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### CONTROLLING HABITAT DESTRUCTION

### GLOSSARY

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**Glossary words**

When a word is printed in **bold**, click on it to find its meaning.
Biodiversity keeps ecosystems healthy. Each different group, or species, of plant or animal has an important job to do in its ecosystem. For example:

- some species fertilise the soil
- some species provide clean air and water
- some species are a source of food for other species.

So far, people have discovered 1.8 million different species on Earth. There could be as many as 100 million species, but many will become extinct before people discover them.

In the past, some plants and animals became extinct because of natural disasters, such as floods and bushfires. Today, extinctions are occurring at a rapid rate because of human activities, such as:

- overharvesting, which is the practice of cutting down trees faster than they can grow and killing animals faster than they can breed
- introducing species into environments that are not their natural habitat

A population is a group of plants or animals of one species that live together. Some plants and animals live in separate populations in different places. If one of these places is destroyed, the plants and animals that live there will disappear. This is called a ‘local extinction’.

Some plants and animals are so rare that there is just one population left that lives in just one place. If this place is destroyed, the rare plant or animal that lives there will become extinct.

Habitat destruction also affects plants and animals that do not live in the place that has been destroyed. For example, an owl that lives in a forest may hunt for mice in nearby grasslands. If the grasslands are destroyed, the owl may disappear from the forest because it has lost its hunting grounds.

Biodiversity gives us fresh air to breathe. Trees produce the oxygen that people breathe. They absorb a greenhouse gas called ‘carbon dioxide’, which pollutes the air around the Earth, our atmosphere.

Biodiversity gives us clean water to drink. Trees in river catchments help to maintain the water cycle, which is the never-ending movement of water between the atmosphere and the land.

Farmers cleared most of the woodlands in the centre of New South Wales so they could grow wheat and graze sheep. Some of the plants and animals that lived in the woodlands became extinct.

Habitat destruction in Australia

Australia has one of the highest rates of land clearing in the world. More than 500,000 hectares of land are cleared each year. Rainforests, woodlands, mangrove forests, wetlands and other habitats are being destroyed. More habitats will be destroyed as the number of people in Australia increases.

Many people believe that loss of biodiversity is the most serious environmental problem in Australia. Habitat destruction is doing more damage to biodiversity than any other human activity.
Land clearing is the removal of plants that cover the land. People clear forests, woodlands, grasslands and wetlands so they can use the timber to make forest products or use the land for a different purpose.

The first European settlers cleared land in the coastal areas of Australia. They used the timber to make buildings and the land for agriculture. In the late 1800s, many farmers cleared woodlands in the inland areas of Australia. They used the land to graze sheep. At present, more than 500,000 hectares of land are cleared each year.

People remove trees by cutting them down, pushing them over with bulldozers or burning them. People also kill trees by ringbarking them and poisoning them. Trees may die if nearby land is cleared for water supply lines, gas pipelines, power lines or roads, because clearing allows sunlight, weeds and feral animals to enter the forest.

Land clearing destroys the habitats of native plants and animals. If a plant or animal lives in only one habitat, it will become extinct if that habitat is destroyed. Cleared land is more likely to be damaged by soil erosion, soil salinisation and weeds, because the soil is no longer protected by trees.

Living trees absorb carbon dioxide from the atmosphere. When they rot or burn they release carbon dioxide. Carbon dioxide traps the sun’s heat, making the Earth warmer. As the Earth becomes warmer, plants and animals that cannot adapt may become extinct.

Reducing the effects of land clearing

State governments decide what clearing can be done, and how it must be done, in their states. An Australian government program, National Reserve System, is conserving natural landscapes and native plants.

Plantations for Australia: the 2020 Vision is a plan to treble the area of tree plantations by 2020. The total area of tree plantations increased by 2.5 per cent in 2009, from 1.97 million hectares to 2.02 million hectares. Plantations are large groups of trees that are cultivated by farmers or forestry workers. Trees in these plantations absorb carbon dioxide and protect the land from soil erosion and soil salinisation. When the trees mature, the timber is harvested.

Government in action

Land clearance is listed as a key threatening process under the Australian Environment Protection and Biodiversity Conservation Act 1999.

