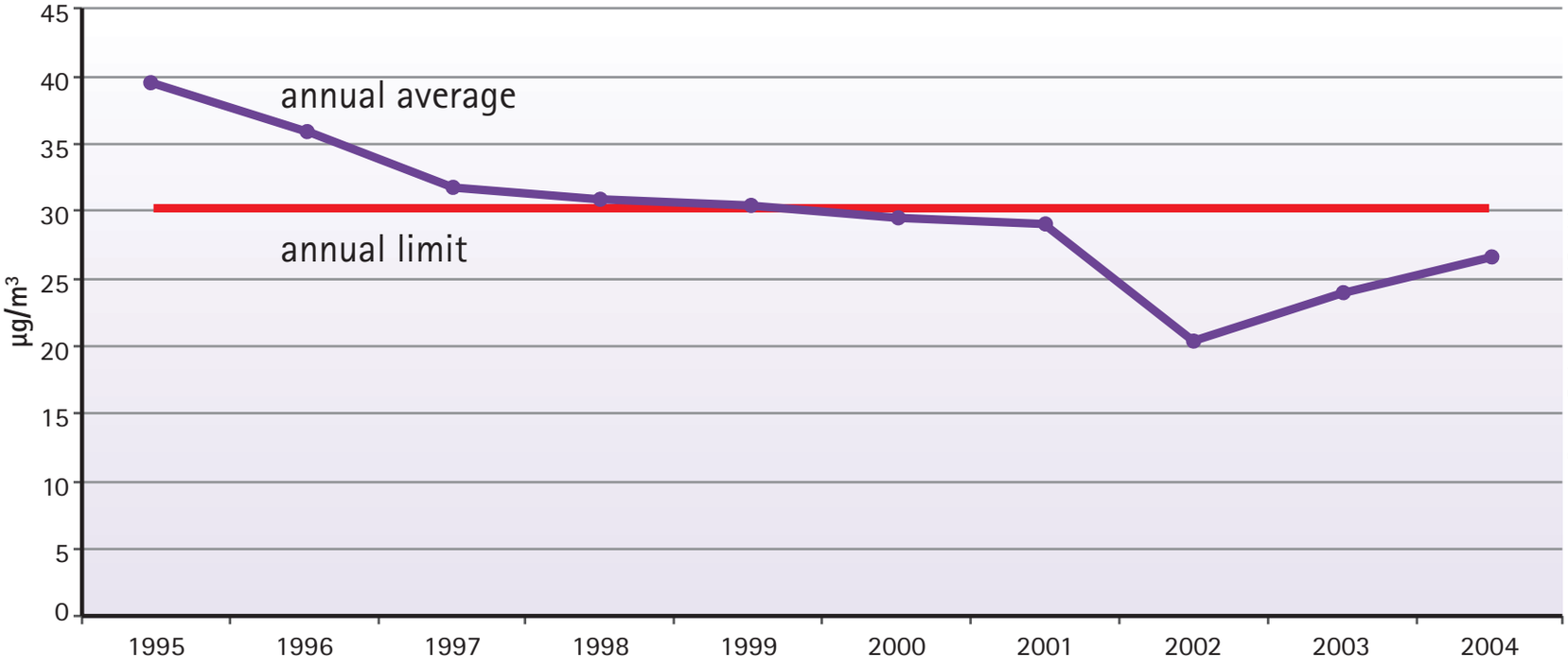
Source: Environment and Food Agency

Ozone in the stratosphere is beneficial because it prevents strong ultraviolet rays from reaching the earth. Ozone can also form near the surface of the earth, assisted by pollutants such as nitrogen oxides and hydrocarbons. Under such conditions, ground-level ozone can damage plants and affect human and animal respiratory systems. It is believed that ozone increases the prevalence of asthma, irritates the nose and eyes, and causes chest discomfort and headaches. It is also thought that ozone compromises the effectiveness of breathing in healthy individuals, as well as reducing the lungs' resistance to disease. Long-term exposure can cause lasting damage. Overall, the concentration of ozone near Grensásvegur has risen over the last decade; however, it is within reference limits.



CLEAN AIR

Atmospheric nitrogen dioxide concentrations near Grensásvegur in Reykjavík

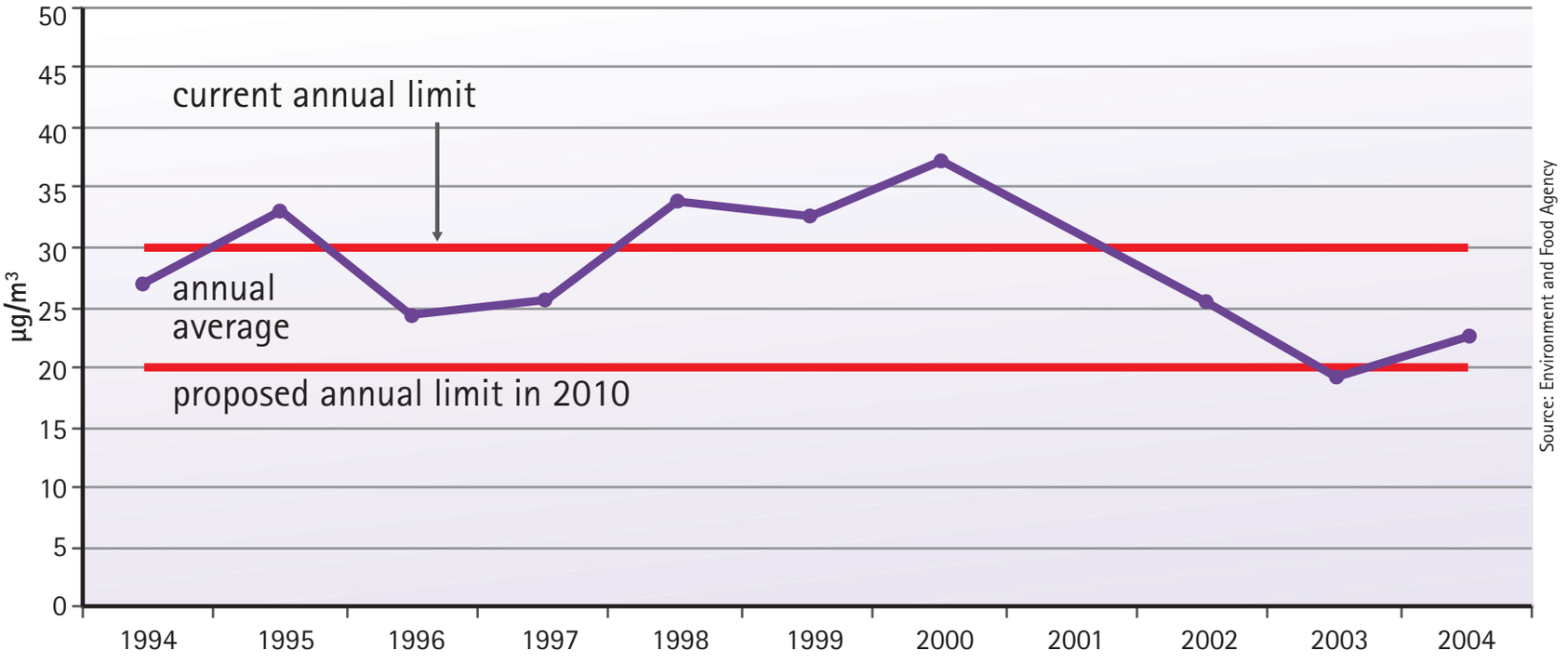


Source: Environment and Food Agency

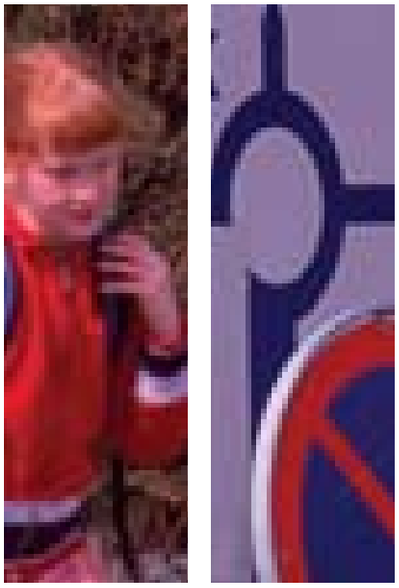
Pollution caused by nitrogen dioxide (NO_2) is a common problem. NO_2 is a by-product of industrial activity and the combustion of fossil fuels. On the whole, pollution stemming from NO_2 in the area near Grensásvegur is on the decline. However, it is not far below health protection limits. On calm winter days, a clearly visible layer of polluted air can blanket the city. Under such conditions, the concentration of NO_2 can sometimes exceed the 24-hour limit. Nitrogen dioxide causes lung irritation in humans and animals and high concentrations of NO_2 can damage vegetation.

CLEAN AIR

Atmospheric concentrations of airborne particulate matter near Grensásvegur in Reykjavík



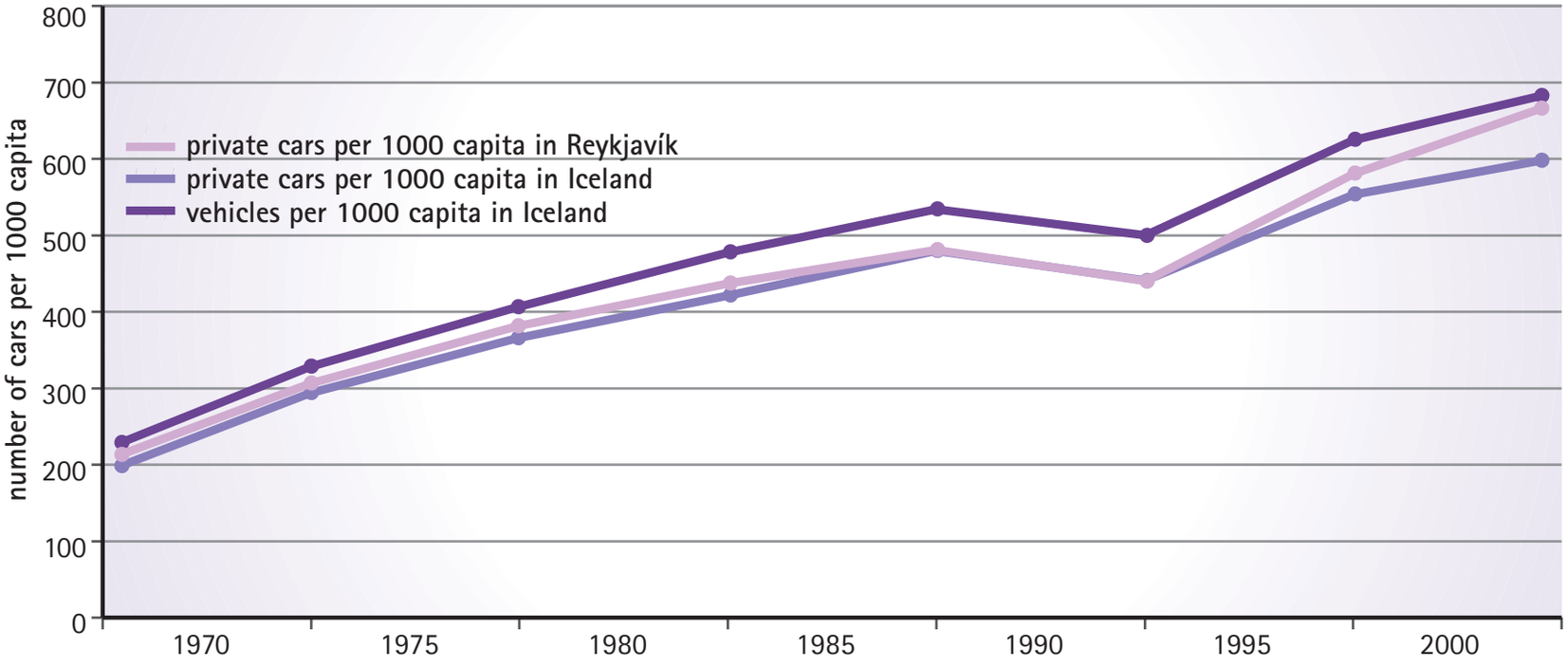
Airborne particulate matter resulting from human activities is generated, for the most part, by fossil fuel combustion, traffic, and industry. The concentration of airborne particulate matter in Reykjavík has dropped considerably in recent years and is now below the current health protection limits. It remains, however, at or above the limits planned for the year 2010. The concentration of airborne particulate matter was measured in Akureyri in the spring of 2005. Those measurements suggest that conditions there are similar to those in Reykjavík.



The impact of airborne particulate matter on human health is largely dependent on the size of the particles themselves. Particles smaller than 10 µm pass easily down into the lungs and can accumulate there. The effects are also determined by how long, and how often, a person inhales polluted air and whether hazardous materials are in the air or adhere to the particles.

CLEAN AIR

Trends in the number of motor vehicles per thousand inhabitants

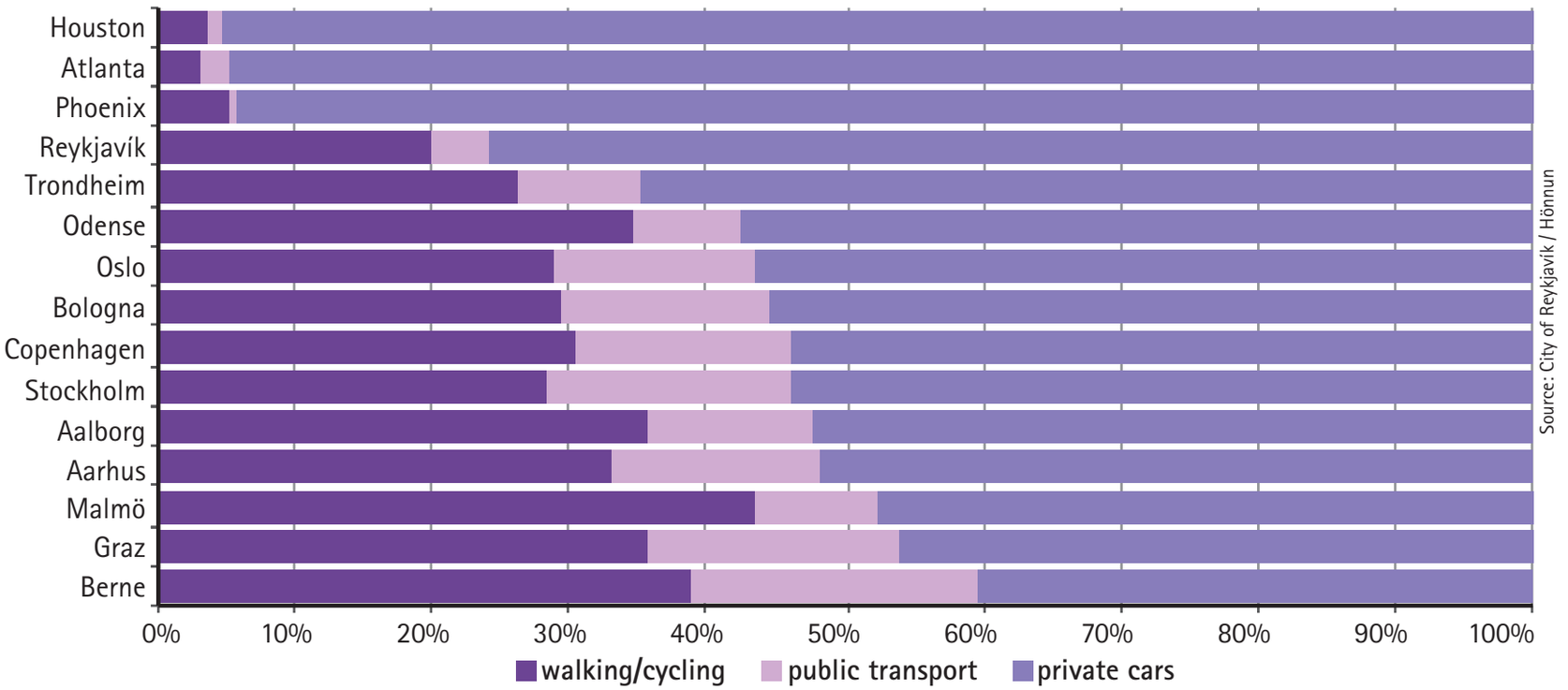


Source: Statistics Iceland

Automobile traffic is one of the main causes of urban pollution in Iceland. There has been a substantial increase in the number of automobiles in the country in recent years, and now the number of motor vehicles per capita in Iceland is among the highest in the world. Therefore, increased use of private vehicles, and not increased population, is the primary explanation for the increase in traffic. At the same time, the number of people who use public transportation is diminishing.

CLEAN AIR

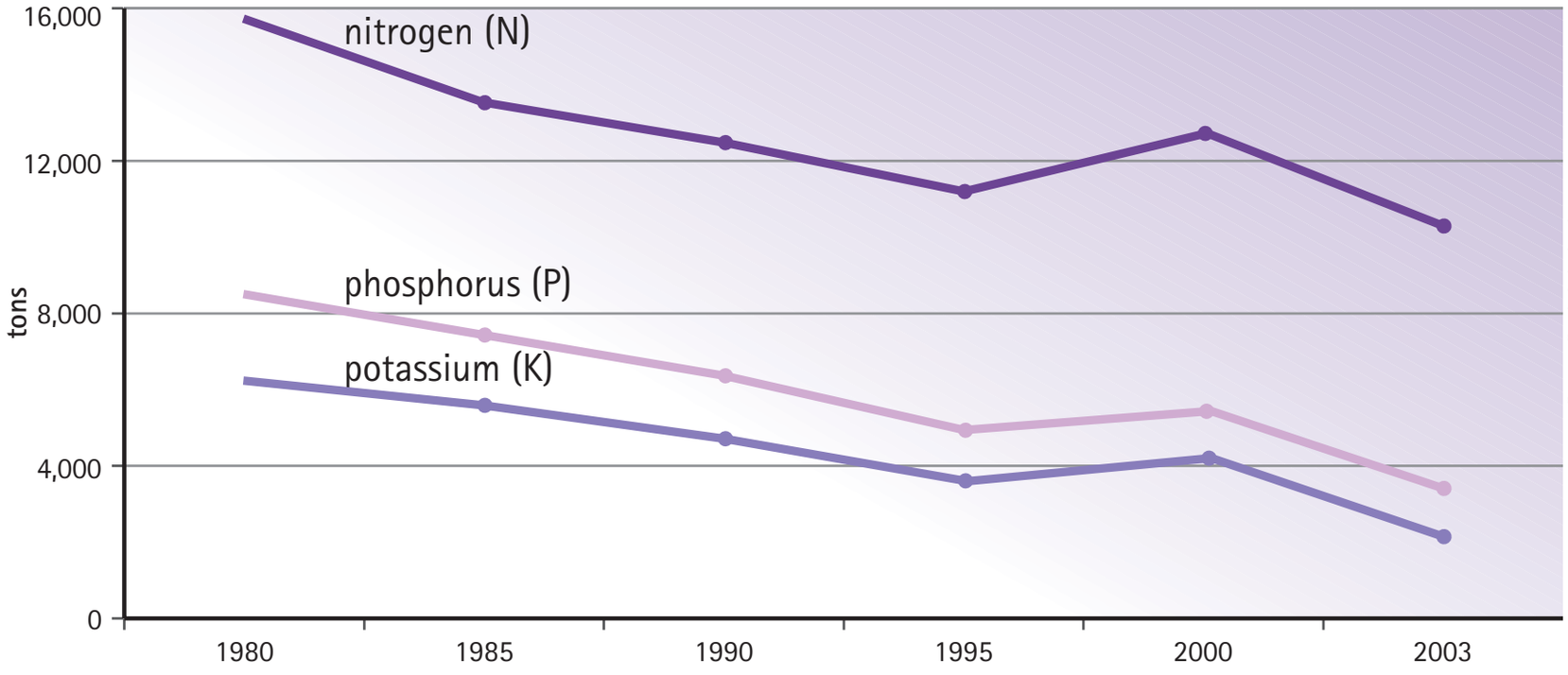
Choice of modes of transport in several cities



Reykjavík residents closely resemble urban Americans as regards the choice of a mode of transport. In Iceland, private automobiles are used in over 70% of instances, while public transportation is used in less than 5% of instances. It is worth mentioning that over 60% of trips taken in private vehicles are shorter than 3 km, and roughly one-third are shorter than 1 km. The graph shows that our neighbours in Oslo, Stockholm, and Copenhagen use private automobiles far less than Icelanders do, and that public transportation and bicycling are more commonly used.

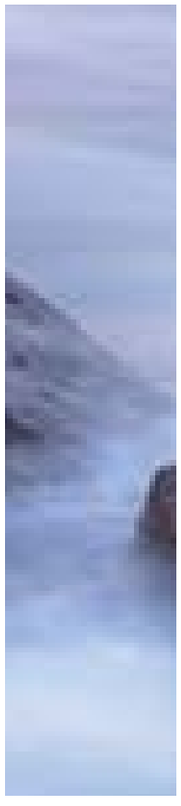
CLEAN FRESHWATER

Agricultural use of prepared fertiliser



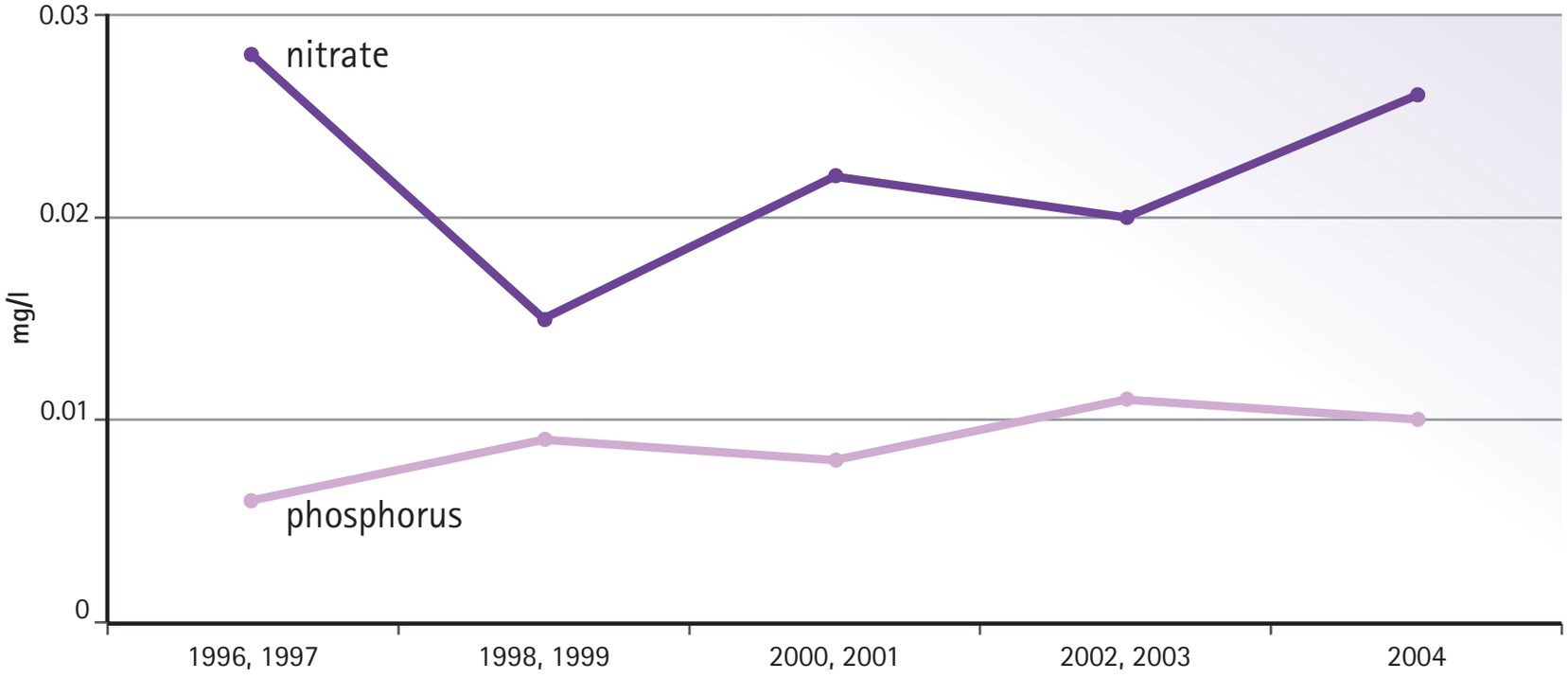
Source: Statistic Iceland

Nitrogen, phosphorus, and potassium are important nutrients for plants; therefore, they are used as agricultural fertilisers. Overuse of fertiliser can on the other hand cause pollution in rivers and lakes. The use of prepared fertiliser in Iceland peaked around 1980 but has dropped substantially in recent years. In Iceland, cultivated land extends to roughly 1.4% of the total land area of the country, and precipitation is considerable. For this reason, there is limited risk of pollution from the use of fertiliser. The concentration of dissolved phosphorus and nitrogen in the form of nitrates is, in most instances, quite small and is always below reference limits.



CLEAN FRESHWATER

Concentration of phosphorus and nitrates in Ölfusá river

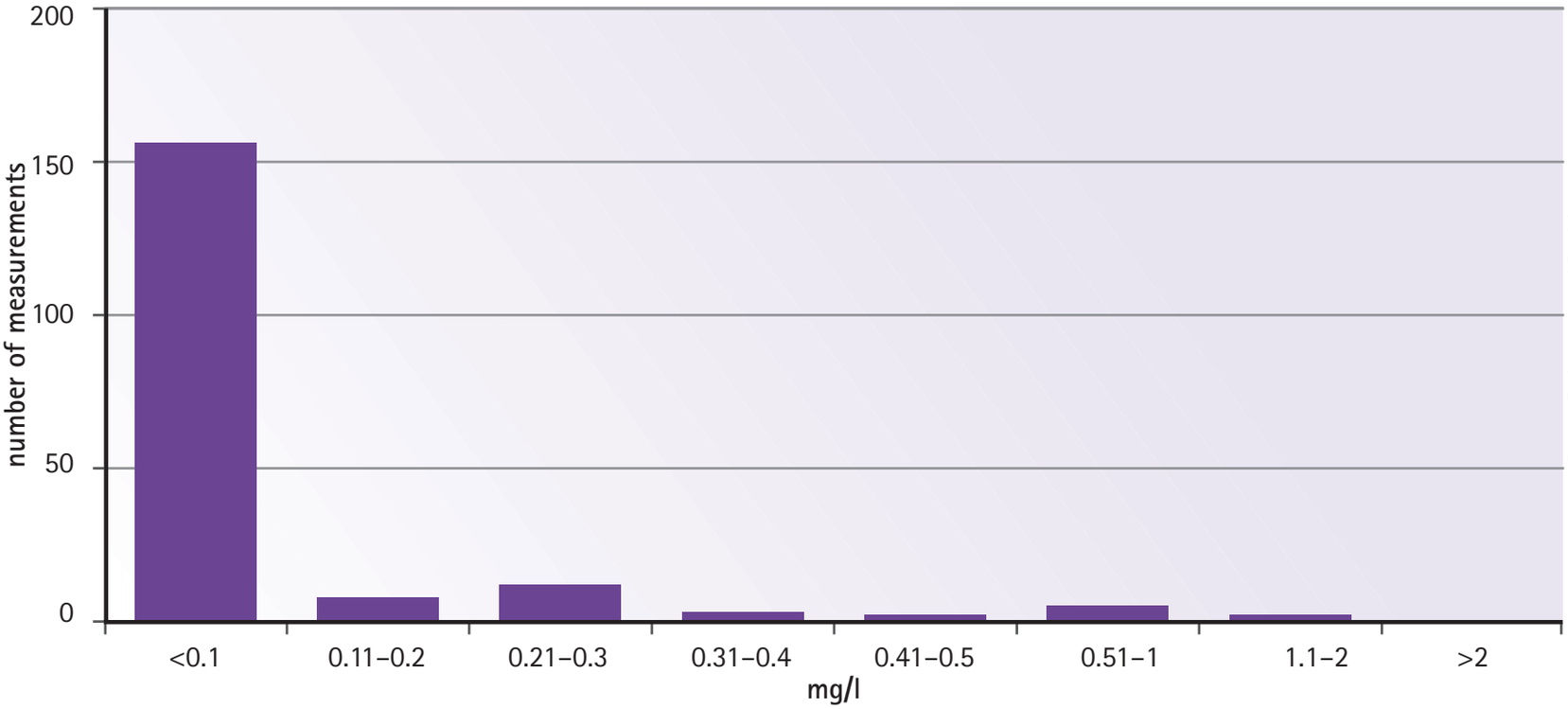


Source: Environment and Food Agency

The graph shows the concentration of phosphorus and nitrate in the Ölfusá river near the town of Selfoss. Because of natural weathering of rock and leaching of chemicals from the soil, naturally derived phosphorus and nitrates can be found in water. Phosphorus and nitrates can exceed natural concentrations in water, as a result of both the discharge of sewage from drainage systems and the leaching of chemicals contained in agricultural fertilisers. Measurements indicate that the concentration of phosphorus and nitrates is not a problem in the Ölfusá river.

CLEAN FRESHWATER

Concentration of nitrates in drinking water

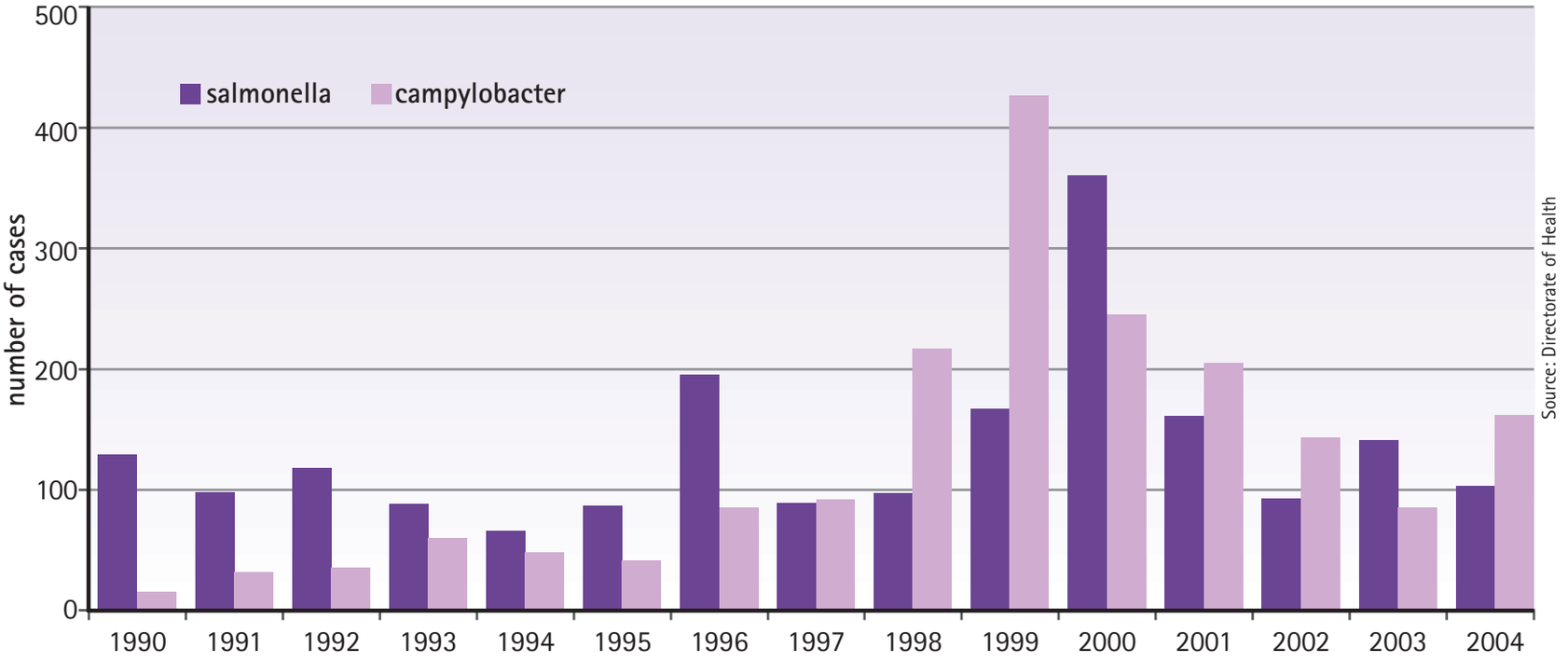


Source: Environment and Food Agency

The graph shows the results of nitrate measurements in drinking water during the period 1999–2004. Nitrates are considered hazardous to human health and especially hazardous to children's health. For this reason, it is important to monitor their concentration in drinking water. The measurements show that nitrate concentrations are under 0.1 mg/l in most instances and that they never exceed 2 mg/l. Agriculture is the chief cause of the transmission of nitrates into drinking water. High nitrate concentrations are also measured in groundwater near airports as a result of substances used for de-icing. The results of measurements show that the concentration of nitrates in drinking water is not a problem in Iceland.

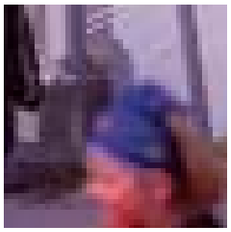
SAFE FOOD PRODUCTS

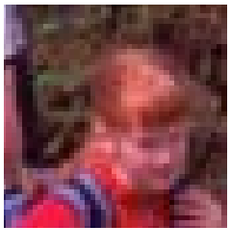
Number of recorded instances of illness caused by food contamination



Source: Directorate of Health

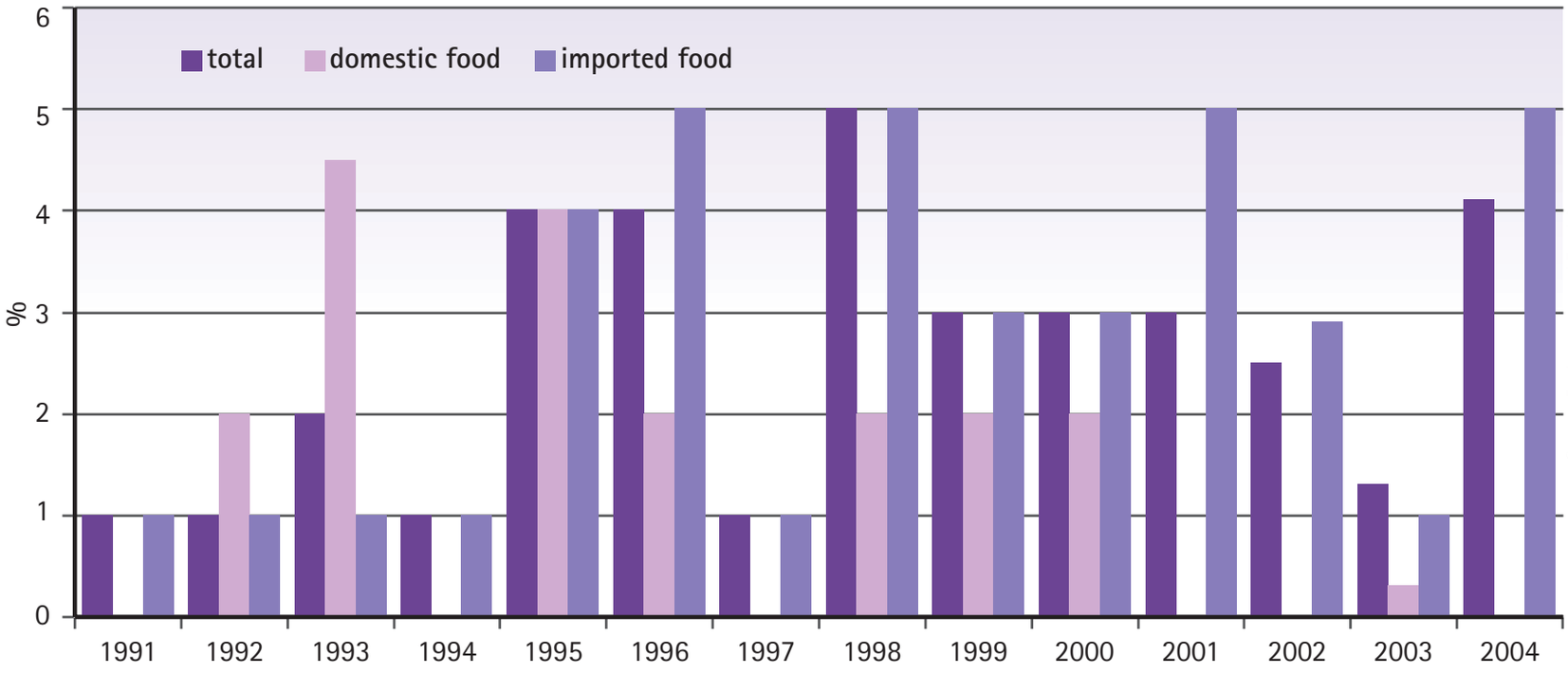
Salmonella is often detected in animals and in the environment and is thus a considerable risk factor in the pollution of food and drinking water. Studies of campylobacter indicate strongly that the contamination of food in Iceland is related primarily to raw poultry and related products and to drinking water obtained from small waterworks and private supplies. The campaign launched against campylobacter in the wake of an increase in campylobacter-related illnesses in 1999 and 2000 has proven very successful.





SAFE FOOD PRODUCTS

Pesticides above maximum permissible levels in foodstuffs



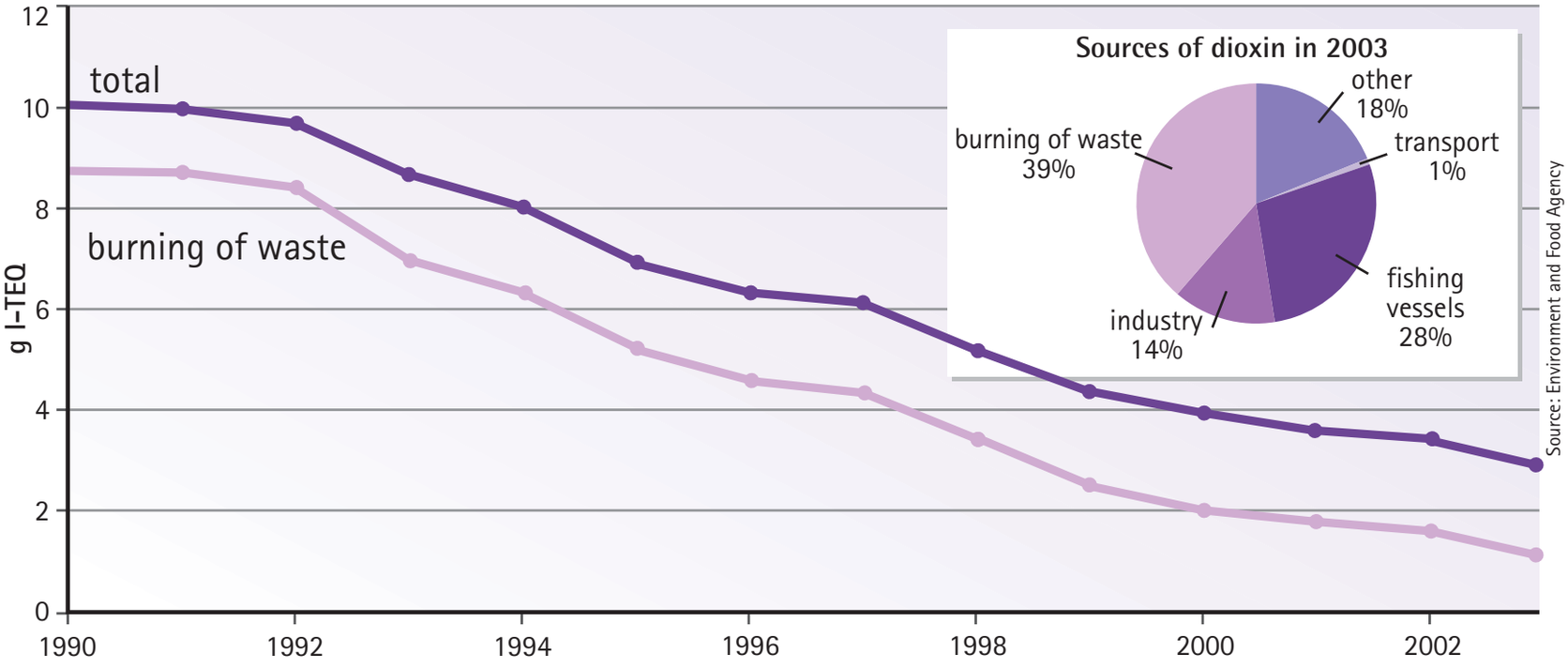
Source: Environment and Food Agency

The graph shows the percentage of fruits and vegetables containing pesticides in amounts exceeding maximum permissible limits. This percentage has remained rather stable, or 2–5%, which is similar to levels in the other Nordic countries. Pesticides are used in the manufacture and storage of various foodstuffs, such as vegetables and fruits, in order to protect them from weeds, fungi, and vermin. In some instances, traces of pesticides can be found in foods, especially in the outermost layer of fruits and vegetables.

It should be noted that maximum permissible pesticide levels are generally very low, far below the amount that could be considered hazardous to human health.

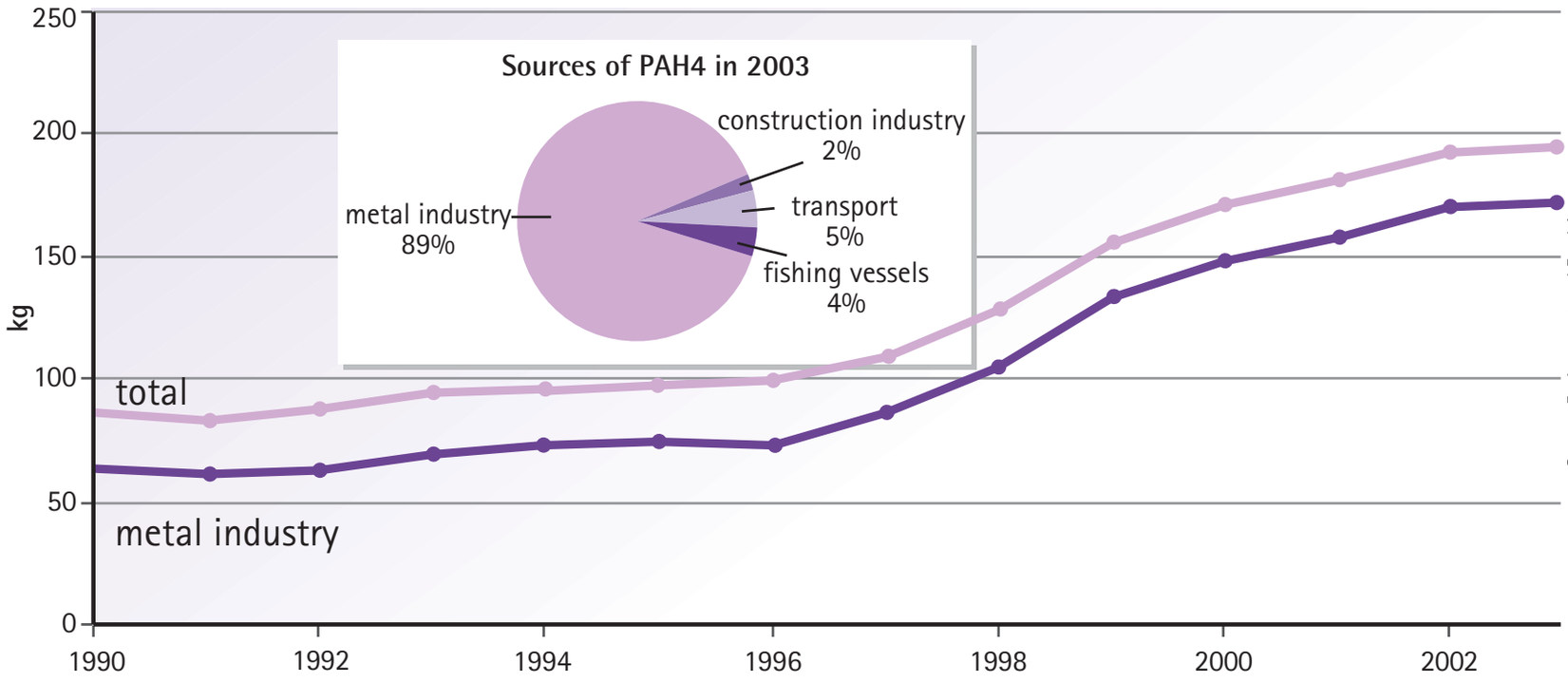
AN ENVIRONMENT FREE OF HAZARDOUS MATERIALS

Trends in dioxin emissions



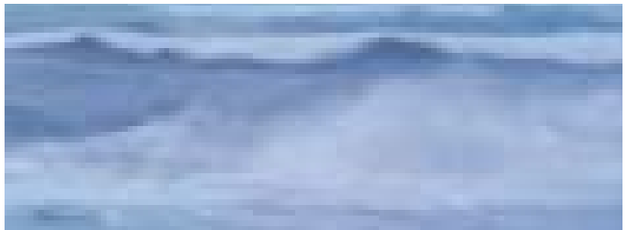
Dioxins are among the most toxic substances found in our environment. Dioxin is a persistent organic pollutant that is a by-product of various processes. Because of their properties, dioxins accumulate in the natural environment. Total dioxin emissions have diminished in recent years, which can be traced largely to reduced rates of dioxin emissions from the incineration of waste. Since 1990 the amount of incinerated waste has been reduced substantially. In addition, open-pit burning of waste has been virtually eliminated. Still in operation, however, are incineration facilities with limited monitoring and little pollution control equipment. The emission of dioxins from such installations is considerable.

Trends in PAH emissions



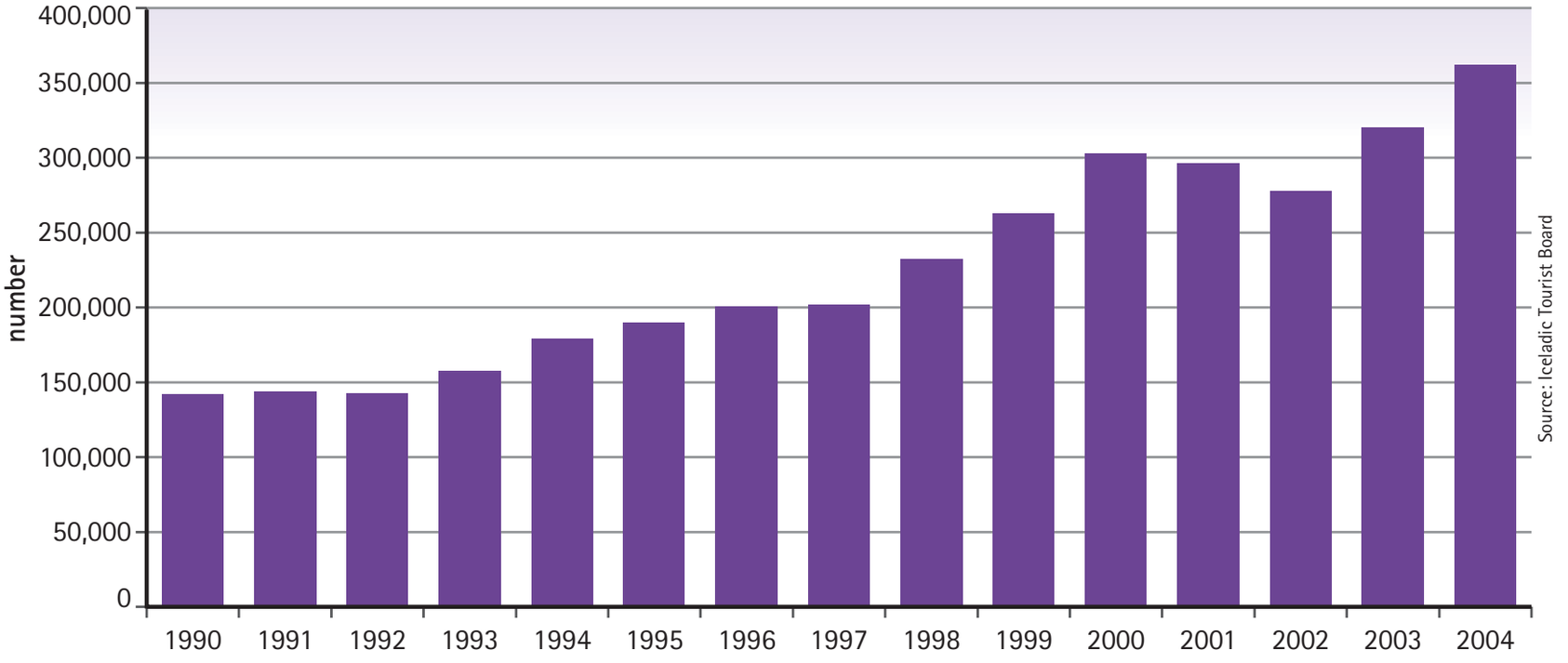
Source: Environment and Food Agency

PAH pollution is generated by polycyclic aromatic hydrocarbons, which are formed as a result of numerous types of industrial activity, among other things. These compounds can be transmitted into the food chain and can cause cancer, as well as having various other negative effects. In Iceland the emission of PAH4 has increased from just below 90 kg in 1990 to almost 200 kg in 2003. This increase is primarily due to increased production of aluminium and ferrosilicon.



OUTDOOR ACTIVITIES IN HARMONY WITH NATURE

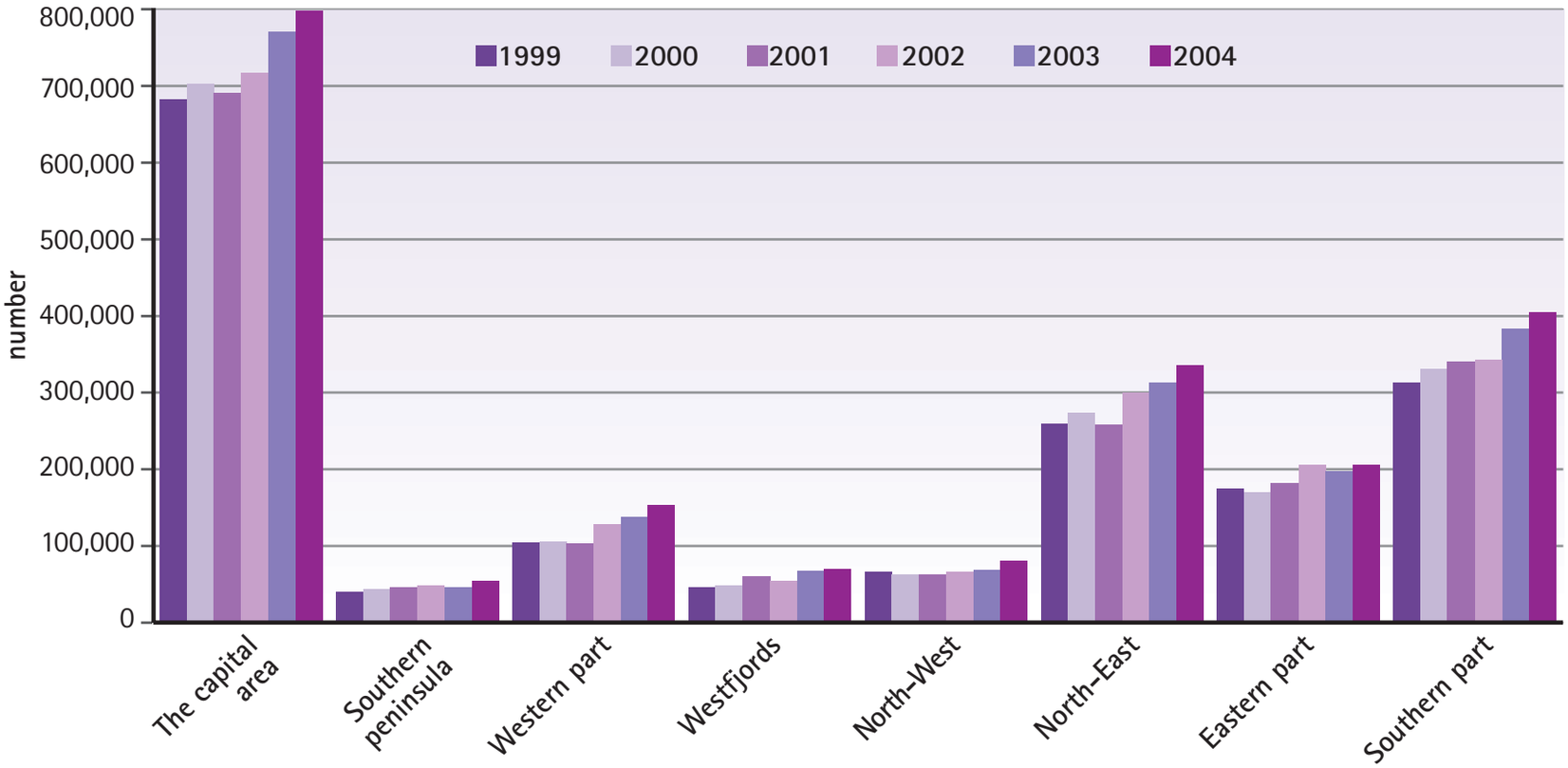
Total number of foreign visitors to Iceland



The number of foreign tourists who visit Iceland has increased substantially in recent years. Research indicates that Icelandic nature is what attracts most foreign visitors to the country. The increase in the number of foreign tourists is therefore an indication of the attraction of the Icelandic nature as well as a reminder of the importance of ensuring that the country's natural beauty will not be damaged by increased tourist traffic.

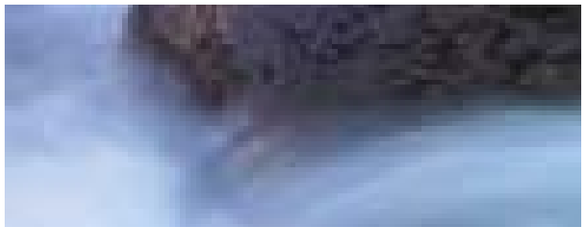
OUTDOOR ACTIVITIES IN HARMONY WITH NATURE

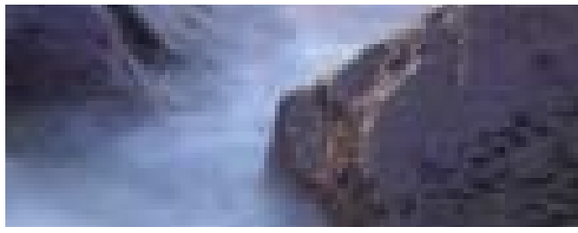
Total number of overnight stays categorised by region



Source: Statistics Iceland

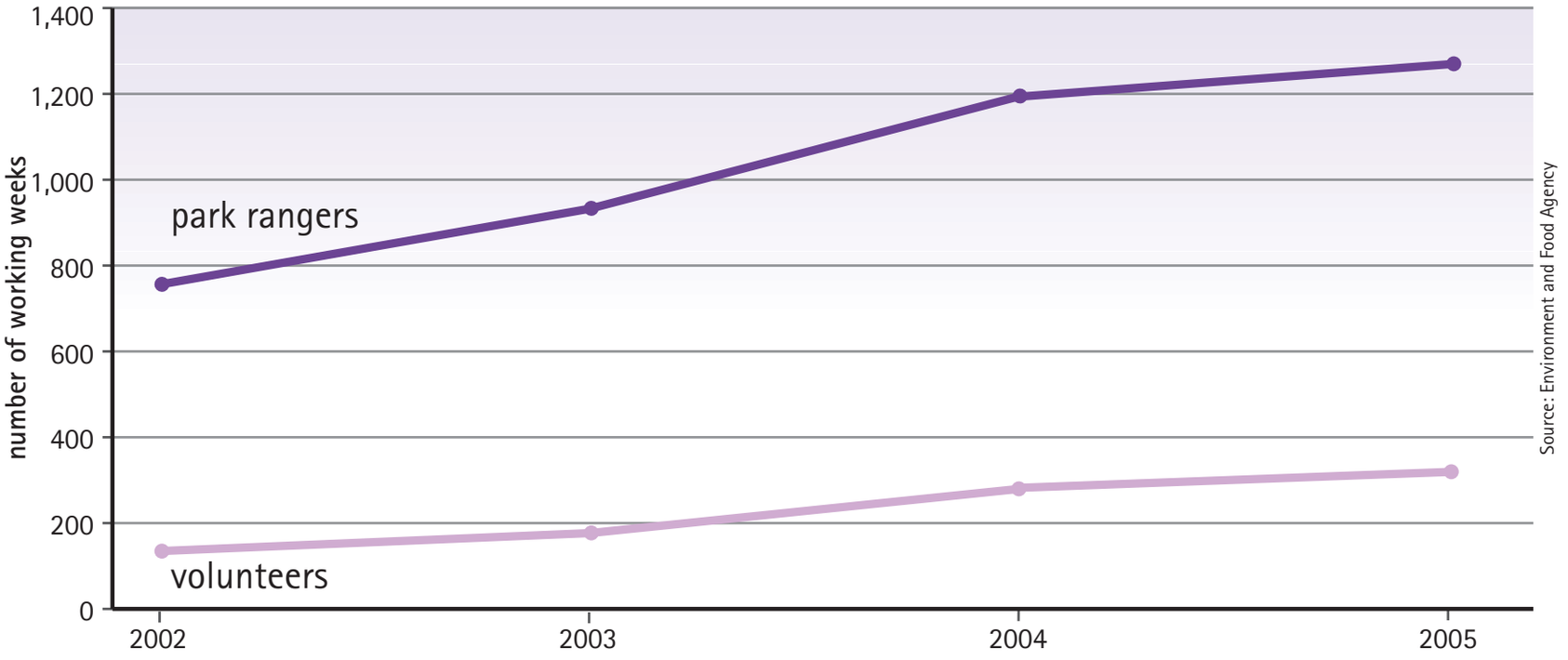
The bar graph shows the total number of overnight stays of tourists, Icelandic and foreign, in hotels and other commercial accommodations. Icelanders account for about one third of the nights, but their relative share is decreasing due to an increase in the number of foreign visitors. Tourists are not evenly spread around Iceland, and some of the most popular destinations may be negatively affected by high number of visits.





OUTDOOR ACTIVITIES IN HARMONY WITH NATURE

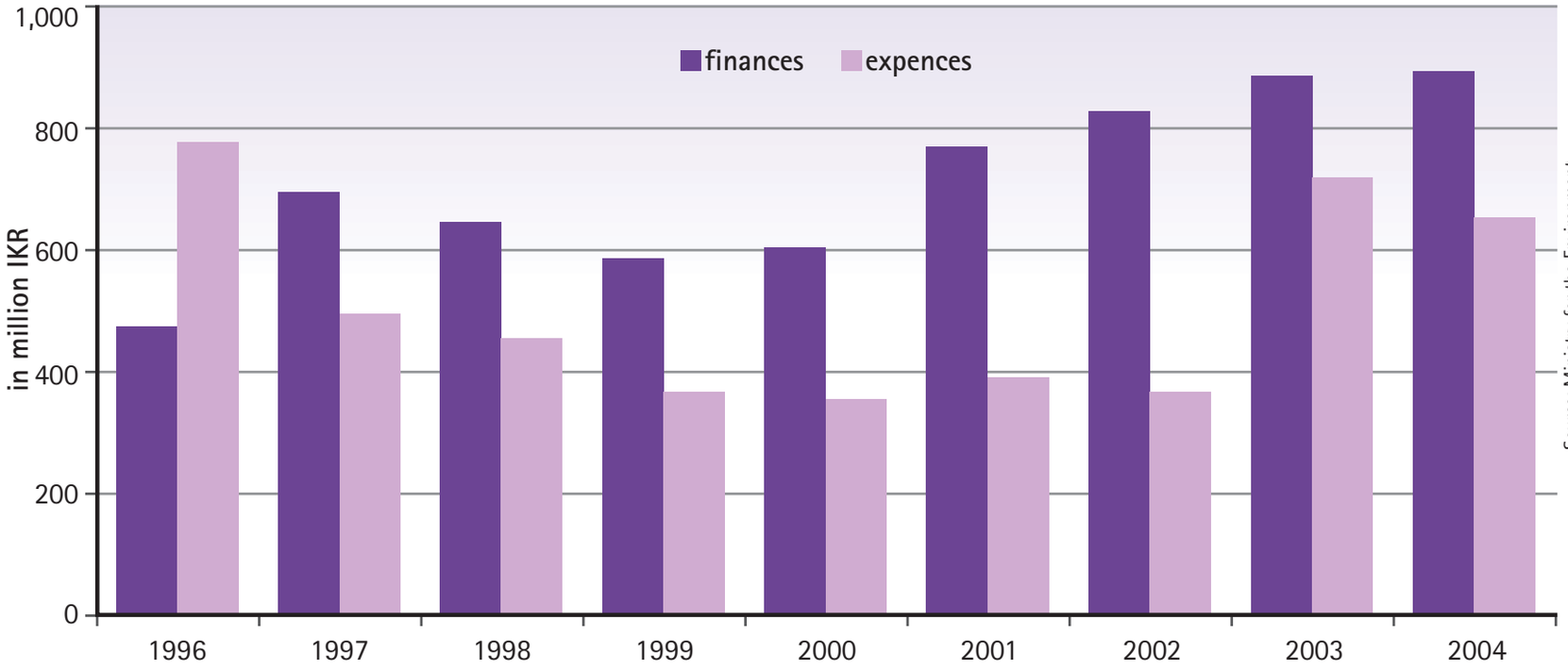
Park rangers and volunteers working on behalf of the Environment and Food Agency



Increased interest in Iceland's outdoors increases the strain on the country's most popular destinations. This is particularly so in the case of national parks and other protected areas, which often attract large numbers of visitors but are extremely sensitive to human traffic. It is important that both the build-up of these areas and the operations carried out there take this into consideration. Park rangers supervise various activities and tasks in national parks and protected areas all over the country. Among these are guest reception and dissemination of information to visitors, nature conservation and monitoring, and the operation of visitor facilities, campgrounds, and overnight cabins. The role of park rangers has been expanded and fortified in recent years. Each summer, a number of volunteers work in national parks and protected areas in addition to the park rangers.

PROTECTION AGAINST NATURAL DISASTERS

The Avalanche Fund – funding allocations

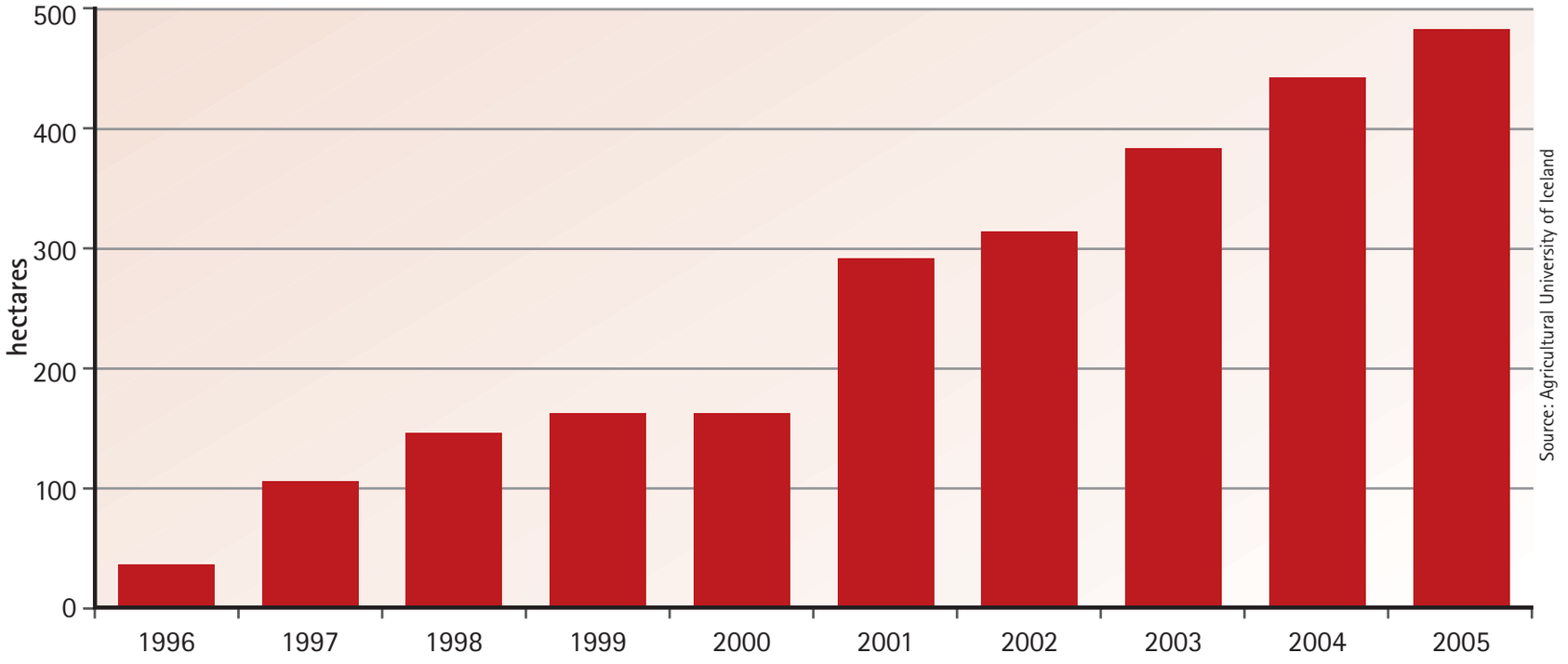


Source: Ministry for the Environment

The graph shows the Avalanche Fund's allocated funds juxtaposed with the Fund's investments during the same period. By far the largest operational item in the Avalanche Fund budget for 1996–2004 is the expense for preventive measures in areas at risk of avalanche. Various projects are included in this category. The most comprehensive are the construction of protective structures and the purchase of homes in risk areas or the transport of such homes to safer areas. In recent years, substantial capital has been dedicated to the protection of communities at risk from potential avalanches.

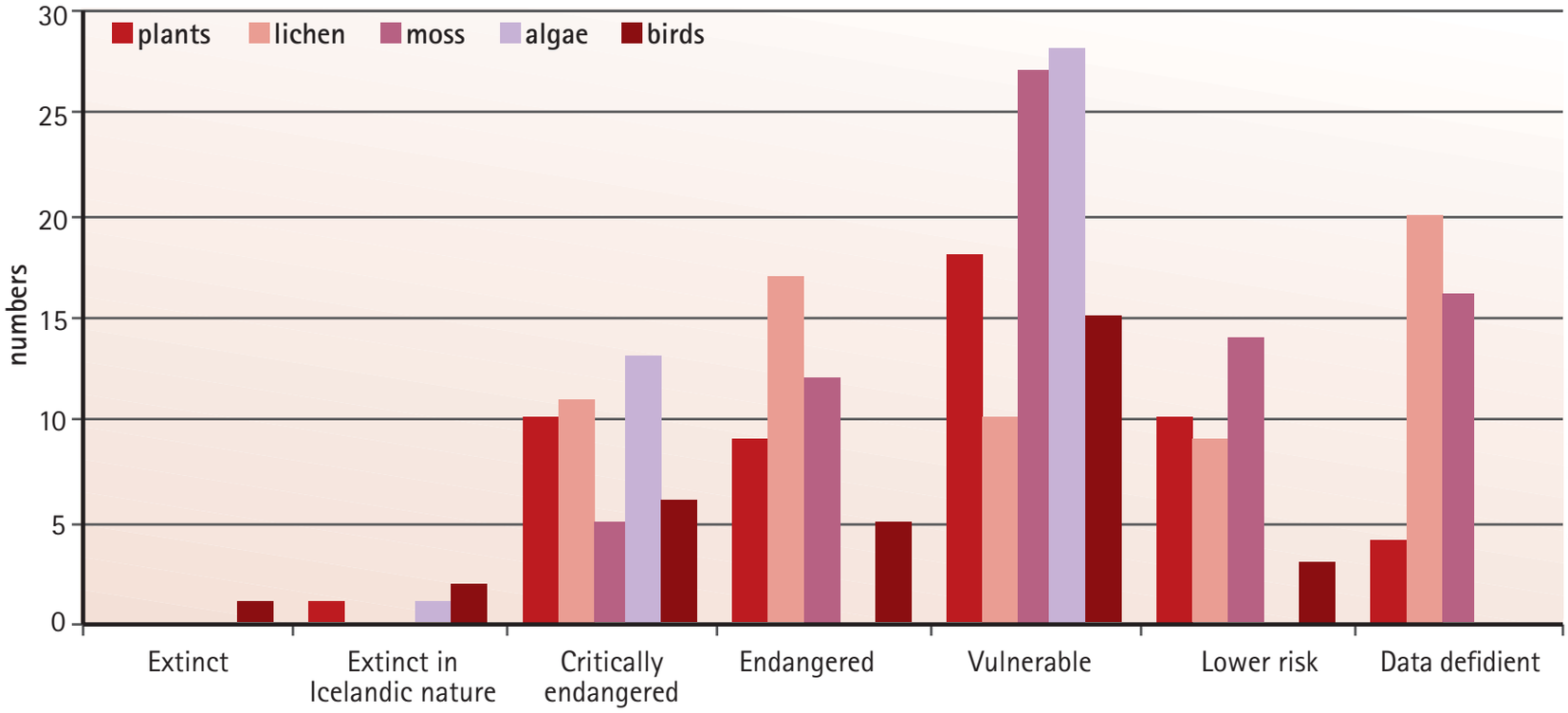
PROTECTION OF ICELANDIC NATURE

Total area of reclaimed wetlands



Wetlands are an important habitat for birds, small animals, and plants. Today, almost half of the wetland areas that existed at the time Iceland was settled has been lost. Since 1993 the drainage of lowland wetlands has virtually ceased. The effects of the draining of wetlands will in many places be gradually reversed in time, as ditches that are not maintained become silted. In some places, an attempt has been made to speed up this process by filling old ditches. As the graph shows, attempts to reclaim several wetland areas have been successful.

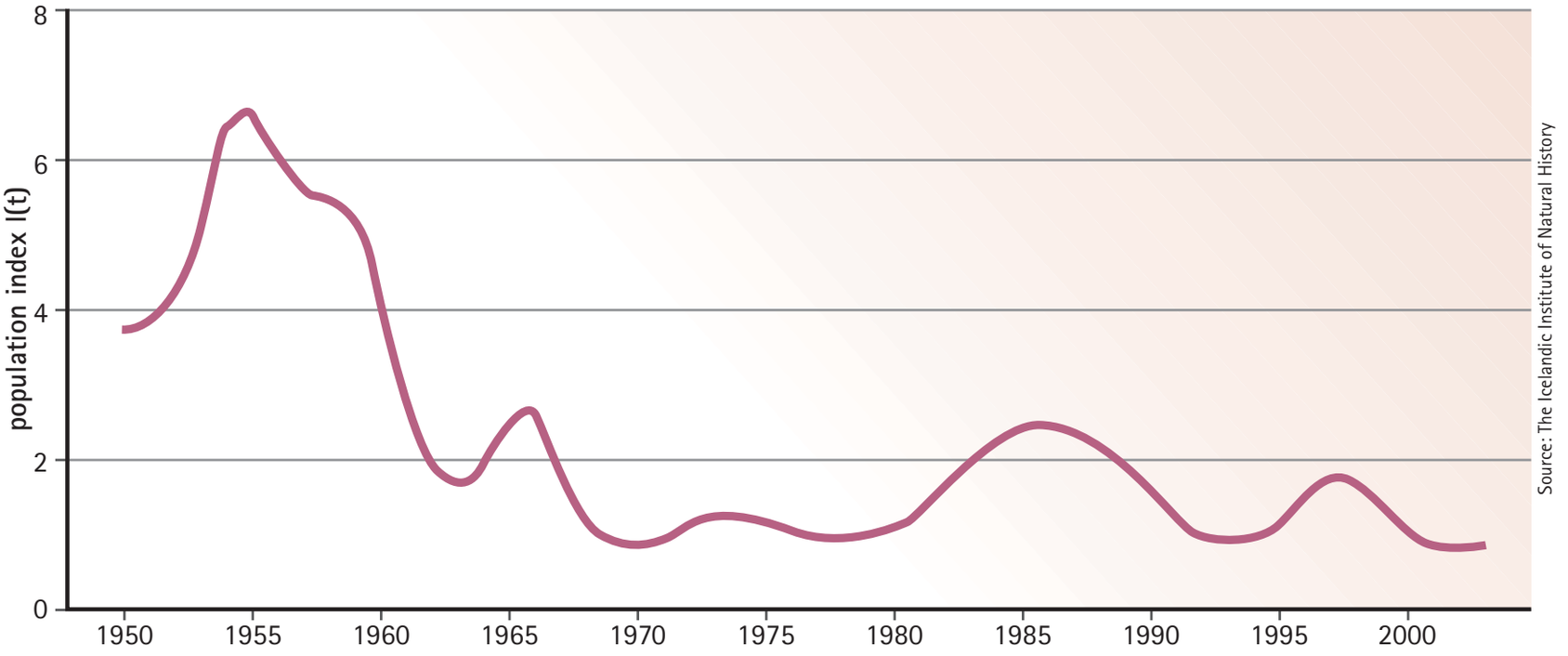
Red lists of endangered species



Source: The Icelandic Institute of Natural History

The Institute of Natural History regularly compiles "red lists" of endangered plant and animal species, classified according to the threat of population decline or even extinction. The graph shows the number of vascular plants, ferns, lichen, mosses, benthic algae, and birds that are either extinct or are considered to be endangered or vulnerable.

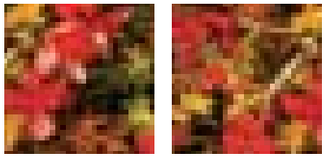
Size of ptarmigan population



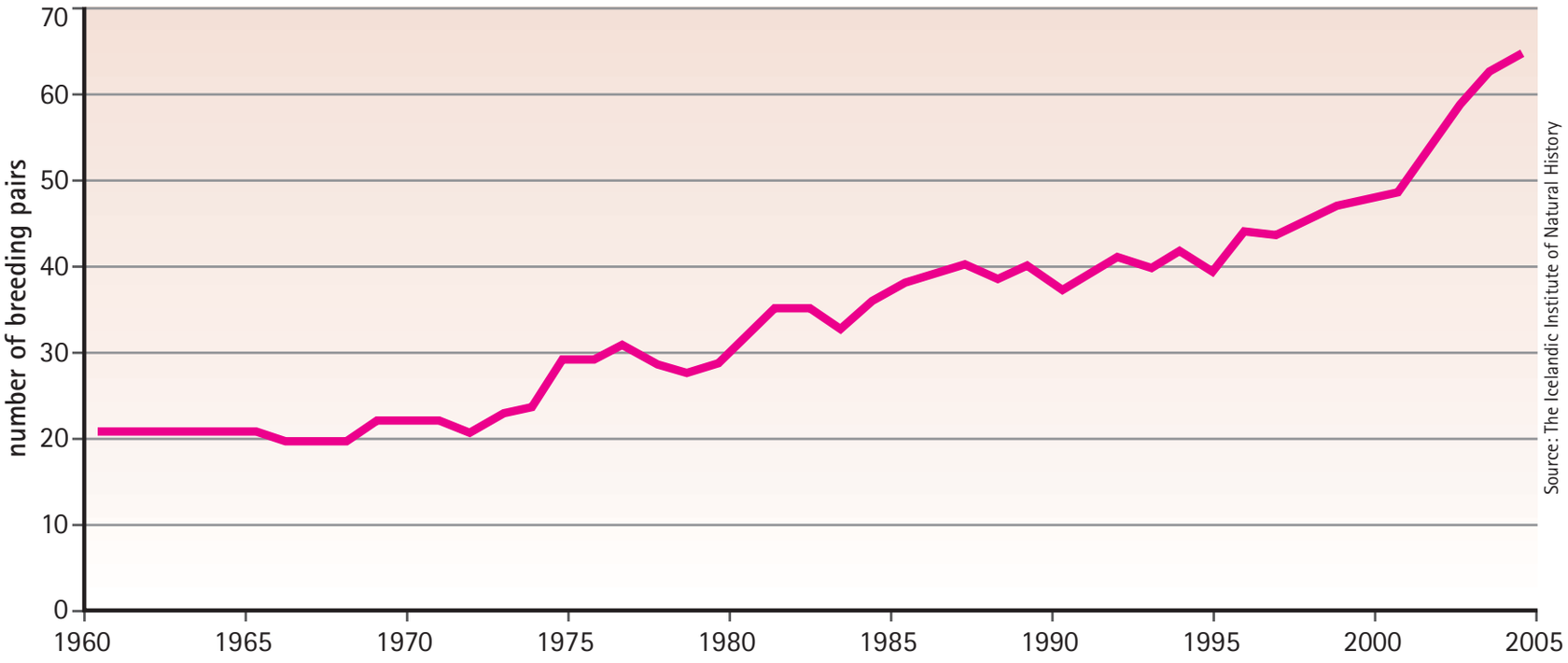
Source: The Icelandic Institute of Natural History

The graph shows trends in the index of population abundance of ptarmigan in Northeast Iceland from 1950 to 2003. Fluctuations in the ptarmigan population, with ten years elapsing between peak years, are well known. The last big population peak occurred in 1955, with subsequent peaks gradually declining.

In 2003 ptarmigan were protected temporarily, as research indicated that the population was at a low point. The effects of hunting are important, as hunting is the only attrition factor that the authorities can control for the short term. In the two years that have passed since ptarmigan were protected, the population has more than tripled, and its tolerance to hunting has therefore increased greatly. This substantial growth over the past two seasons is unparalleled in recent years, and the ptarmigan population has now reached levels consistent with those anticipated when protection took effect in 2003.



Size of White-tailed eagle population

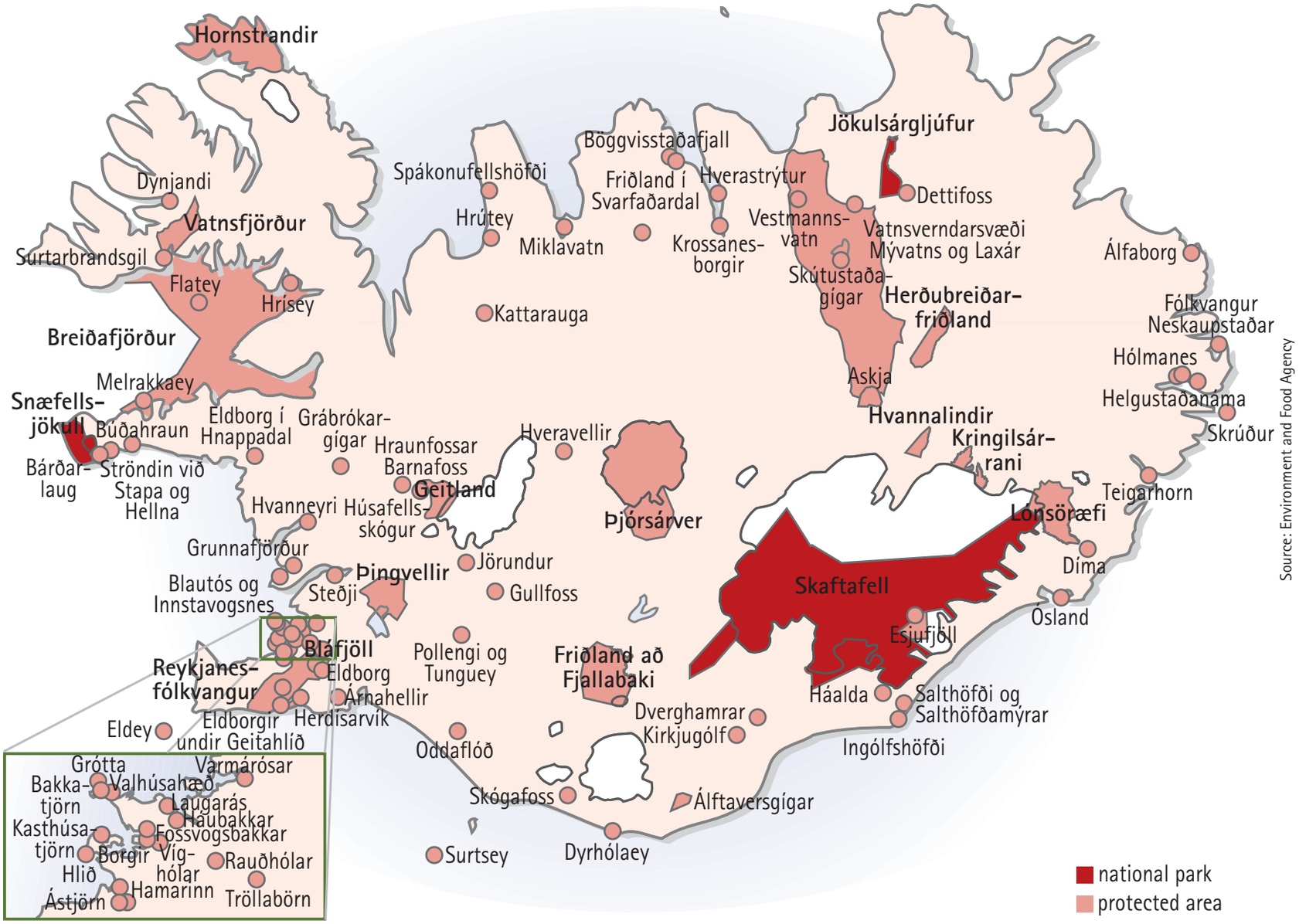


Source: The Icelandic Institute of Natural History

The White-tailed eagle was protected by Icelandic legislation in 1914. The effects of this protection did not become apparent though until after 1964, when the practice of poisoning for foxes was banned. Since then, the eagle population has more than tripled. The eagle's primary dwelling place is on Breiðafjörður fjord, where over 40 pairs — some two-thirds of the total population — now live. There are also a number of eagles on the north side of Faxaflói bay and in the West Fjords. In addition, eagles have reclaimed old nesting areas in South and North Iceland. In 2004 and 2005, they were able to raise young in the old Flateyjarhreppur district, where nesting and breeding attempts had been unsuccessful since the middle of the 19th century.

WILDERNESS CONSERVATION

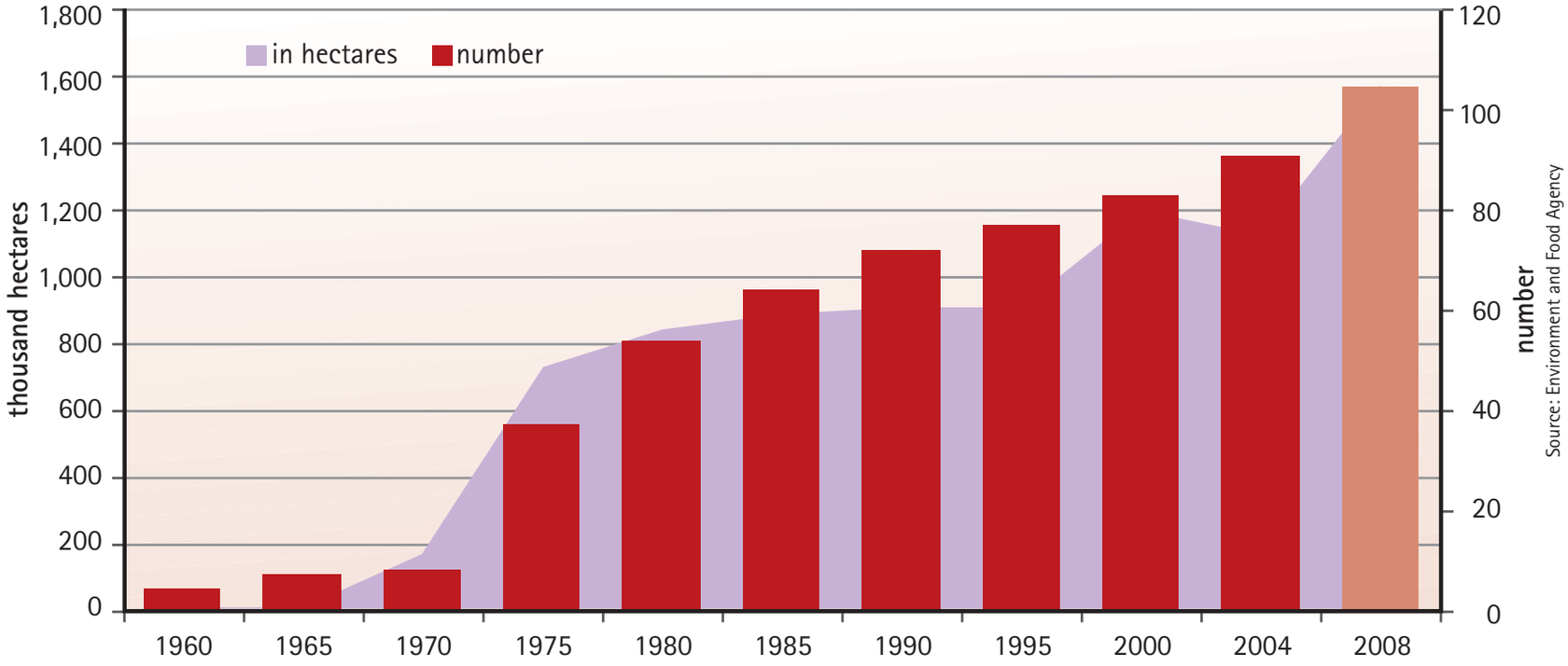
Protected areas in Iceland



The total protected land area in Iceland covers over 11,000 km², or roughly 11% of the total area of the country. Areas can be protected for several reasons, including landscape, biota, or unique geological formations. Rules governing protected areas vary in accordance with the objectives of the protection, the characteristics of the land area in question, and agreements with stakeholders.

WILDERNESS CONSERVATION

Trends in size and number of protected areas

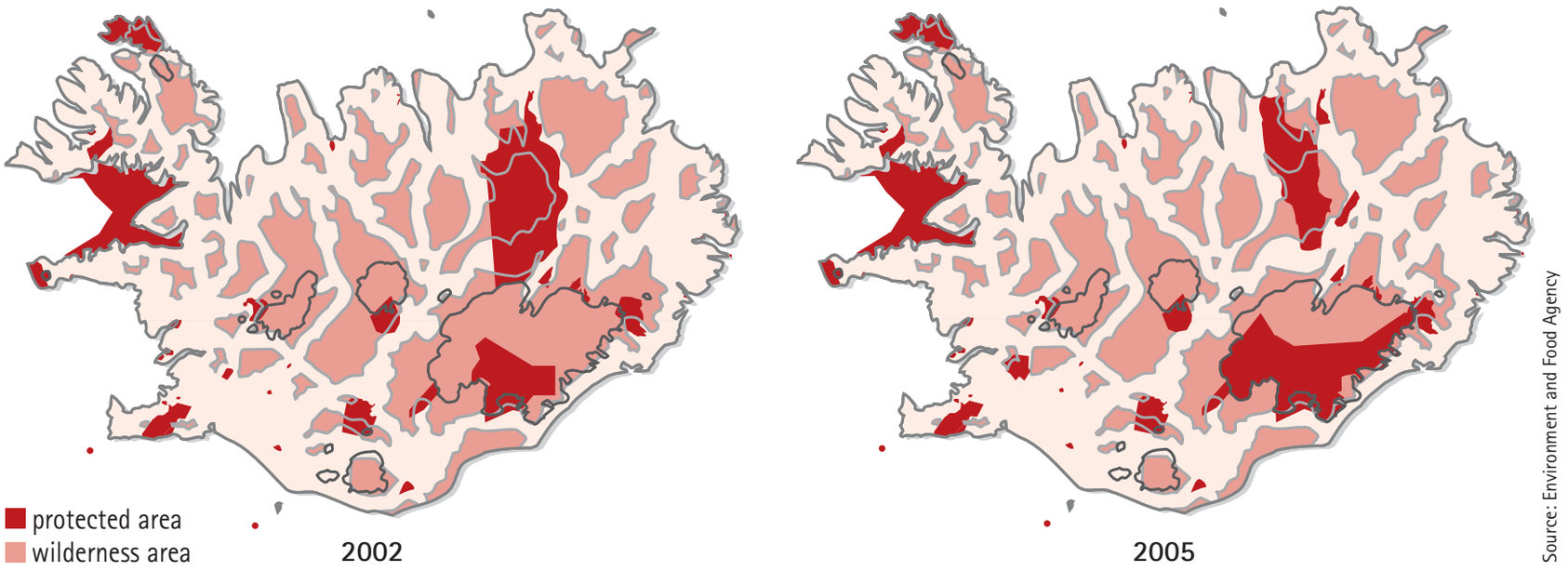


Source: Environment and Food Agency

Protected areas in Iceland, excepting land protected for reclamation and afforestation, dates to the year 1930, when Þingvellir was protected by special legislation. This graph illustrates trends in size and number of protected areas in Iceland. There were few protected areas in Iceland until 1970, but during the 1970s they increased substantially in number. At present the country has some 90 areas that are designated as protected areas. Most of these are protected under the Natural Protection Act, though a few are subject to special legislation. The graph also shows the planned increase in protected land area according to the nature conservation plan for 2004–2008.

WILDERNESS CONSERVATION

Wilderness areas and protected areas

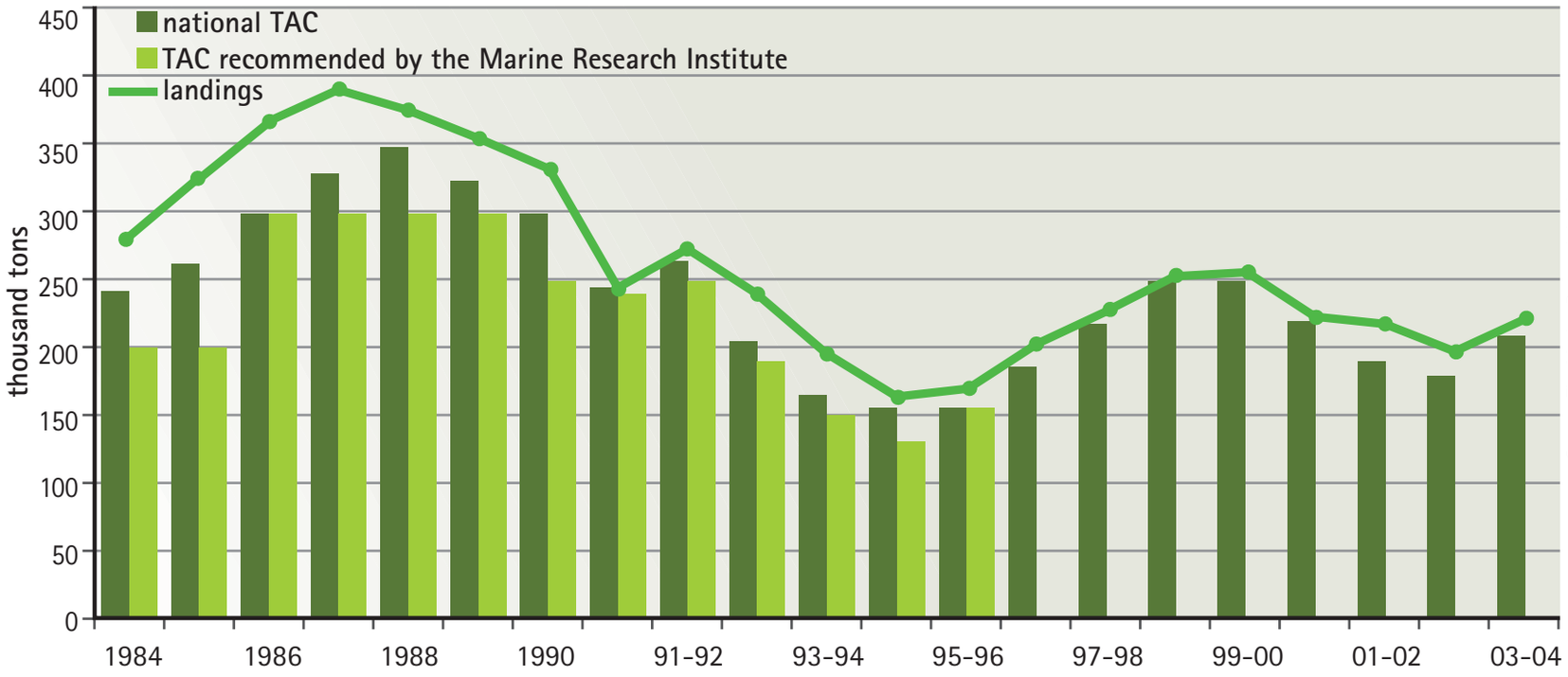


Source: Environment and Food Agency

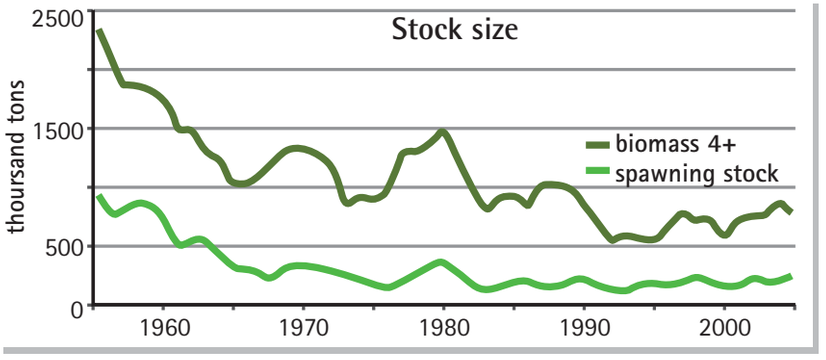
Wilderness is a relatively new concept in the discourse on nature conservation; thus it is only recently that attempts have been made to define how much of the country can be considered wilderness. Updating this information on a regular basis provides an opportunity to monitor the effects of development on total wilderness land area. In 2002, some 39,900 km^2 were defined as wilderness, while today the total wilderness land area in the country is 38,900 km^2, or approximately 38% of the total area of Iceland.

SUSTAINABLE USE OF RESOURCES

Cod

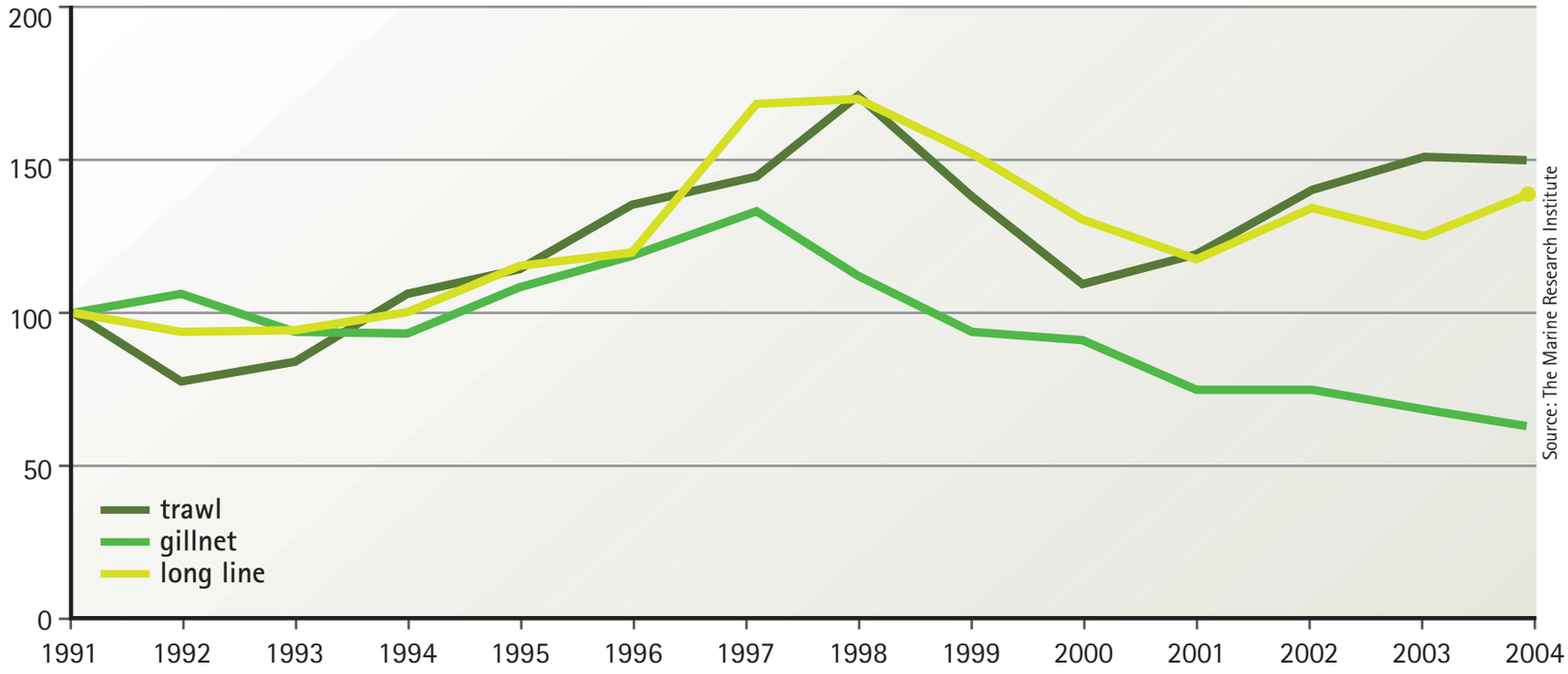


Source: The Marine Research Institute



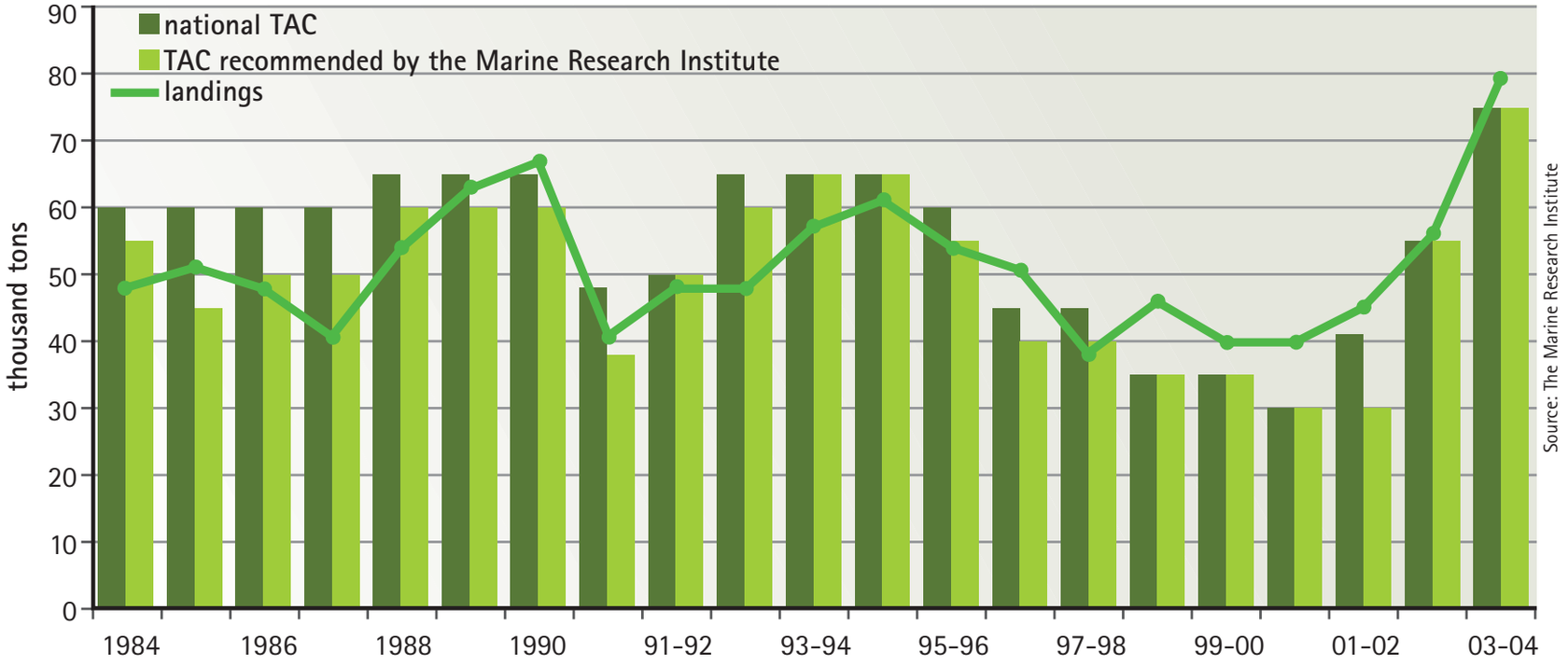
The graph shows the Marine Research Institute's recommendations for catch quota and total allowable catch (TAC) as determined by the government, as well as landings. Beginning in 1996/97, the so-called catch rule is used. The amount of landings was considerably more than recommended by the Marine Research Institute's in the early part of the period, but since the adoption of the catch rule it has been fairly close to recommendations. During the last three fishing years, the cod catch has, on average, been 10% above the TAC. The smaller graph shows trends in the size of the reference and spawning stocks of cod. The reference stock consists of fish four years old and older. During the past five years, reference stocks have grown from 600,000 tonnes to 760,000 in 2005.

Cod catch per unit effort by fishing gear

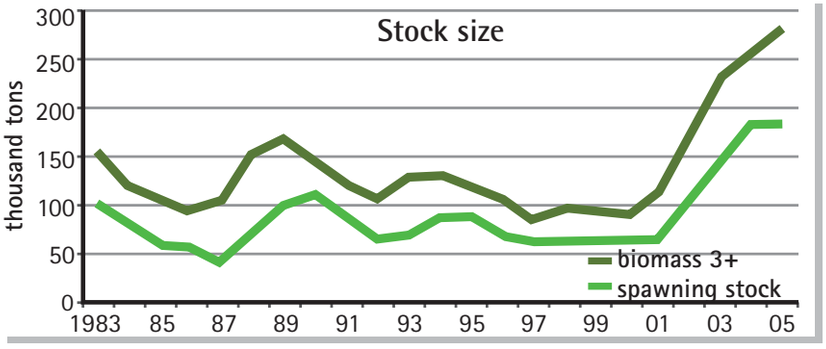


Fishing vessels' catch provides a certain measure of developments in fish stocks. Increased catch based on unchanged fishing efforts indicates that stocks are growing, and a reduction in catch indicates that stocks are declining. The unit of measure is catch per unit effort. In 2004, the cod catch per unit effort of bottom trawling was unchanged from the prior year, while the cod catch per unit effort of net fishing declined and the catch per unit effort of line fishing increased. Cod catch per unit effort of bottom trawling has increased since 2000, while the catch per unit effort of net fishing has declined steadily since 1997.

Haddock

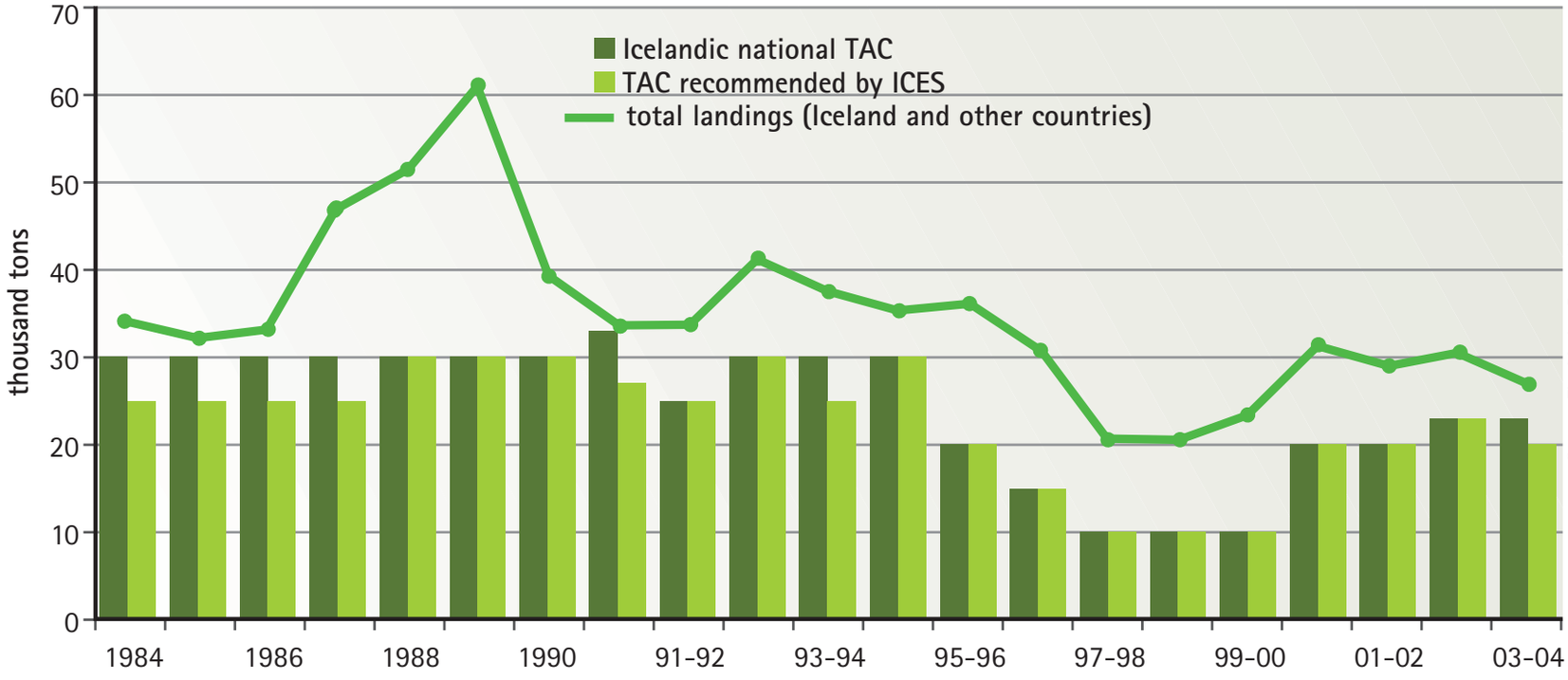


Source: The Marine Research Institute



This graph shows the Marine Research Institute's recommendations for catch quota and total allowable catch (TAC) as determined by the government and landings. For the most part, landings have followed Institute recommendations rather closely. The smaller graph illustrates trends in the reference stock and spawning stocks for haddock. The reference stock consists of fish that are three years old and older. In 2000, reference and spawning stocks were at a minimum, or 89,000 and 61,000 tonnes respectively. Because of successful recruitment, both stocks have grown rapidly since that time.

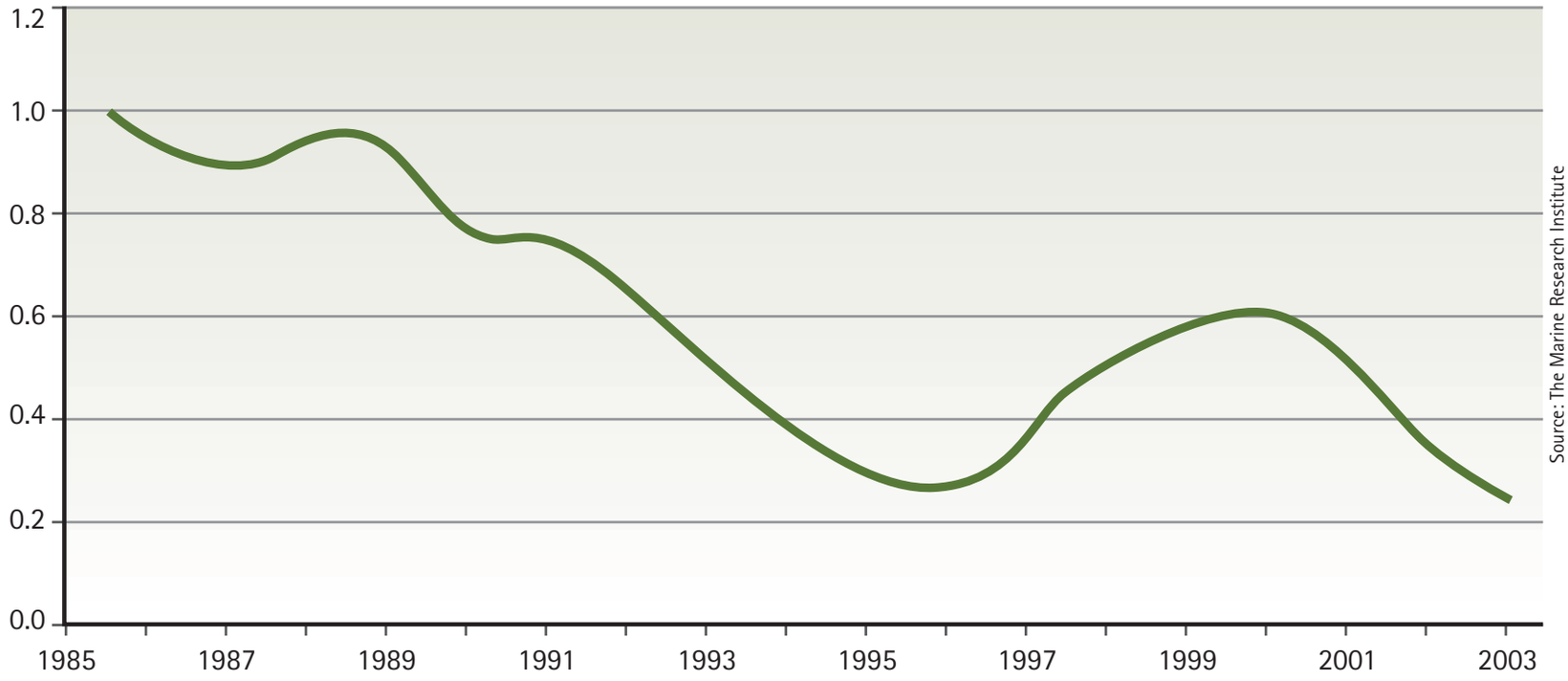
Greenland halibut



Source: The Marine Research Institute

The graph shows the International Council for the Exploration of the Sea's (ICES) recommendations for total allowable catch and Iceland's total allowable catch (TAC) as determined by the government, as well as total landings. In 2004 the Marine Research Institute and ICES recommended that the total catch in the seas around Eastern Greenland, Iceland, and the Faeroe Islands should not exceed 15,000 tonnes in the year 2005. Based on Iceland's allocated catch quota and recent catch levels in the seas surrounding the Faeroe Islands and Eastern Greenland, the total catch can however be expected to reach approximately 25,000 tonnes in 2005. "There is no international agreement on the exploitation of the stocks, and the total catch has been in excess of recommended limits for many years. If the situation remains unchanged, it is likely that the fishing of the stocks will exceed its yield potential" (Marine Research Institute, Fjölrit no. 121:43).

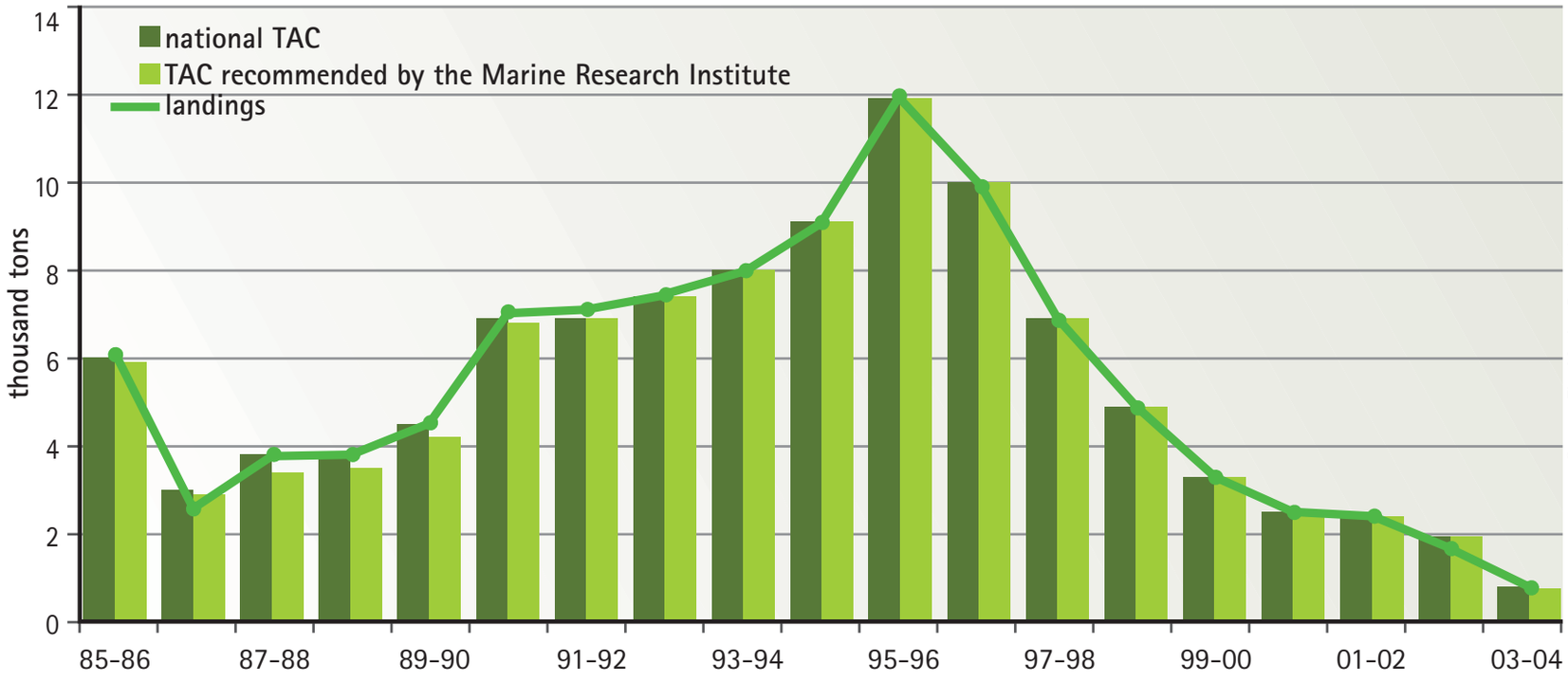
Greenland halibut catch per unit effort



Source: The Marine Research Institute

Fishing vessels' catch provides a certain measure of developments in fish stocks. Increased catch based on unchanged fishing efforts indicates that stocks are growing, and a reduction in catch indicates that stocks are declining. The unit of measure is catch per unit effort. The Icelandic trawler fleet's halibut catch per unit effort was rather stable during the period 1985–1989 but then dropped year by year, reaching a low point in 1995–1997. During those three years, catch per unit effort was less than 30% of the average for the 1985–1989 period. Catch per unit effort doubled in 1998–2001 but then dropped again, reaching an historical low in 2004, when the catch was only 25% of 1985 levels. Since 1999, fishing efforts have tripled.

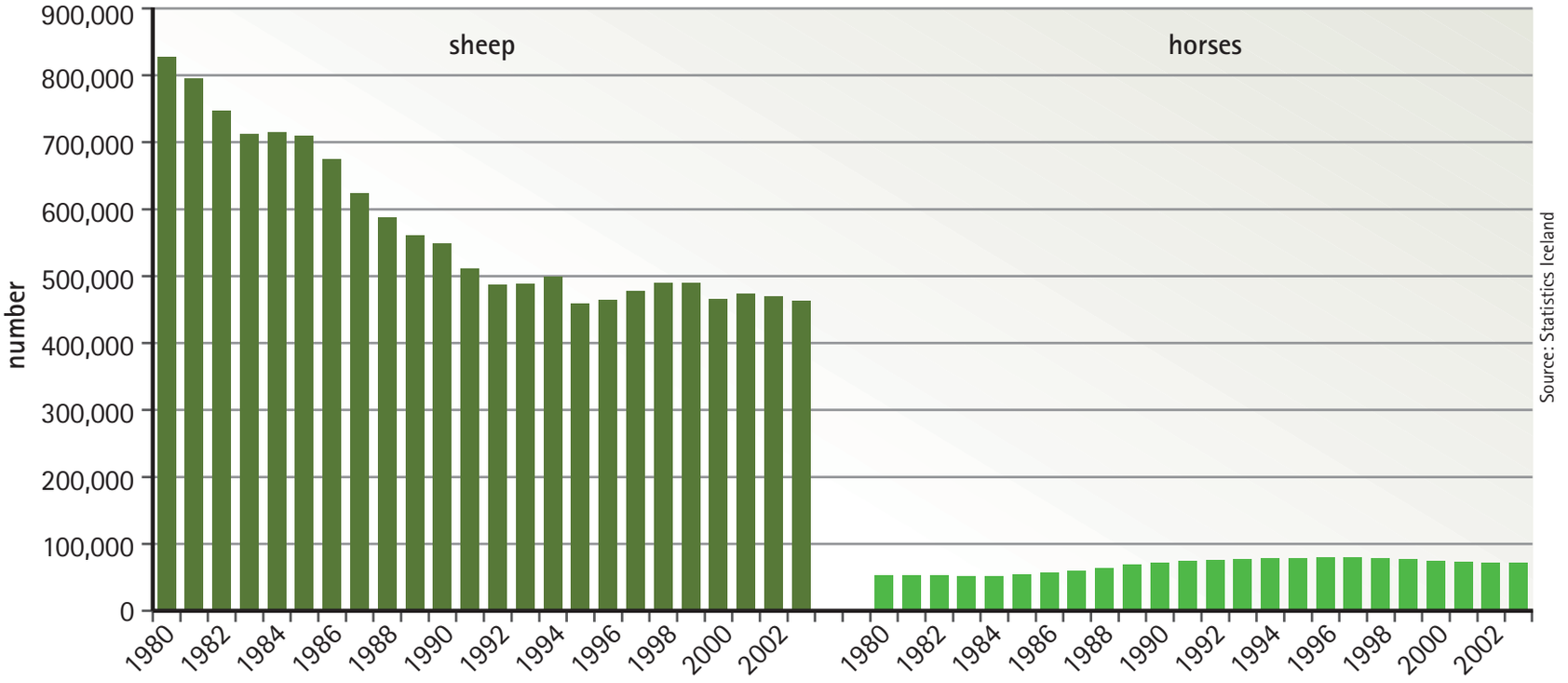
Shrimp in shallow waters



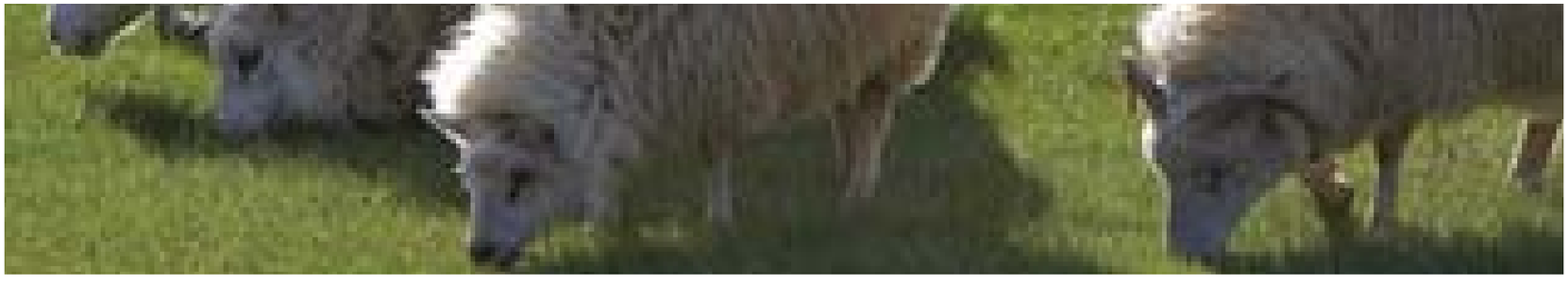
Source: The Marine Research Institute

This graph shows the Marine Research Institute's recommendations for catch quota and total allowable catch (TAC) as determined by the government and landings. Shrimp catches in shallow waters dropped from over 2,000 tonnes in 2001–2002 to below 1,000 tonnes in 2003–2004. It can be expected that shrimp fishing in the shallow waters north of Iceland will continue at minimum levels or will even cease. Significant cod and haddock migration in Húnaflói bay, Skagafjörður fjord, Skjálfandi river, and Öxarfjörður fjord in recent years has affected the size of the shrimp stocks in those waters. No shrimp fishing was carried out in the waters north of Iceland in the 2003–2004 and 2004–2005 seasons. Cod and haddock migration has also increased greatly in Ísafjarðardjúp fjord during the past three years, and shrimp stocks have diminished substantially. No fishing was carried out in the fjord in the 2003–2004 and 2004–2005 seasons.

Total number of sheep and horses



Grazing is one of the factors that influence the condition of the land. Heavy grazing compromises land quality, and it can take a long time to return heavily grazed land to satisfactory condition. In Iceland there is a need to keep track of the grazing activity of sheep and horses. Since 1977, the sheep population has diminished from its maximum of 900,000 to less than 500,000 animals in 2003. This reduction in the number of sheep has dramatically reduced the grazing-induced strain all over the country. During the same period, the number of horses in Iceland has grown, though the horse population, at less than 100,000 animals, is far smaller than the sheep population. On the other hand, horses can easily affect land quality because of their body weight and because of how much and how close to the root they bite.



SUSTAINABLE USE OF VEGETATION AND RECLAMATION OF LAND

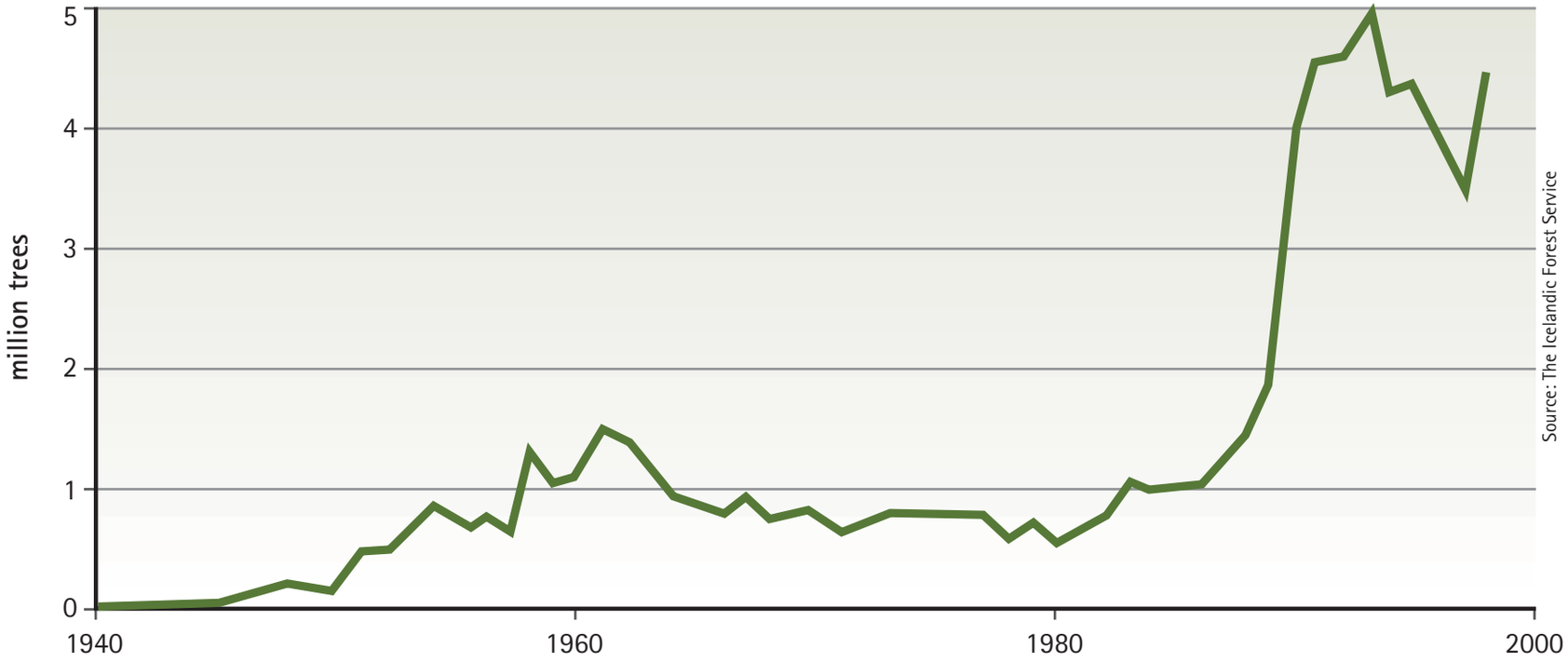
Recorded afforestation 1990–2003

Source: The Icelandic Forest Service

The map shows the location
but not the actual size of the areas

Afforestation in Iceland centres largely on the planting of new forests, which entails the cultivation of trees on land that has been without forests for decades or even centuries. Forested land in Iceland has been classified into three main categories: new forests planted before 1990, which are estimated at some 6,600 hectares with an average plant age of 35 years; new forests planted since 1990, which cover an estimated 11,600 hectares and contain trees with an average age of 8 years; and natural birch woodlands and bushes, whose remnants cover approximately 120,000 hectares, or roughly 1.2% of total land area in Iceland. The map shows only new forests planted between 1990 and 2003 and indicates location rather than actual size. These forests only cover about 0.1% of the country.

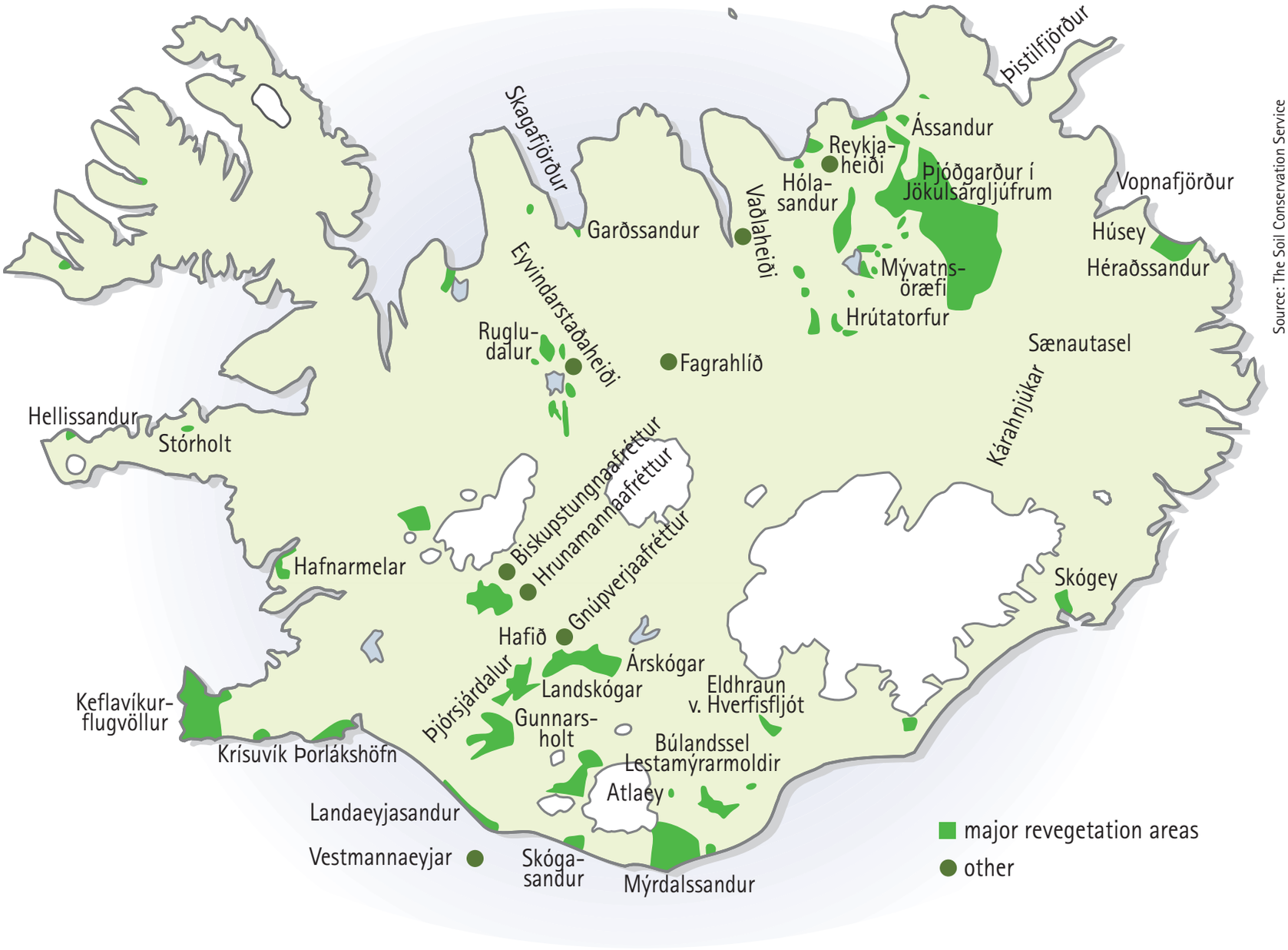
Trees planted per year



The graph shows the number of trees, in millions, that were planted in Iceland each year during the period 1940–1998. The origins of forestation efforts in Iceland can be traced to the year 1899, but it was not until 1946 that the number of trees planted per annum exceeded 100,000. Since 1980 there has been a substantial increase in the number of trees planted annually. Nearly 97 million trees have been planted since organised afforestation efforts began in Iceland. Around the middle of the 20th century, it was quite common to plant new trees in natural birch woodlands. Toward the end of the century, however, new planting moved from existing birch woodlands to non-vegetated areas, which are now the sole focus of afforestation efforts.

SUSTAINABLE USE OF VEGETATION AND RECLAMATION OF LAND

Land reclamation areas as of 2003

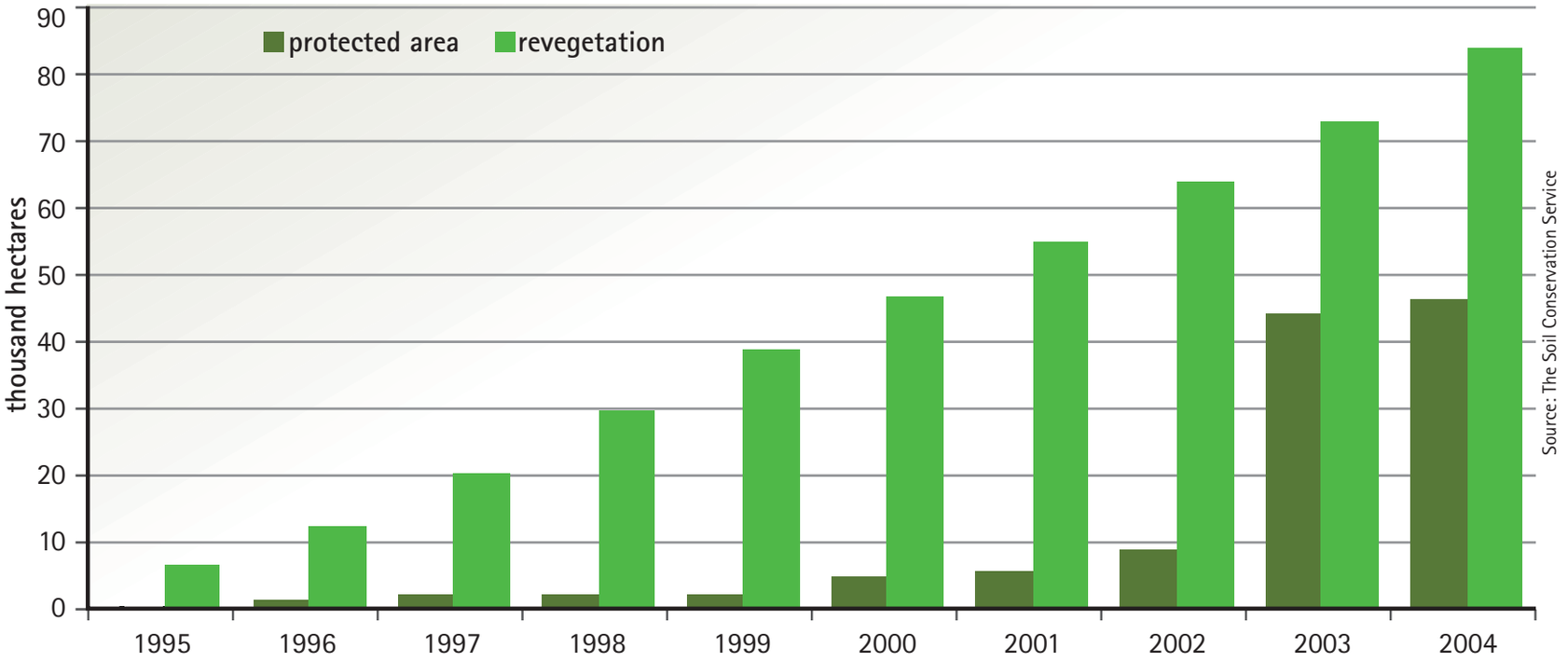


Source: The Soil Conservation Service

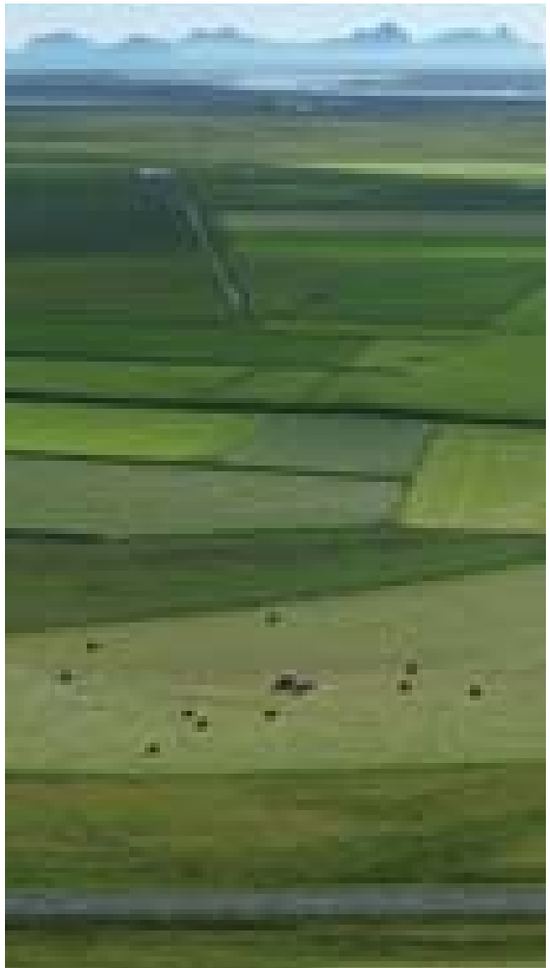
The Soil Conservation Service concentrates on reclaiming, conserving, and improving the resources contained in soil and vegetation, and on guaranteeing the sustainable utilisation of these resources. The Conservation Service is active all over the country, and its district offices play a key role. Research indicates rapid soil erosion in areas covering some 17% of the country.

SUSTAINABLE USE OF VEGETATION AND RECLAMATION OF LAND

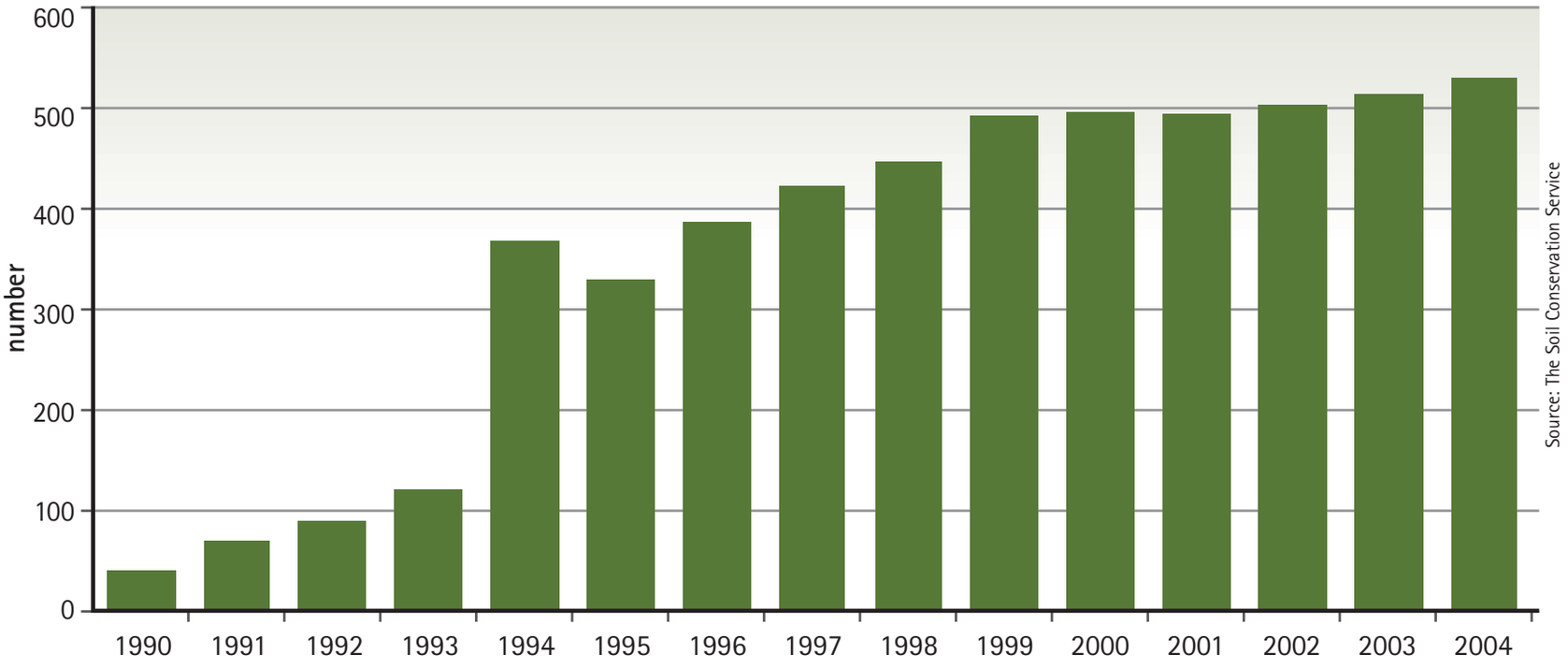
Areas protected for revegetation and land reclamation



The graph shows the total land area of revegetation zones and areas that have been protected because of land reclamation during the period from 1995 to 2004. It includes only those areas where the Soil Conservation Service is directly involved. There is a constant increase in land area that is being revegetated. The aim of land reclamation is to conserve vegetation and soil, cultivate plants in barren areas, and fortify existing flora. All of these activities also serve to bind carbon from the atmosphere in vegetation and soil. In that way increased carbon sequestration will counteract increases in greenhouse gas emissions.



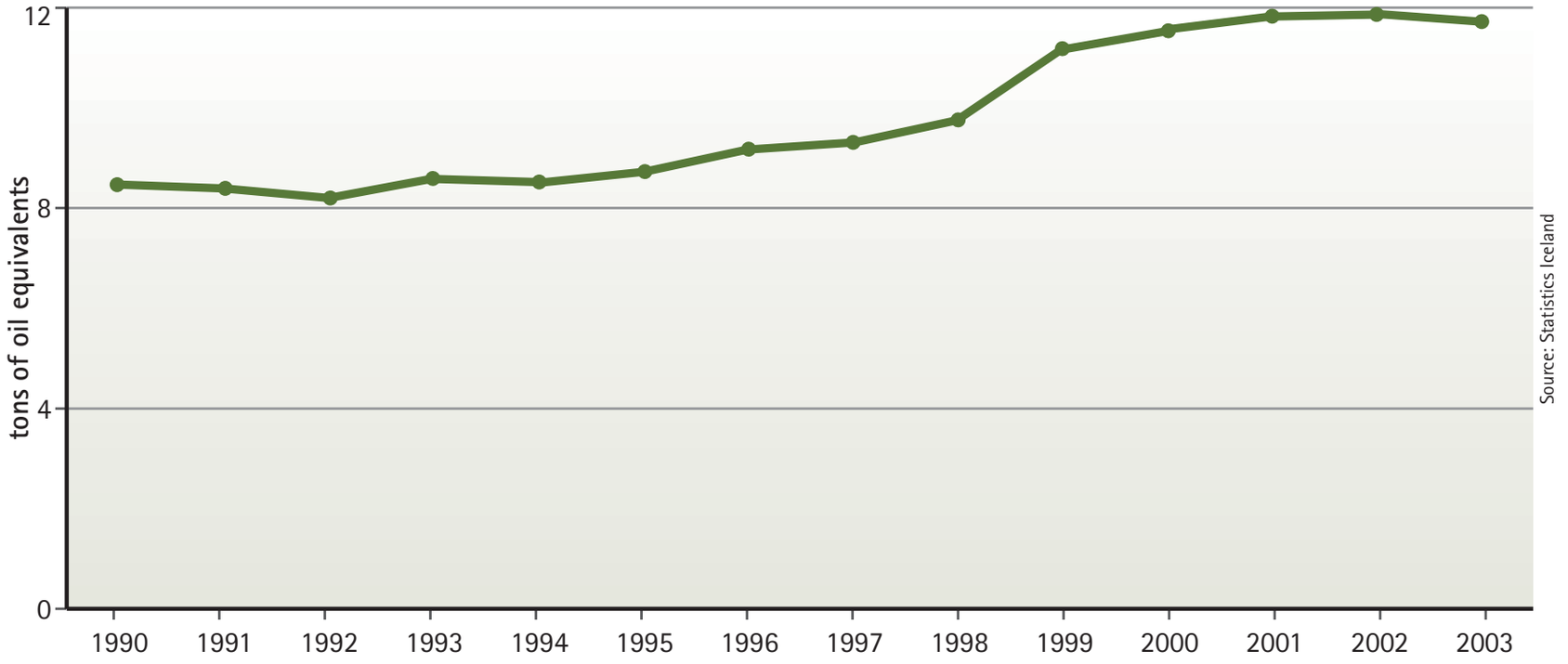
Participation in the project "Farmers revegetate the land"



The project called "Farmers revegetate the land" is a collaborative endeavour of the Soil Conservation Service and Icelandic farmers, with the aim of revegetating home fields. The objective of the project is to support farmers in their land reclamation efforts, to stop erosion, and revegetate the land. The Soil Conservation Service oversees the project, but the farmers themselves carry out planting and fertilisation. The project began in 1990 and now has over 500 participants.

INCREASED UTILISATION OF RENEWABLE ENERGY

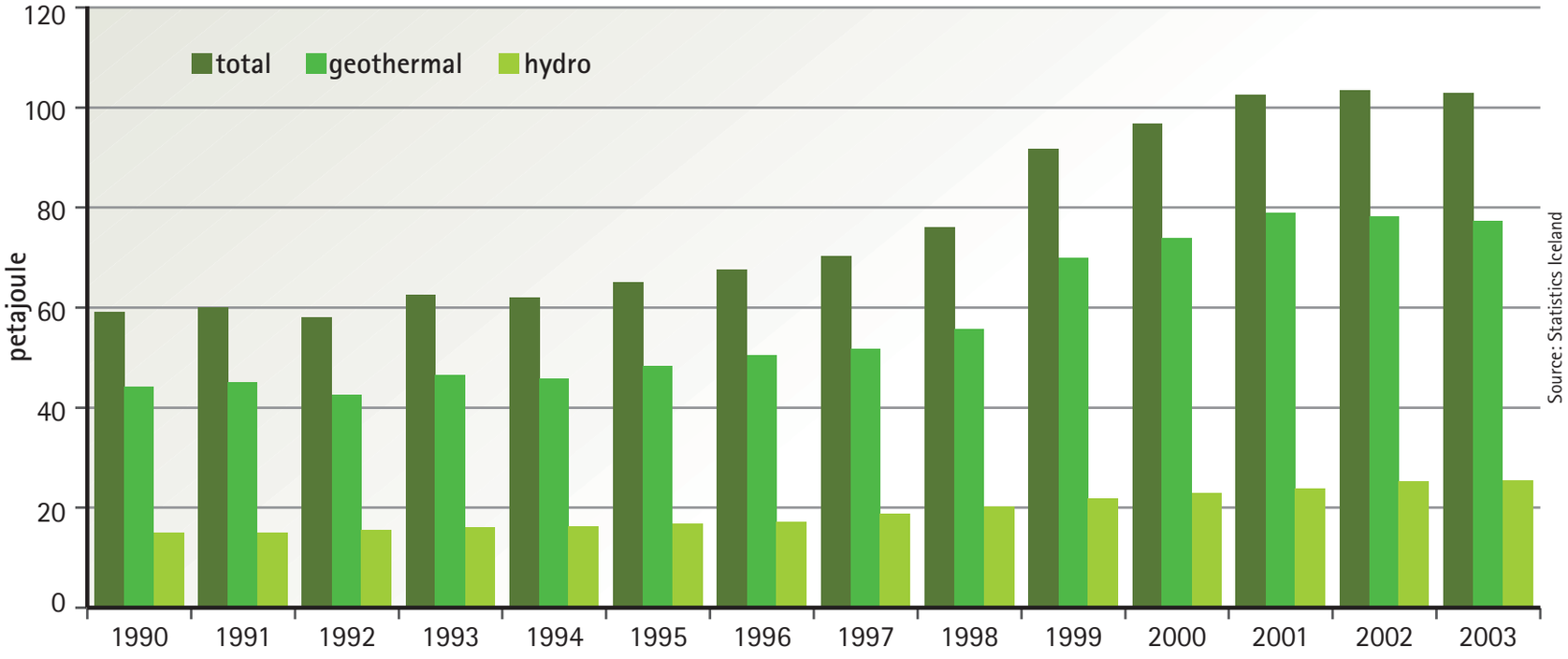
Total energy use per capita



Energy use per capita in Iceland is substantial in comparison with other nations. The cold climate and sparsely distributed population demand a great deal of energy for indoor heating and transport. In comparison with other countries, it is important to note that key economic sectors — such as fishing and heavy industry — are energy-intensive activities.

INCREASED UTILISATION OF RENEWABLE ENERGY

Use of domestic energy by source

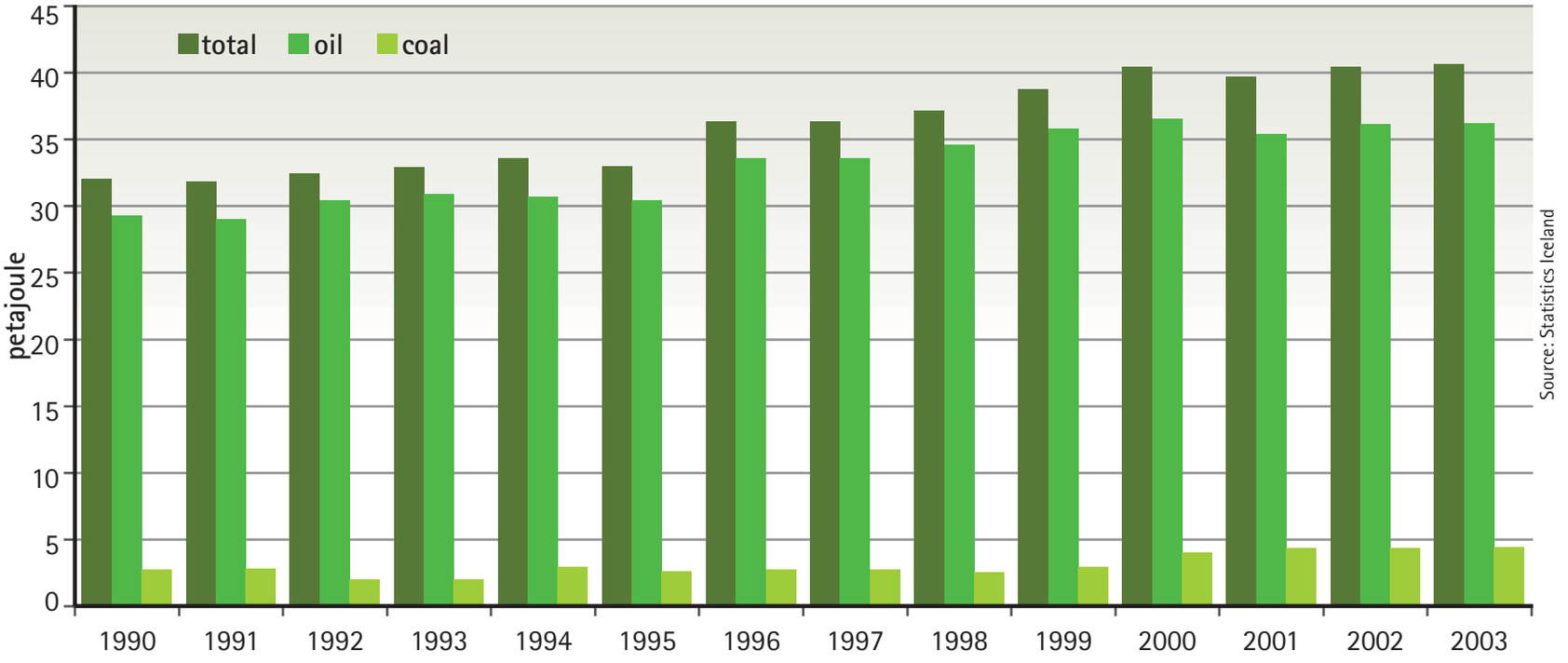


Source: Statistics Iceland

In an international context, Iceland is in a unique position when it comes to energy utilisation. Energy use per capita is among the highest in the world; but the percentage of renewable energy is much higher than elsewhere. In 2003, geothermal energy and hydropower covered over 70% of the total energy consumption in Iceland.

INCREASED UTILISATION OF RENEWABLE ENERGY

Use of imported energy by source

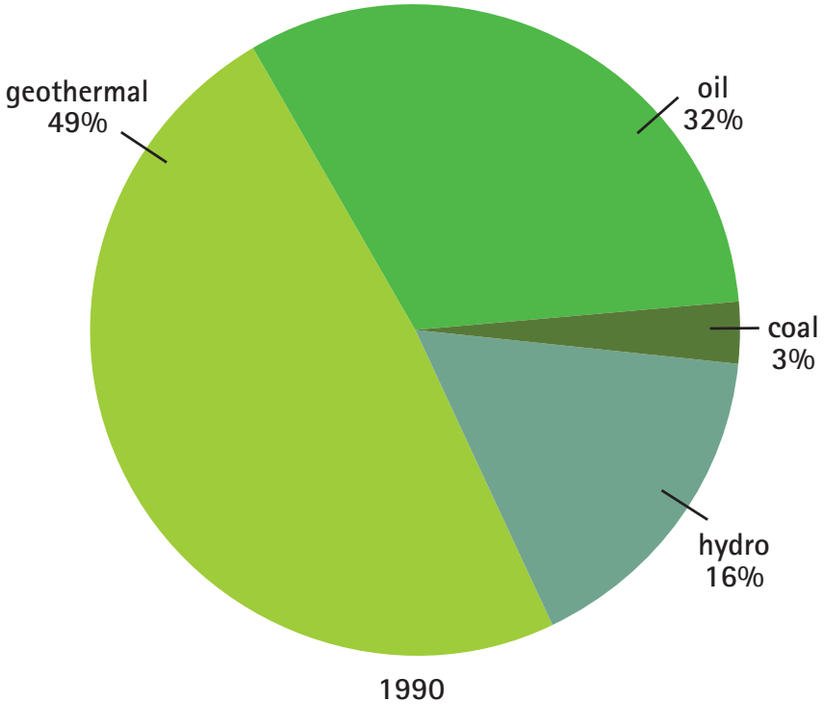


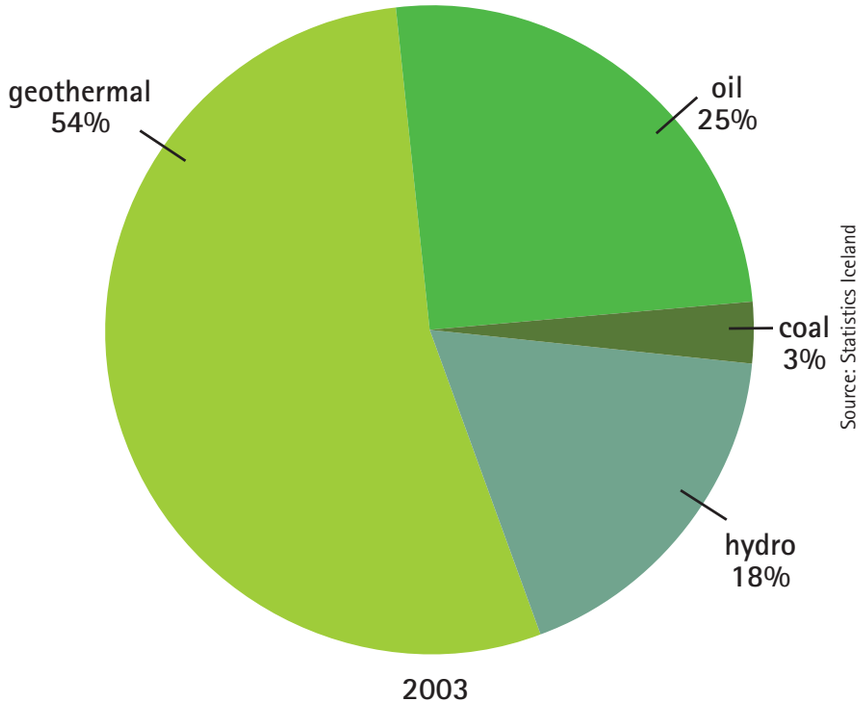
Source: Statistics Iceland

Icelanders' use of imported energy is mainly due to combustion of oil. Over 90% of oil use stems from transport and fishery activities. The graph shows that the use of imported energy has grown steadily, though that growth has slowed in recent years. The use of fossil fuels causes the emission of various pollutants into the atmosphere. The combustion of fossil fuels also generates carbon dioxide, one of the primary greenhouse gases. Increased concentrations of carbon dioxide contribute to global warming.

INCREASED UTILISATION OF RENEWABLE ENERGY

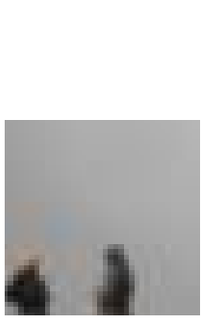
Division of total energy use by source – trends from 1990 to 2003

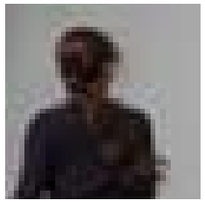




Source: Statistics Iceland

These pie charts illustrate the developments that have taken place in energy use in Iceland during the period 1990–2003. It can be seen that the proportion of renewable domestic energy has increased by 7% since 1990. During the same period, the proportion of oil consumption has fallen by a corresponding 7%, while coal consumption has remained constant.

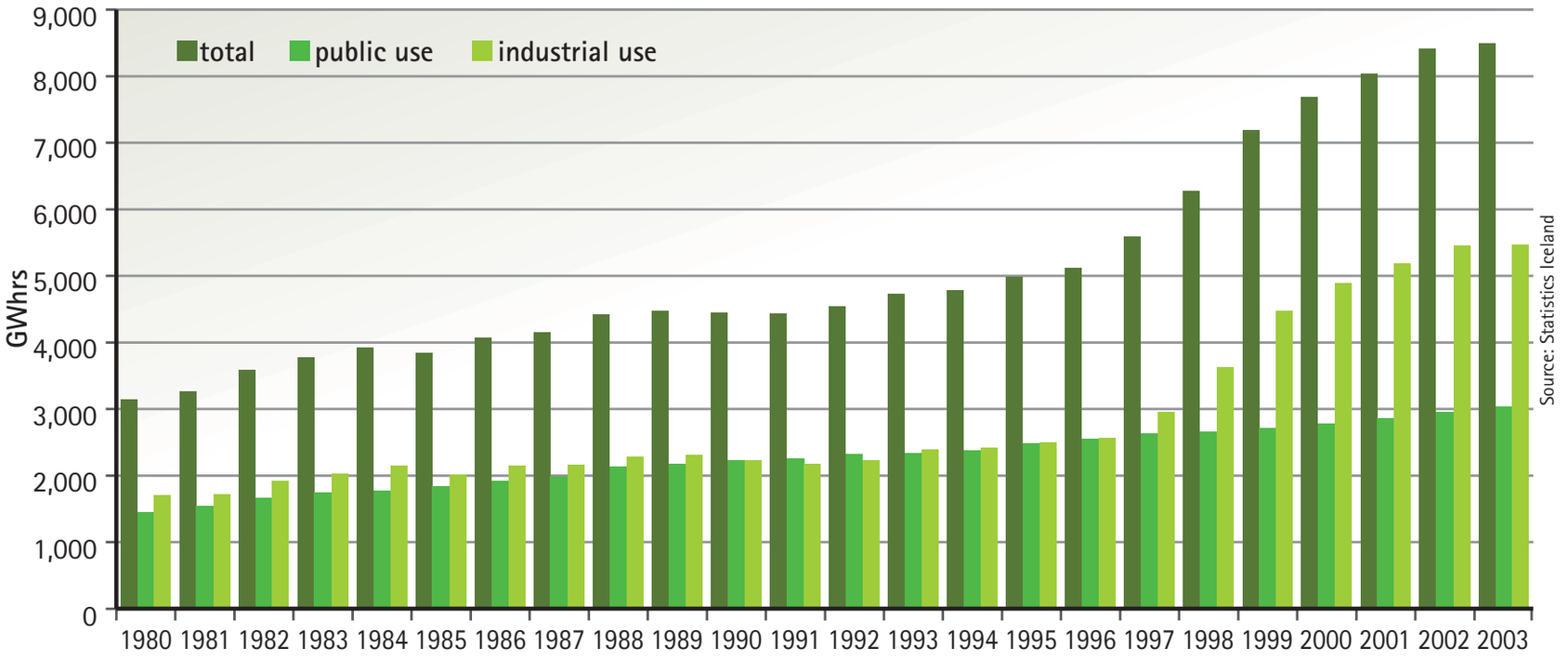






INCREASED UTILISATION OF RENEWABLE ENERGY

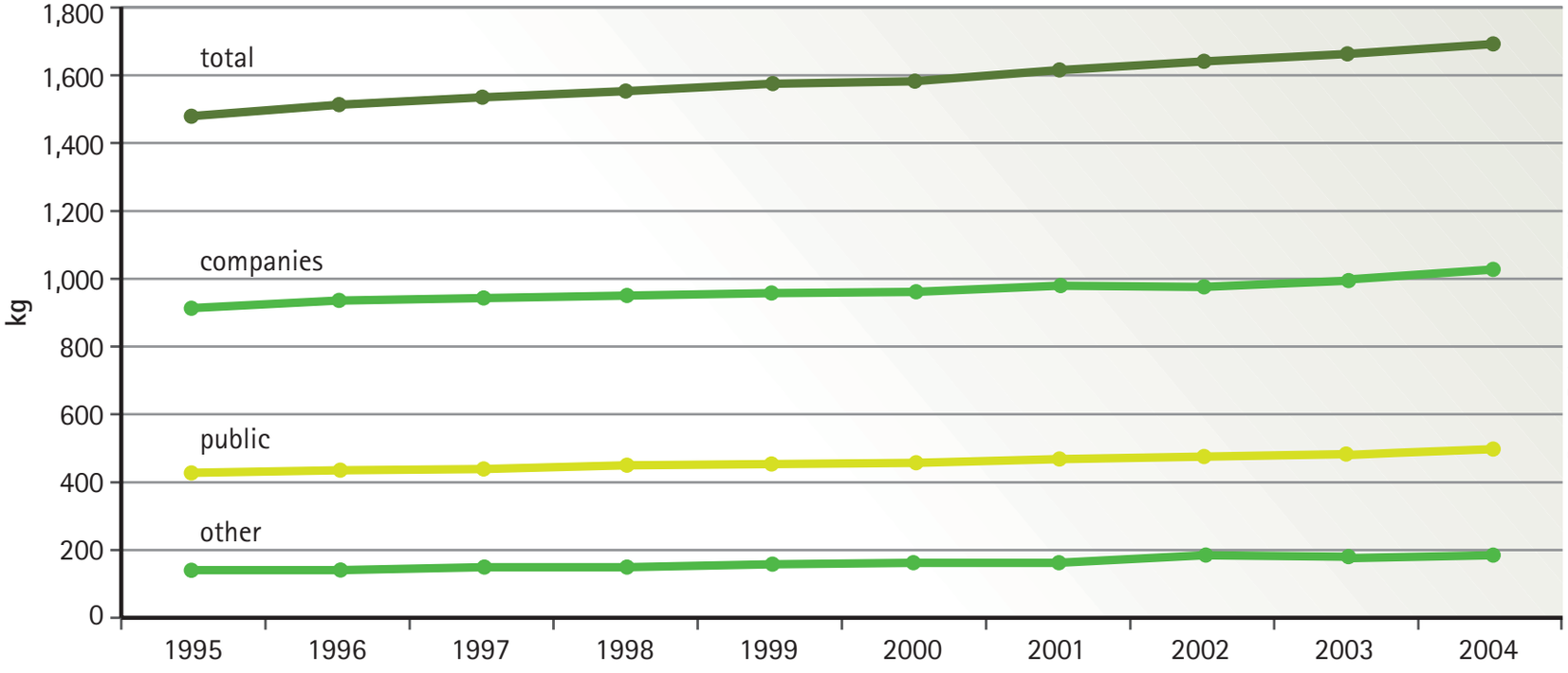
Division of electricity between industry and public use



The graph illustrates developments in the use of electricity in recent decades. It shows clearly that increased electrical energy use in recent years is largely due to increased consumption by heavy industry, not to increased public use.

REDUCTION AND IMPROVED HANDLING OF WASTE

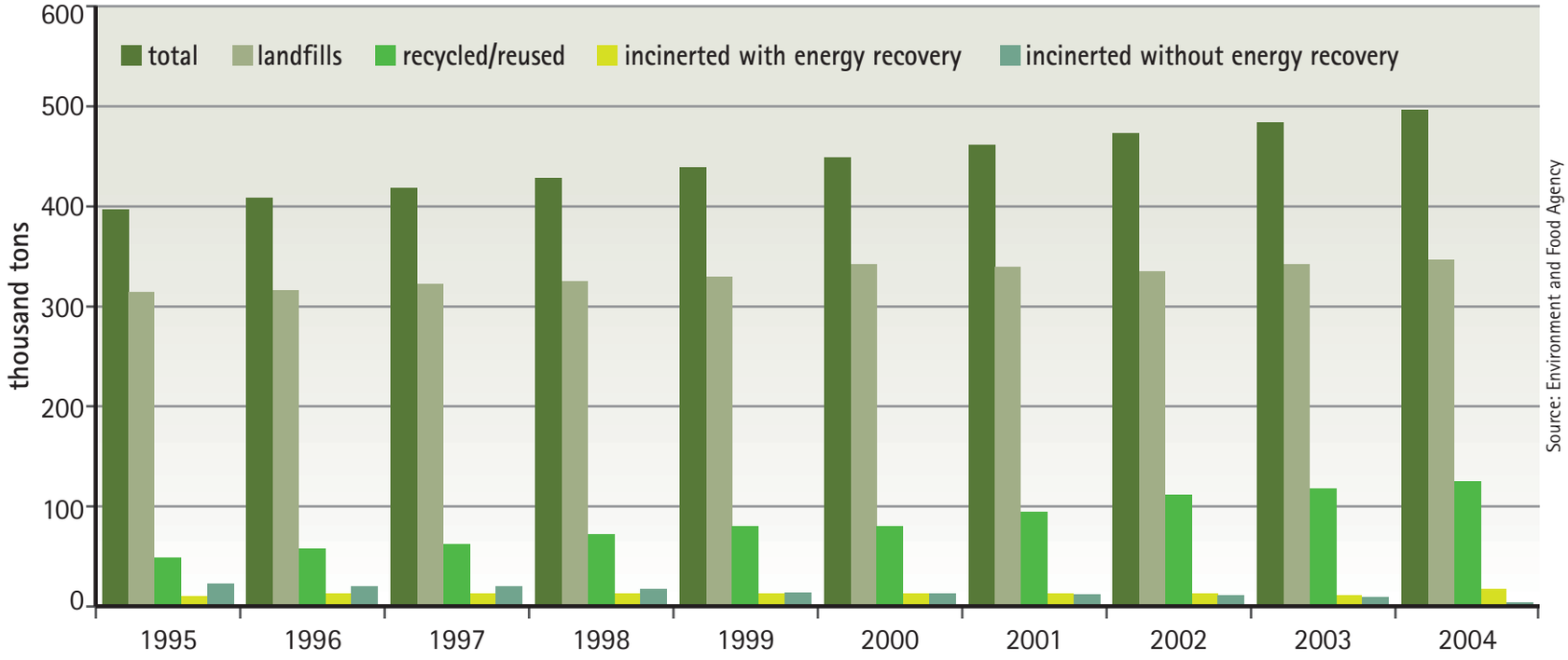
Total waste per capita



Source: Environment and Food Agency

Modern societies generate a substantial amount of waste. The amount of waste is steadily increasing in Iceland, as it is in most other countries. This calls for public measures to minimise waste and increase recycling and reuse. The Environment and Food Agency has issued a national plan for waste handling for 2004–2016. The aim of the national plan is to reduce waste generation systematically, increase recycling and reuse, and diminish the quantity of waste that is sent for permanent disposal.

Waste treatment and disposal

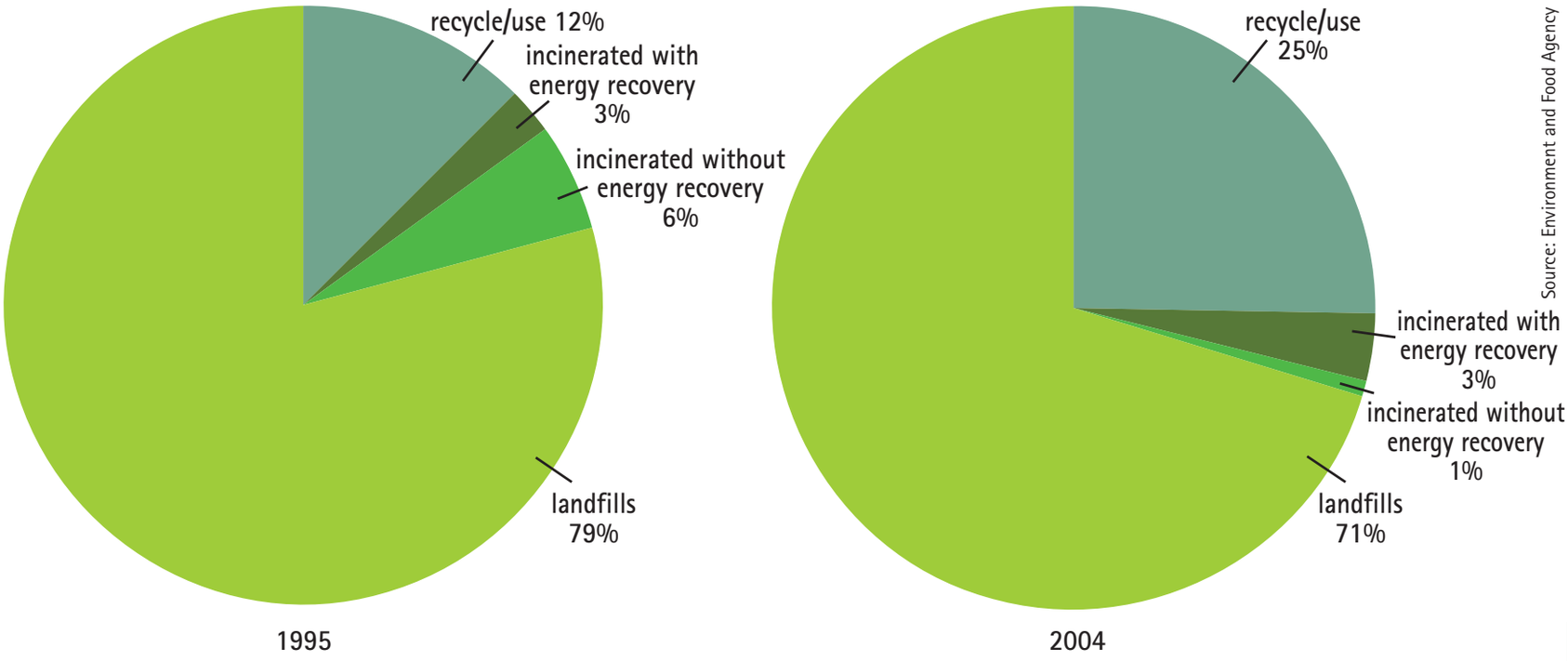


Source: Environment and Food Agency

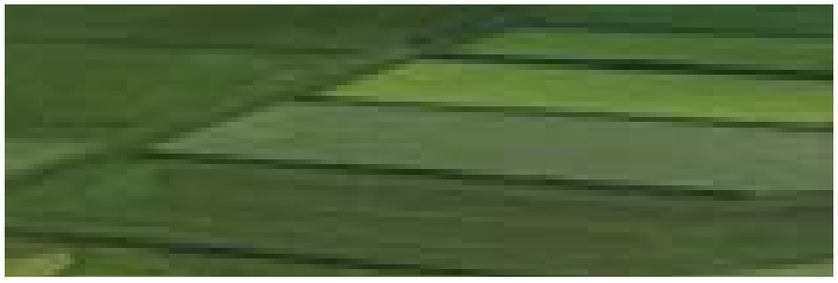
The total quantity of waste does not tell the entire story. It matters greatly to what extent waste is recycled and how it is handled. At present, the vast majority of waste in Iceland is placed in landfills, but the percentage of recycled waste is increasing, and the percentage of waste that is incinerated has dropped correspondingly. Though the total amount of waste placed in landfills has not dropped, the past several years have seen substantial improvements in landfill management.

REDUCTION AND IMPROVED HANDLING OF WASTE

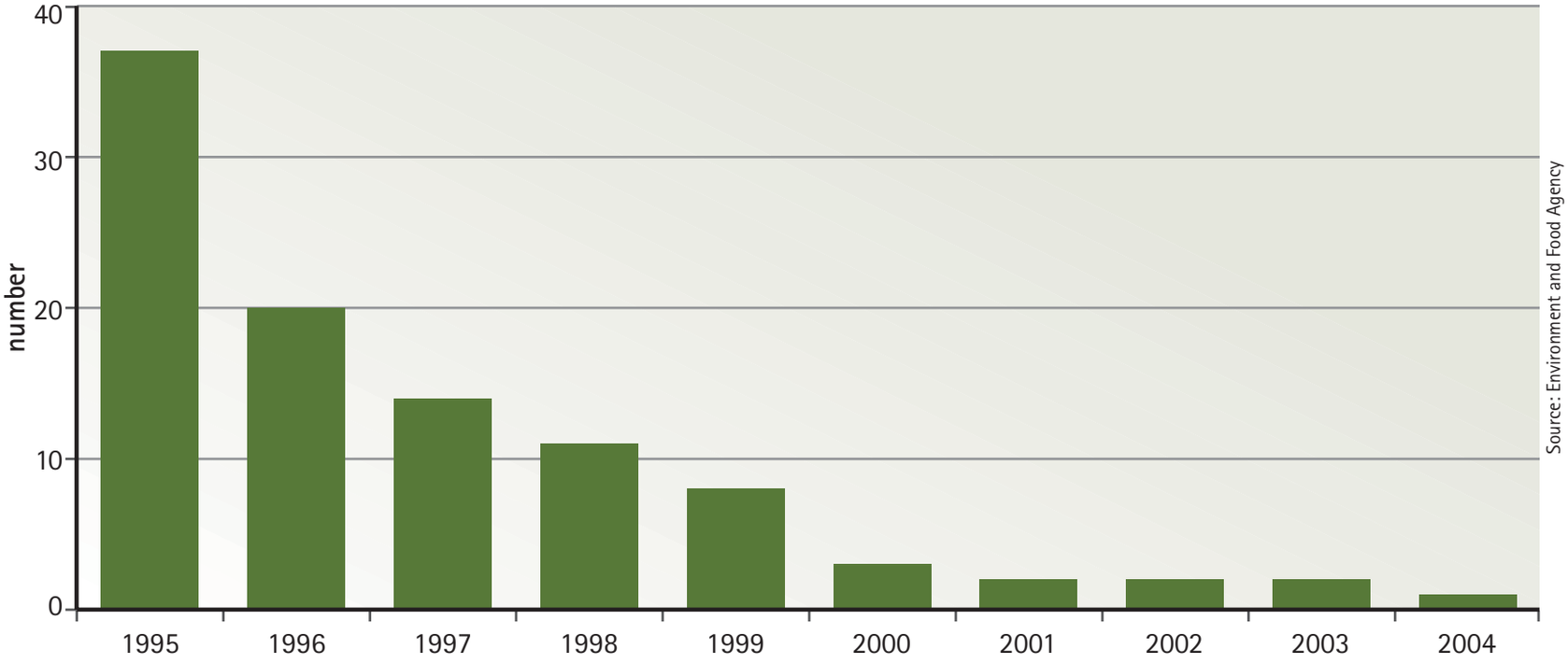
Waste treatment and disposal – trends from 1995 to 2004



The pie charts illustrate the developments that have taken place in waste treatment and disposal in Iceland in the past 10 years. It can be seen that the percentage of recycling and composting has more than doubled during this period, with the result that roughly one-fourth of the waste in Iceland is now recycled. During the same period, the percentage of waste buried in landfills has dropped by 8%.



Number of locations using open-pit burning



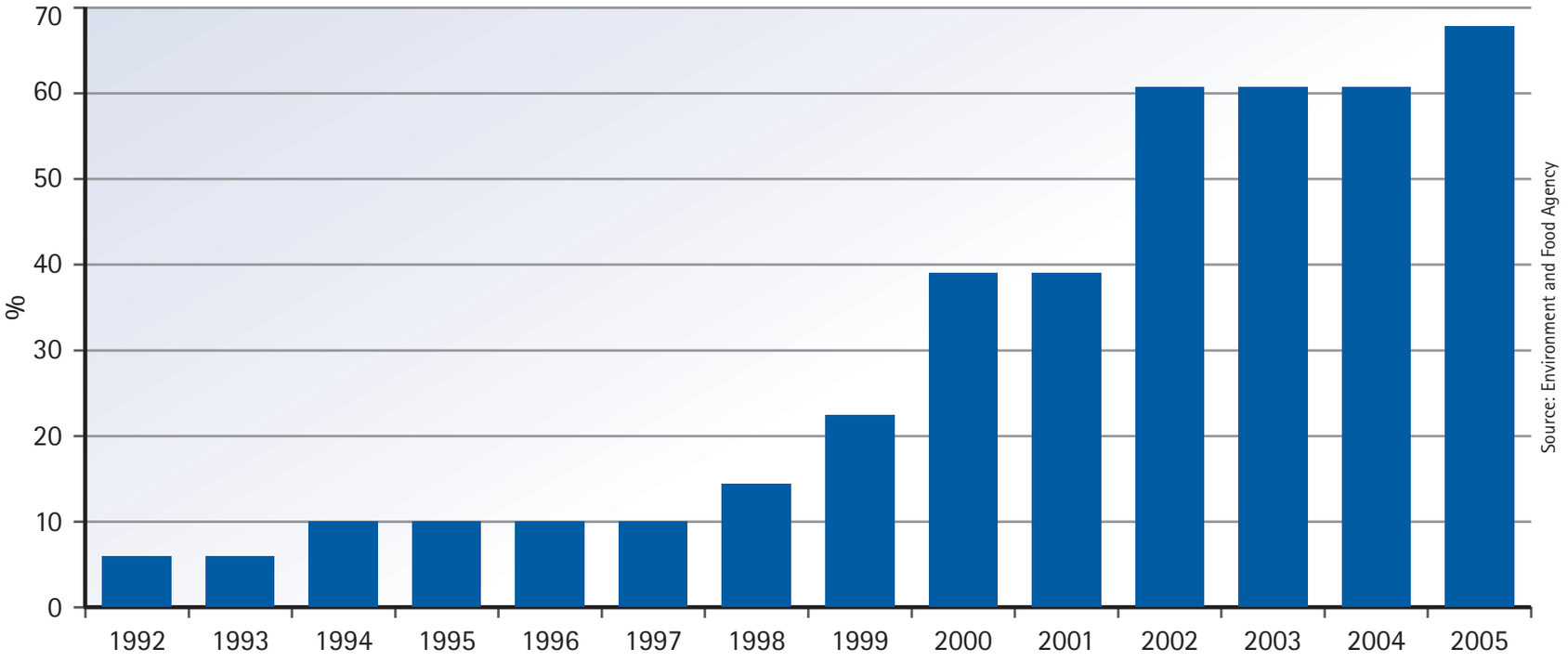
Source: Environment and Food Agency

Over the past decade, work has been done toward closing locations that burn waste in open pits. At present there is only one such location in operation in the country. When waste is incinerated in an open fire, air flow and temperature are not monitored, and the heat distribution in the waste is uneven. Under these conditions, organic compounds are not fully converted to carbon dioxide, as is the case with complete combustion. Instead, the process generates combustion residue, soot, and half-combusted organic compounds. Dioxins and furans are examples of organic substances that can be generated by open-pit burning. They are extremely hazardous to the environment and to human health.

GLOBAL ISSUES

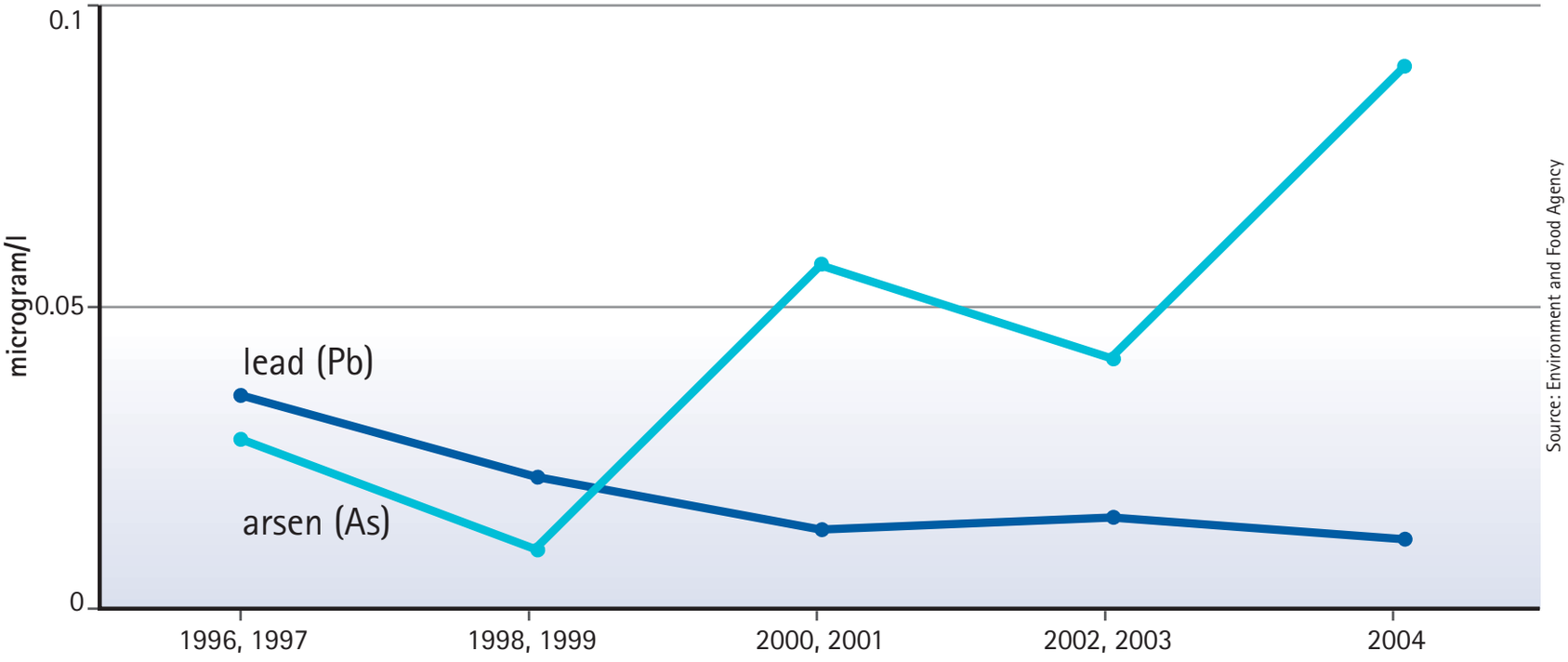
CLEAN OCEAN

Percentage of inhabitants with waste water treatment



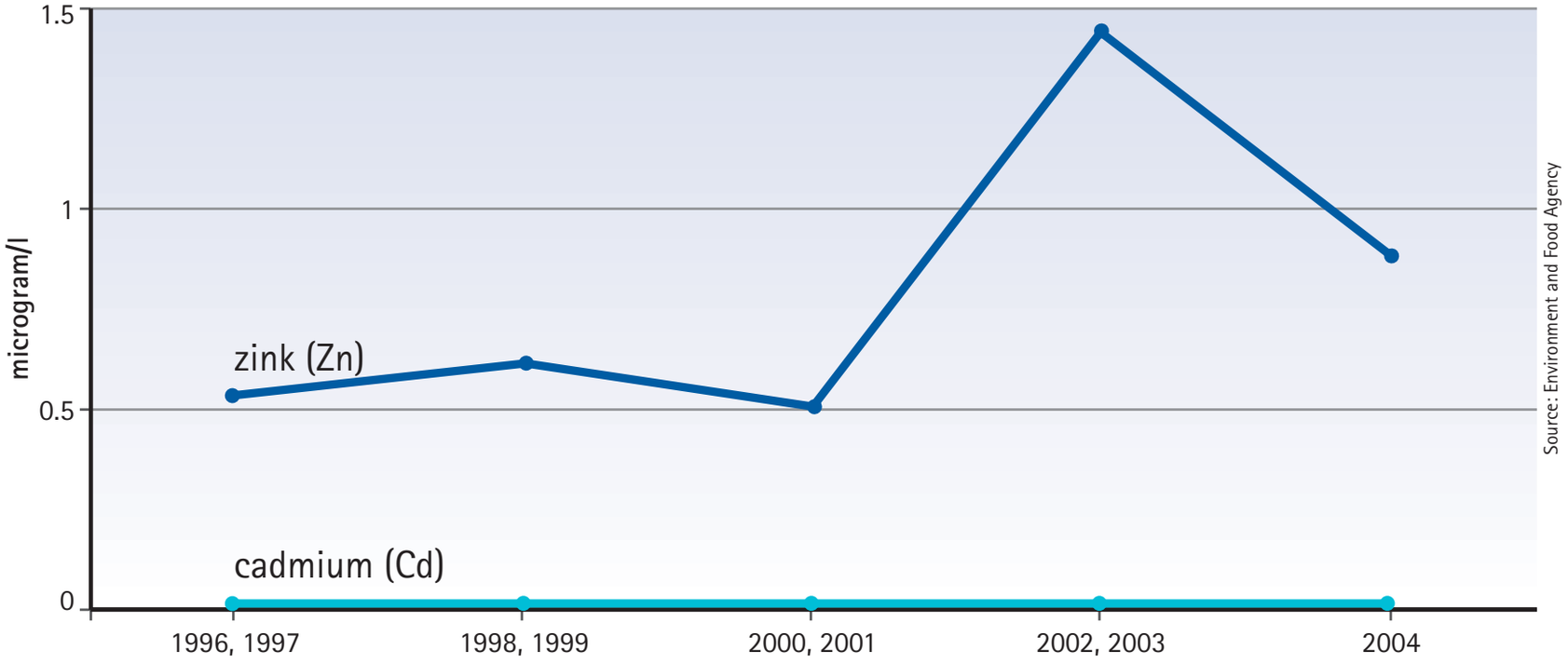
Pollution due to unsatisfactory treatment of waste water is one factor that can threaten to pollute the ocean. The Act on Hygiene and Pollution Control, no. 7/1998, and the Regulation on Drainage and Waste, no. 798/1999, provide for the treatment of waste water in densely populated areas and set specific time limits for such treatment. As the bar graph shows, progress is being made in these matters. The proportion of inhabitants living in areas with waste water treatment has increased rapidly in recent years, from 10% in 1997 to almost 70% in 2005.

Concentration of arsen and lead in Ölfusá river



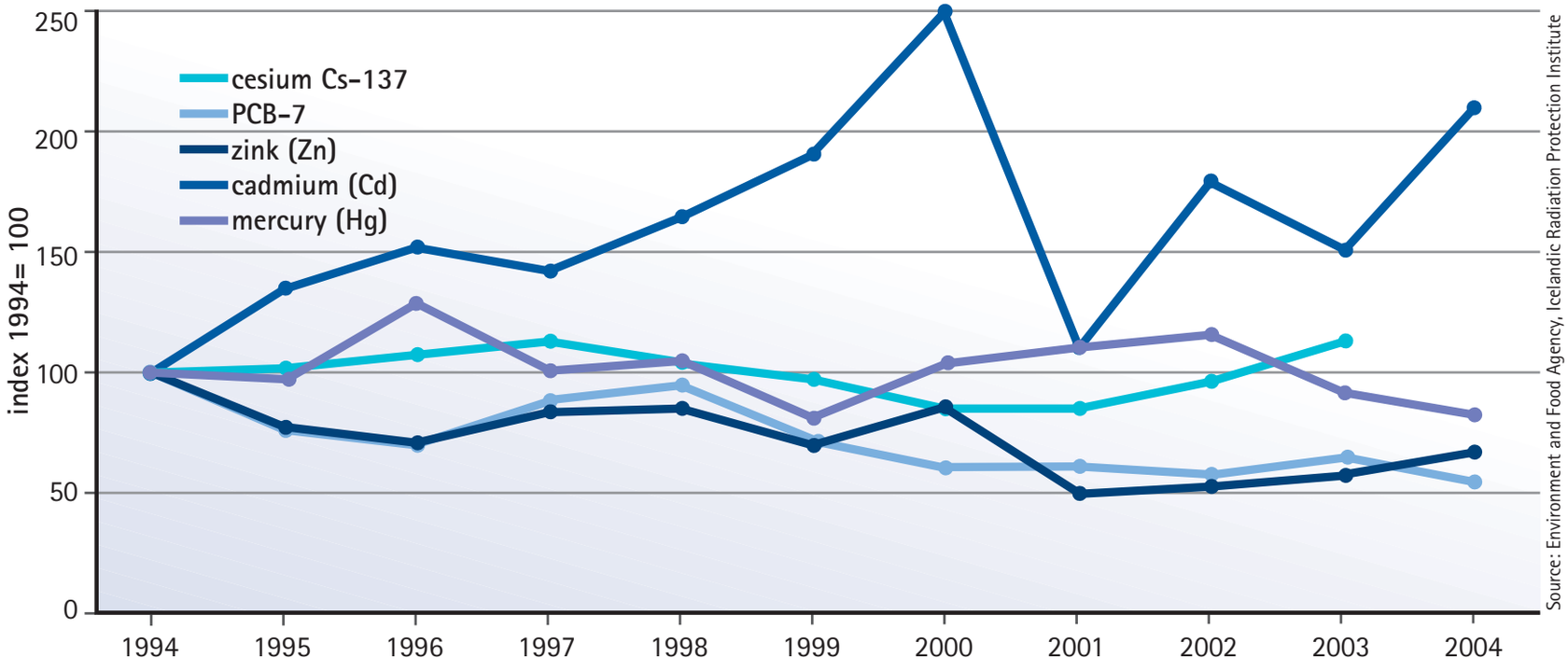
The graph shows the concentration of arsenic and lead in the Ölfusá river near the town of Selfoss. Arsen and lead are natural trace elements that can be found in rivers. It is thought that arsen poses little threat to marine biota in concentrations below 5 micrograms per litre, but the reference limit for drinking water is 50 micrograms per litre. Lead is considered to pose little threat to marine biota in concentrations below 1 microgram per litre. The concentration of arsen has increased in recent years. The concentration of both arsen and lead is low in the Ölfusá river and remains well below the applicable reference limits.

Concentration of zinc and cadmium in Ölfusá river



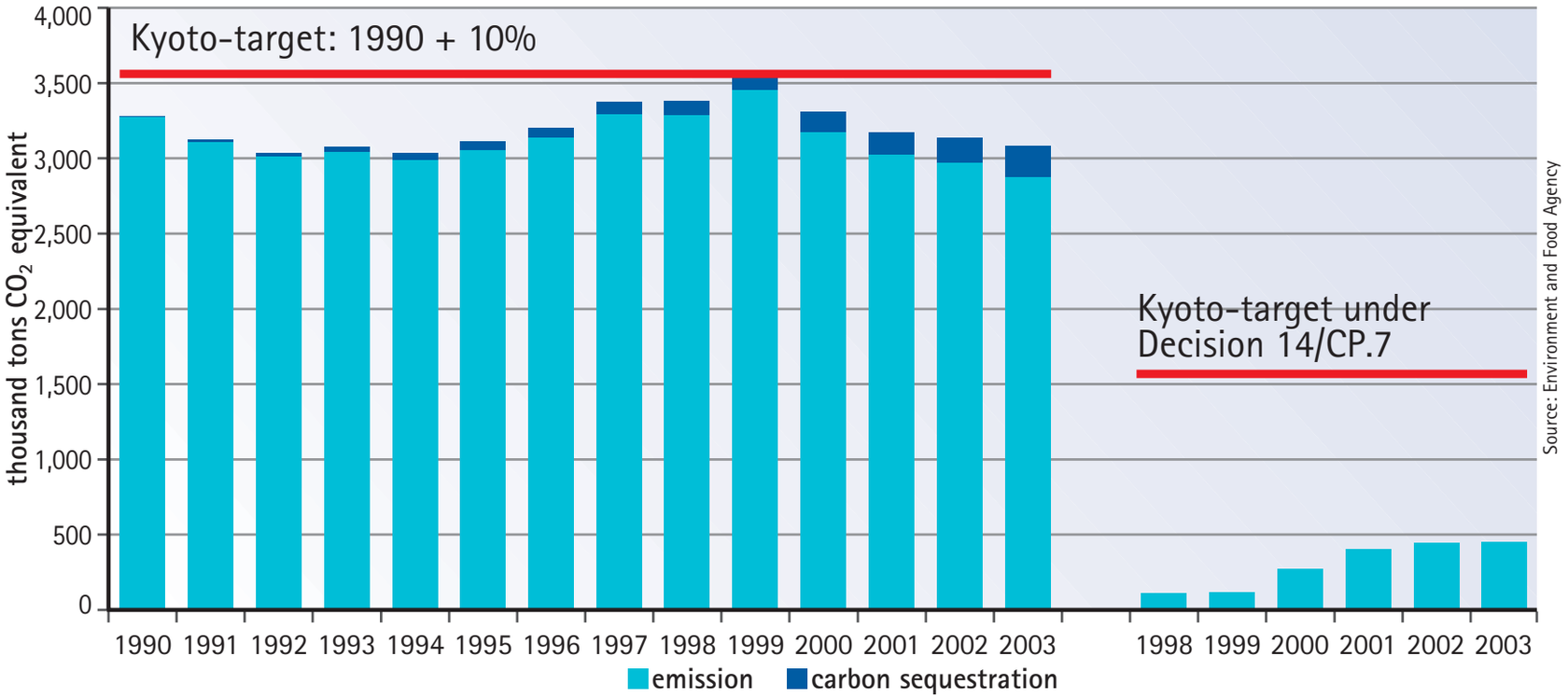
The graph shows the concentration of zinc and cadmium in the Ölfusá river near the town of Selfoss. Zinc and cadmium are natural trace elements that can be found in rivers. Zinc is considered to pose little threat to marine biota in concentrations below 20 micrograms per litre. The same applies to cadmium if its concentration is less than 0.1 microgram per litre. The concentration of zinc has increased in recent years. The concentration of both zinc and cadmium is low in the Ölfusá river and remains well below the applicable reference limits.

Persistent organic pollutants, radioactive materials, and heavy metals in cod in Icelandic waters

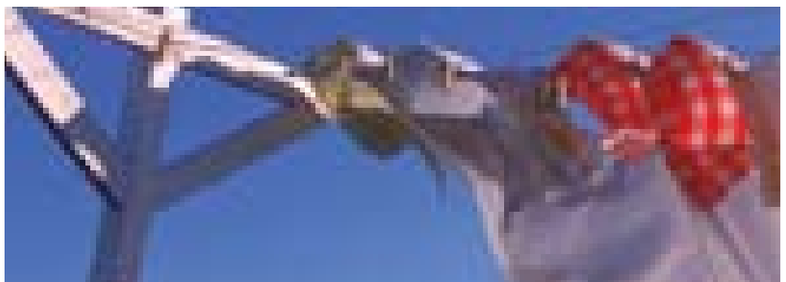


Persistent organic pollutants, heavy metals, and radioactive materials are the three categories of substances that are considered most hazardous with respect to pollution of the oceans. This graph gives examples of substances from each of these three categories, as well as changes in their concentration in cod found in Icelandic waters. PCB-7 is a persistent organic pollutant; mercury, zinc, and cadmium are heavy metals, and Cs-137 is radioactive. Measurements indicate that concentration of PCB-7 and zinc have dropped, while the concentration of cadmium has increased somewhat. It is not possible to conclude, based on these data, that the concentration of mercury and Cs-137 is on the rise in Icelandic waters. It should be emphasised that the current concentration of these substances is far below the reference limits indicating hazardous levels.

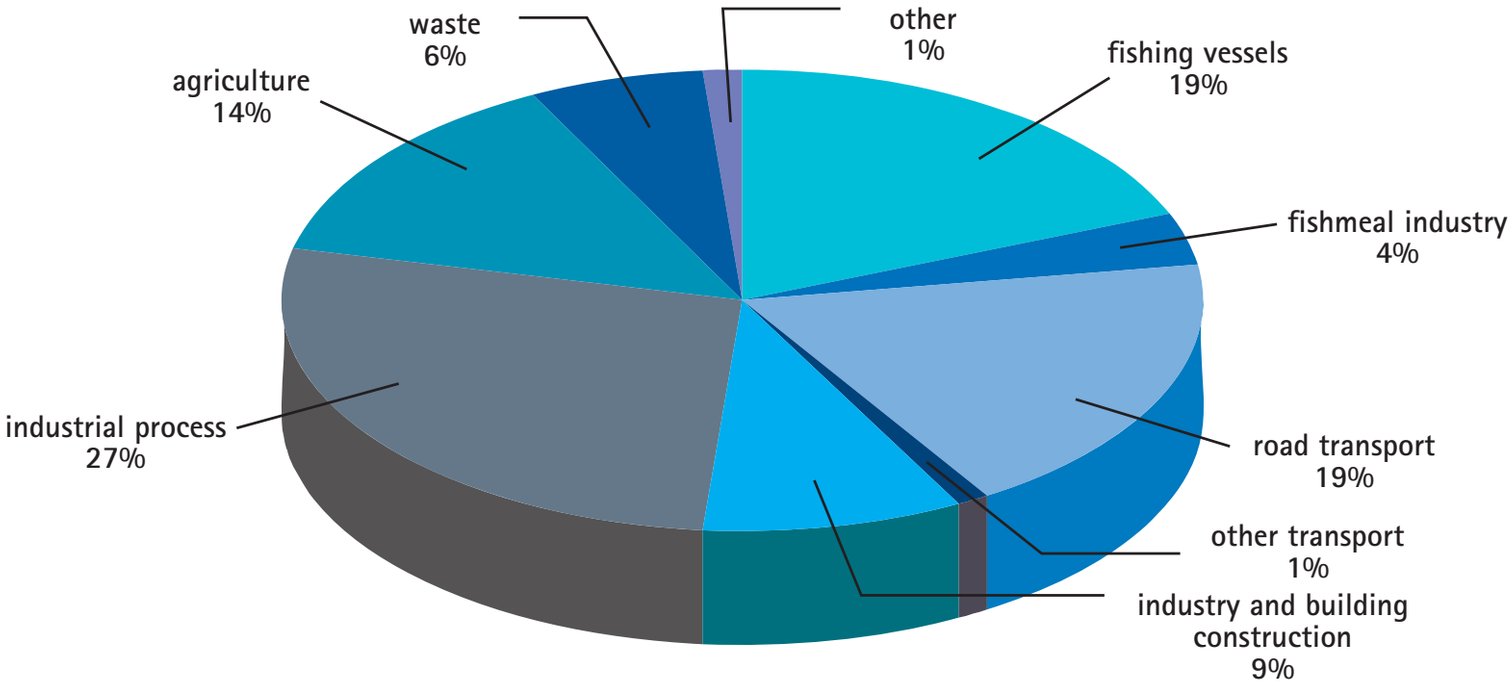
Greenhouse gas emissions in Iceland



In the year 2003, greenhouse gas (GHG) emissions in Iceland where just over 3.5 million tonnes. Iceland has a twofold obligation under the Kyoto Protocol of the UN Framework Convention on Climate Change. First, GHG emissions from Iceland shall not increase by more than 10% over 1990 levels. Second, emissions of carbon dioxide from new industrial plants is to be excluded from the 10% increase, but no more than 1.6 million tonnes. If the situation is assessed in view of the provisions of the Kyoto Protocol, it is clear that GHG emissions, based on Iceland's general emissions allocations, have dropped by 6% from 1990 levels. The Kyoto Protocol also allows for the deduction of carbon sequestration in vegetation from total GHG emissions.



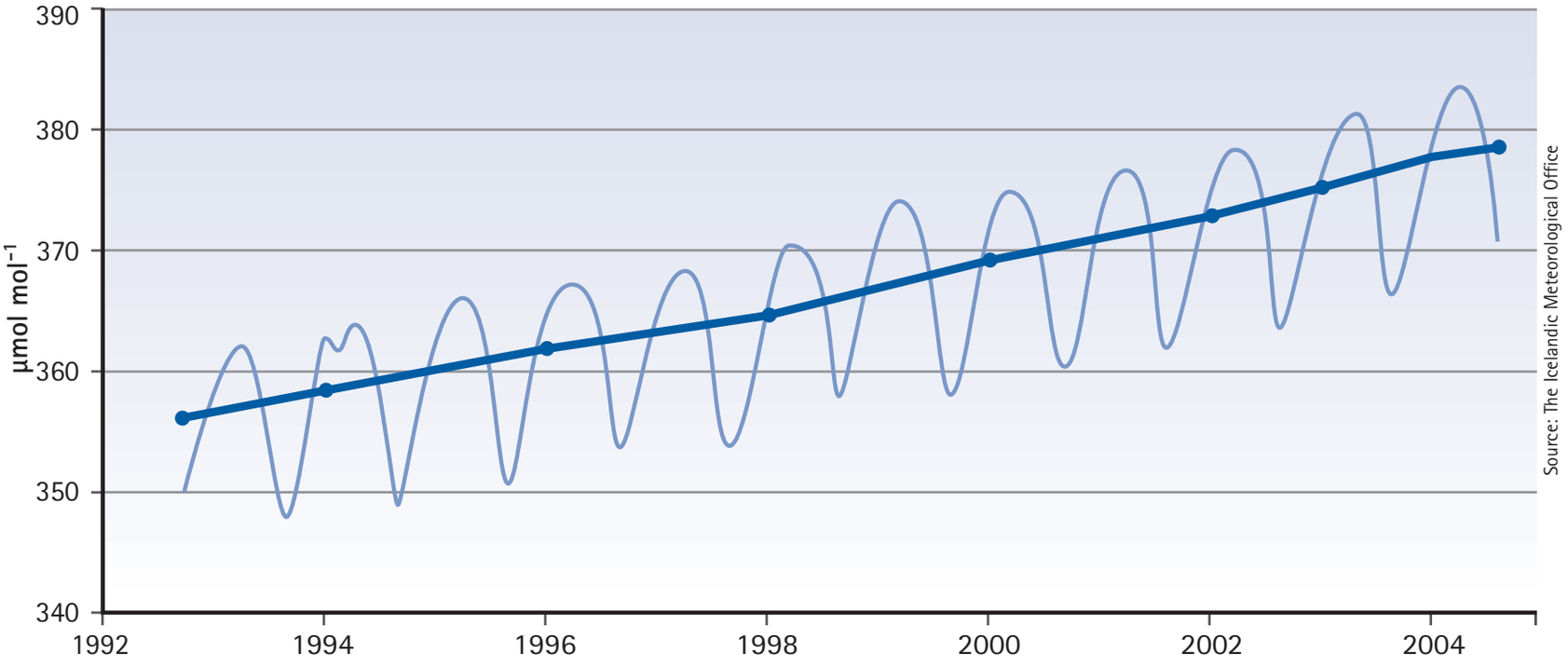
Greenhouse gas emissions in Iceland by sector – 2003



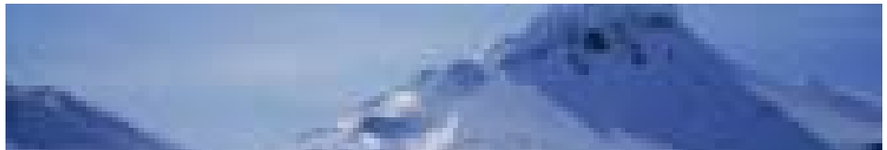
Source: Environment and Food Agency

The composition of greenhouse gas (GHG) emissions in Iceland is, in many ways, unusual as compared with other countries. First, there are virtually no emissions from electricity production or indoor heating, since renewable energy sources are utilised. Second, about 40% of emissions stems from energy utilisation by the transport sector and from fishing vessels. Third, it should be mentioned that emissions from industrial processes are responsible for a large proportion of Iceland's total emissions.

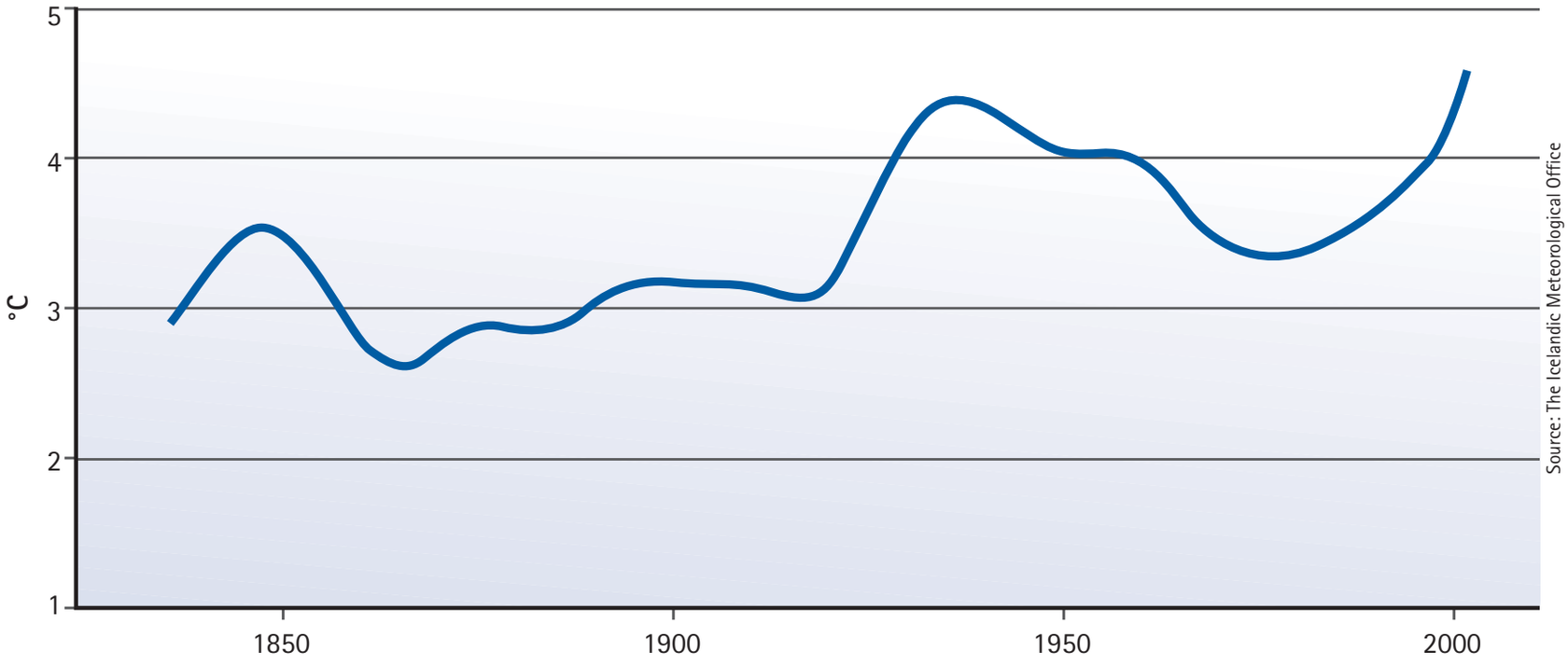
Carbon dioxide concentrations around Iceland



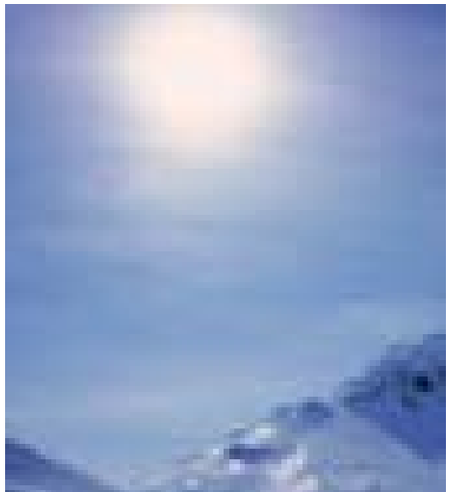
Measurements show that the concentration of carbon dioxide (CO_2) around Iceland is increasing steadily. This trend is not limited to Iceland, however; the same results are obtained from measurements carried out in many parts of the world. CO_2 is one of the primary greenhouse gases, and increased concentrations contribute to global warming. Increases in CO_2 levels can be traced in part to various types of human activity. The combustion of fossil fuels is the chief reason for the increased emission of CO_2 into the atmosphere. Furthermore, the amount of CO_2 has increased due to deforestation and changes in land use.



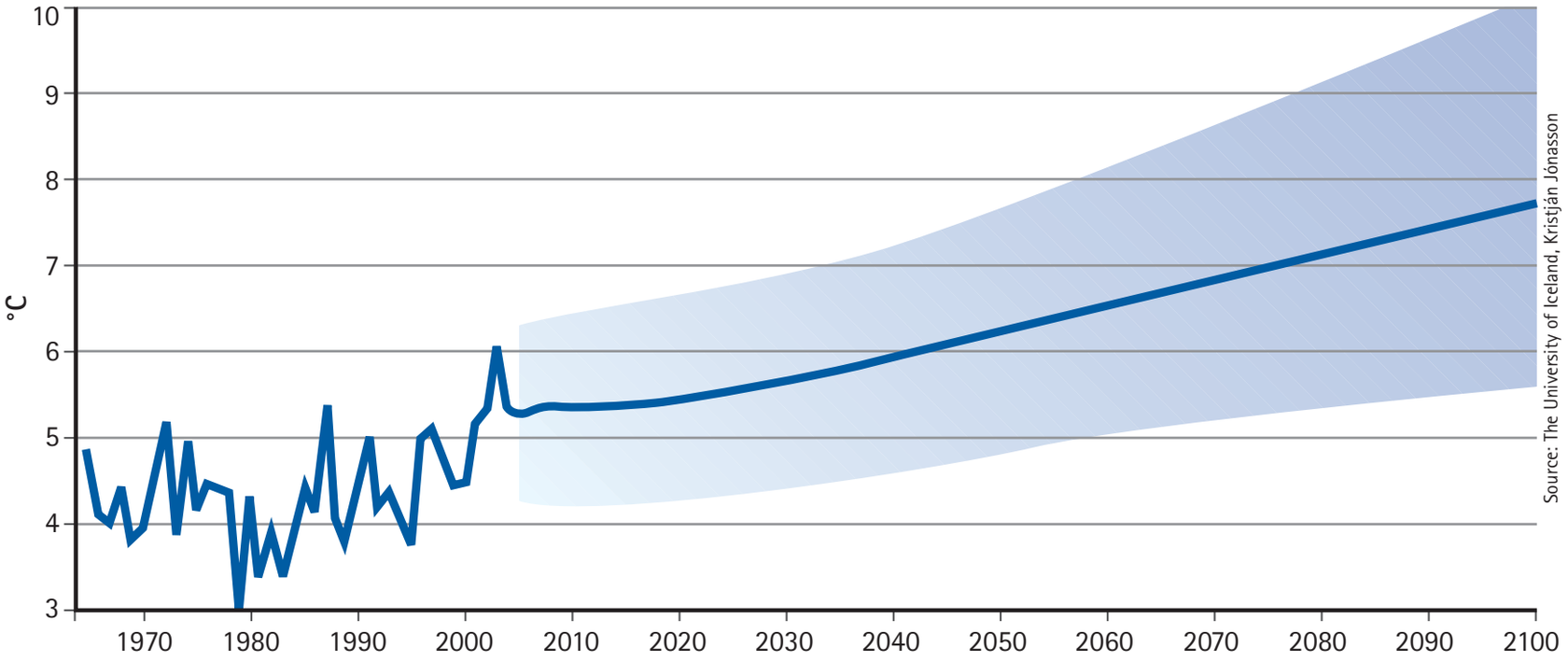
Temperature trends in Stykkishólmur – from 1820 to 2004



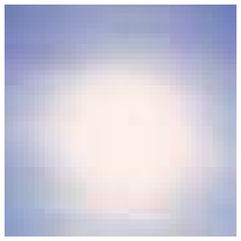
The graph shows developments in mean annual temperatures in Stykkishólmur after fluctuations between individual years have been equalized over a 10-year period. Temperatures in Iceland fluctuate widely, but over the past two decades, temperature trends show that temperatures have risen by 1–1.5°C. Changes in precipitation are difficult to measure; however, it appears as though precipitation has increased somewhat in recent decades. Rising temperatures have an effect on glaciers. Glaciers in Iceland are now receding rapidly after having grown considerably during the period 1970–1990.



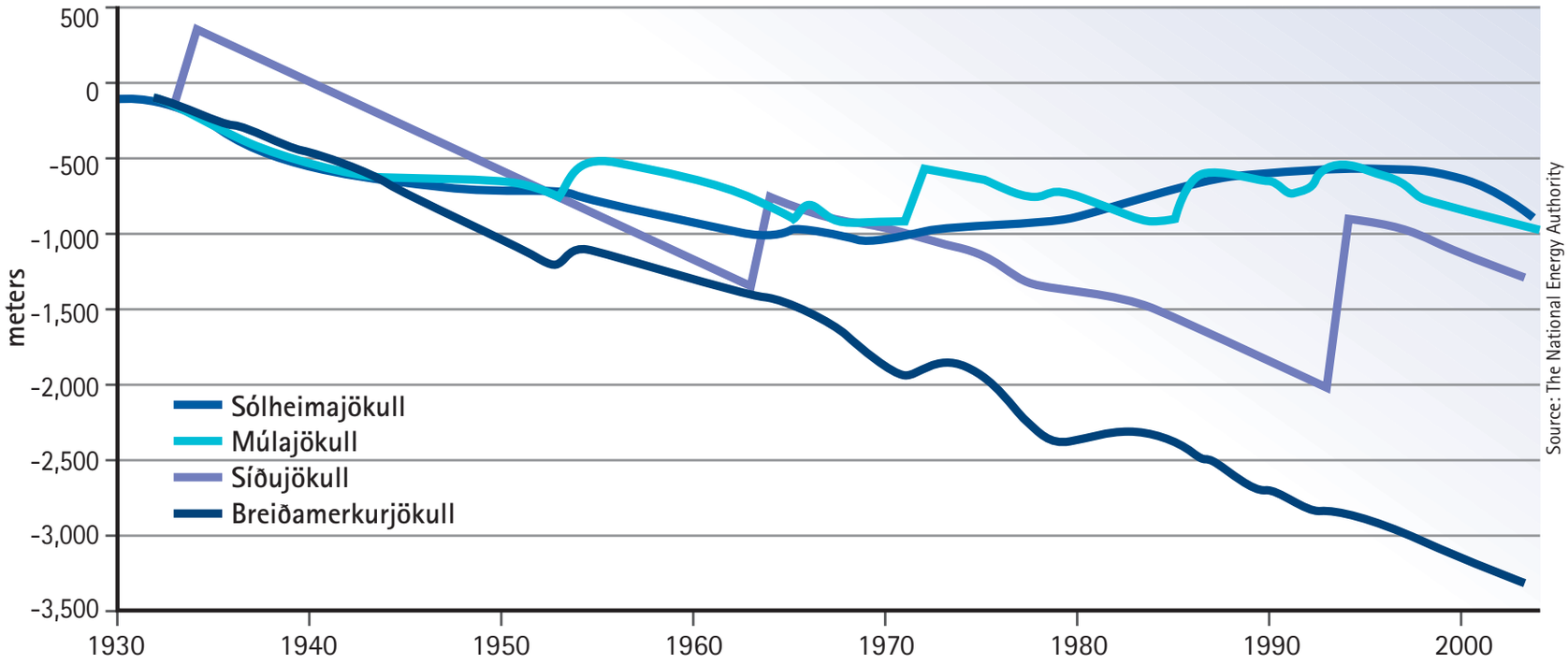
Forecasted temperature developments in Reykjavík



Forecasts assume continued warming in coming decades. The graph shows forecasted developments in annual mean temperatures in Reykjavík until the year 2100. The forecast is based on temperature measurements and on forecasted global temperature developments. The graph includes the results of measurements through 2003, but after 2003 the figures are based on forecasts. The shaded area of the graph indicates likely confidence limits for individual years based on this forecast.



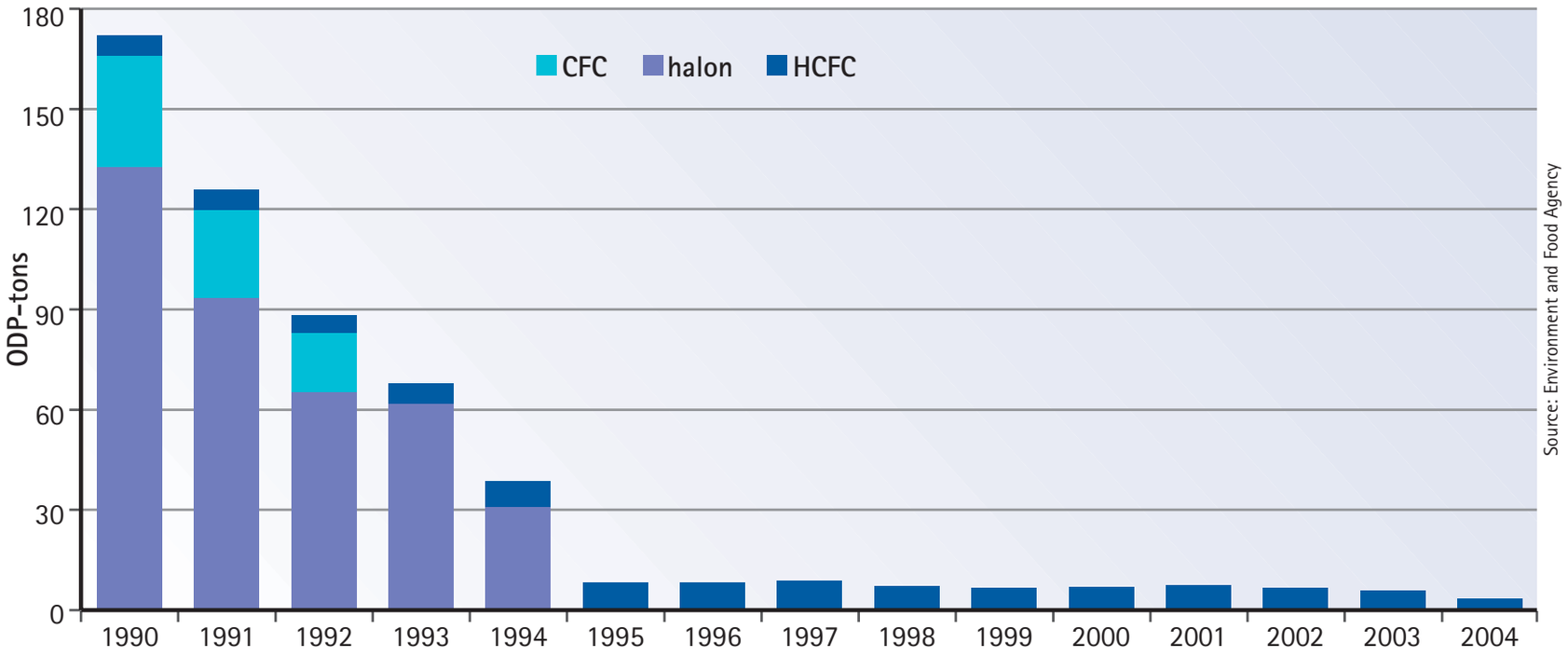
Glacial developments in Iceland



Warming temperatures have a significant effect on glaciers, and glaciers in Iceland are already receding rapidly. This graph illustrates the total change in four outlet glaciers over the past decades, measured in metres. In the year 2003, glaciers melted faster than indicated by previous measurements, and forecasts indicate that this trend will continue for several decades. The total area of all glaciers in Iceland is 11,000 km2, but measurements indicate that glacial area is diminishing by 0.2% per year.

PROTECTION OF THE OZONE LAYER

Importation of ozone-depleting substances

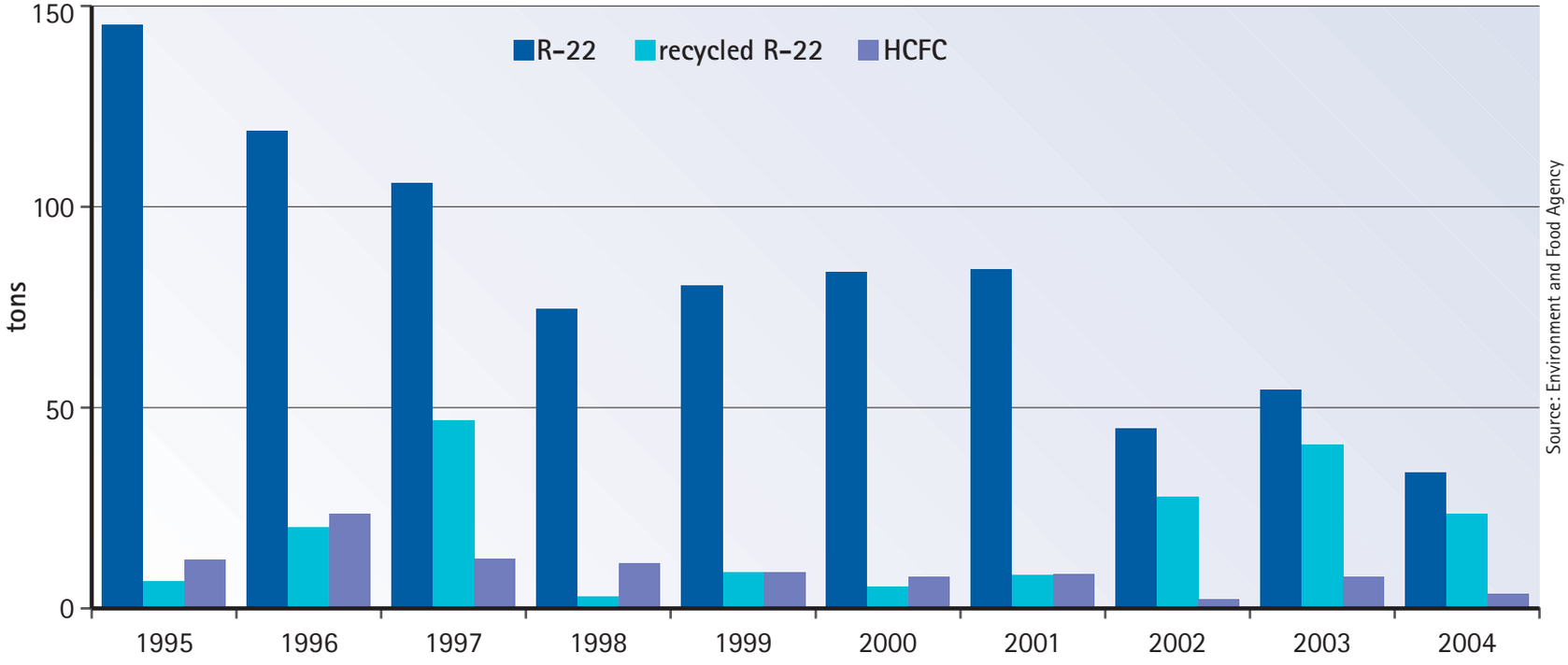


Source: Environment and Food Agency

Iceland does not produce any ozone-depleting chemicals. The graph shows trends in the importation of these substances to Iceland. Substances that deplete the ozone layer have varying depleting effects, defined as Ozone Depleting Potential, or ODP. The use of substances with high ODP values has been banned in Iceland since 1995; therefore, substances such as chlorofluorocarbons and halons are no longer in use. Refrigerants (hydrochlorofluorocarbons) are the only ozone-depleting materials currently imported to Iceland. They have a much lower ODP than many of the substances previously imported to the country.

PROTECTION OF THE OZONE LAYER

Importation of ozone-depleting refrigerants

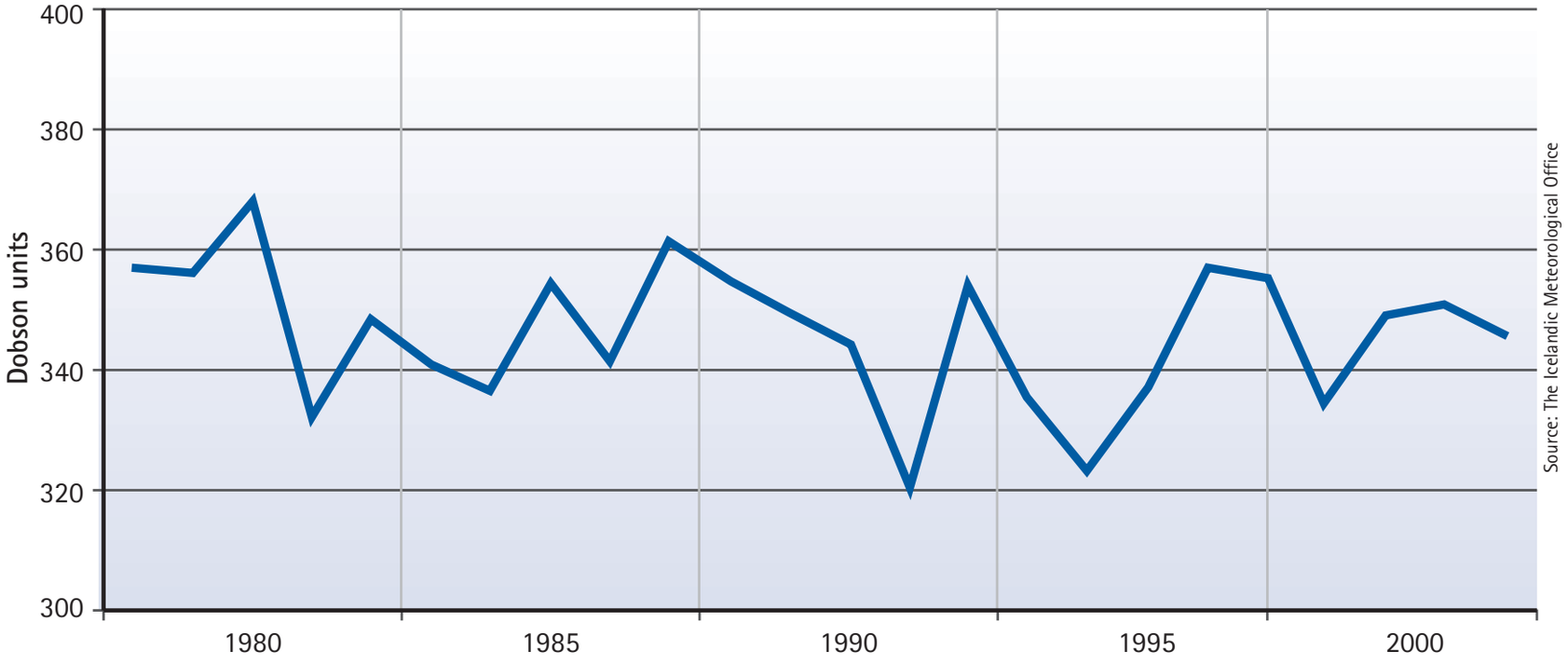


Source: Environment and Food Agency

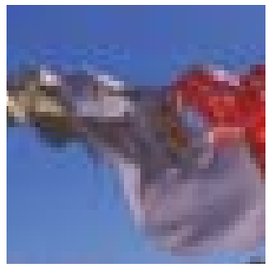
Refrigerants (hydrochlorofluorocarbons) are the only ozone-depleting substances now imported to Iceland. The use of other ozone-depleting substances was banned in 1995. The importation quota for these substances was reduced twice, first between 2002 and 2003 and then again between 2003 and 2004. This partially explains the reduction in the use of these refrigerants. In addition, the Environment and Food Agency embarked on a campaign to reduce leakage from refrigeration systems.

PROTECTION OF THE OZONE LAYER

Average thickness of the ozone layer over Reykjavík



Despite worldwide reductions in the use of ozone-depleting substances, the ozone layer has continued to grow thinner. It can therefore be expected that the ozone layer will continue to thin for some time because of past use of ozone-depleting substances. The thickness of the ozone layer over Iceland fluctuates widely between years and seasons, and it is not possible to interpret existing measurements as indicative of any particular trend. The Icelandic Meteorological Office has measured the thickness of the ozone layer since 1957. These measurements are among the world's oldest continuous measurements of this type and are a meaningful source of information on the condition of the ozone layer in a global context.



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September 2006