Land clearing overseas

Brazil, the Congo, Bolivia and Indonesia have the highest rates of land clearing in the world.
Urban development is a threat to biodiversity

When land is cleared for a housing estate, industrial development or road, the habitats of native plants and animals are destroyed. Fertile soil is covered with tar and concrete. People grow grass and introduced plants around their homes. Grass and introduced plants do not provide food or shelter for most native animals. In cities, the waterways are polluted with sewage, urban stormwater and industrial waste water, the air is polluted with car exhaust and smoke and the land is polluted with garbage. When there are more people, there is more pollution.

How does urban development occur?

Population growth occurs when babies are born and when people immigrate to a country. When population growth occurs, rural land at the edge of a town or city is cleared so new houses, shops, industries, schools, parks, playing fields and hospitals can be built. When population growth occurs, the town or city grows so that it can meet the needs of the people.

Urban density

Urban density is the number of houses or the number of people on a hectare of urban land:

- **High urban densities** occur when there are many houses or people on a hectare of urban land. If people live on smaller blocks of land, less land needs to be cleared for housing. Areas that have high urban densities are more likely to have public transport such as buses or trains. If people use public transport instead of cars, they do not cause as much air pollution or use as much petrol.

- **Low urban densities** occur when there are few houses or people on a hectare of urban land. If people live on larger blocks of land, they have more room to plant native trees.

Reducing the effects of urban development

People can choose to live on smaller blocks of land so that less land needs to be cleared for housing. In their gardens, people can plant local native plants, make frog ponds and build nesting boxes to provide food and homes for animals. People can use public transport to reduce air pollution and the use of petrol. They can recycle paper, cardboard, some plastics, glass, and steel and aluminium cans to reduce garbage.

Government in action

VicUrban is the Victorian government’s sustainable urban development agency. It aims to increase environmental benefits to the community and promote sustainable urban development in Victoria.

Urban development overseas

Urban development is a problem throughout the world. It is a major cause of loss of biodiversity.
Industry is a threat to biodiversity

Primary and secondary industries are big users of energy resources, such as black coal, natural gas and petroleum, and of electricity. Secondary industries such as paper and power generation are big users of water. Secondary industries such as aluminium and copper smelting, iron and steel production, and power generation pollute the air. Some industries produce waste water which pollutes waterways and garbage which pollutes the land. Sometimes an accident happens in a factory or while goods are being transported. It might cause the environment to become polluted with harmful chemicals.

Reducing the effects of industry

Many companies have an environmental policy because they want to protect the environment. Using cleaner methods of production, they reduce the environmental damage at every stage of manufacture. This makes manufacturing safer for the environment and safer for people. Australian companies spend millions of dollars each year on environmental protection. Most of this money is spent on ways of reducing air and water pollution and on disposing of solid waste.

Government in action

In New South Wales, polluters must report pollution incidents that have harmed or threaten to harm the environment to the Office of Environment and Heritage.

Industry overseas

Industries throughout the world use natural resources, and cause water, air, land and noise pollution.

In Brief

Industry is a threat to biodiversity because it uses natural resources such as coal, petroleum and water, and because it pollutes the water, air and land.

✔ People can reduce the effects of industry by using better methods of manufacturing and better ways of managing waste.

Industry is work that is done to produce goods and provide services for people to use. An industry can be very small, such as a corner shop, or very large, such as an international chain of fast food restaurants. Millions of Australians work in industry. They grow foods, manufacture goods and provide services. Foods and manufactured goods are major exports worth billions of dollars.

How does industry start?

Most industries start as small farms or businesses. A farm grows when the farmer buys land next to his or her farm, or buys another farm. The farmer then buys more livestock or plants more crops. A business grows when people pay for the goods it makes or the services it provides. The owner uses this money to make more goods, provide more services or buy another business.

Types of industry

There are four major types of industry:

- **Primary industries** grow, produce, catch or extract raw materials. They include agriculture, forestry, fisheries and mining.
- **Secondary industries** refine, process or manufacture raw materials into finished products. They include steel, jewellery, food products and wood products such as paper.
- **Tertiary industries** sell finished products and provide services. They include warehouses, shops, transport, government departments and law firms.
- **Quaternary industries** give expert help and information. They include consultancy services and research organisations, which can give people advice or information about a subject.

Large industries, such as steel production, provide many jobs but also use energy resources and pollute the air.

Land pollution occurs when industries dispose of liquid and solid wastes.
Mining is a threat to biodiversity

When a mine is opened, soil, plants and animals are dug out of the ground. The ecosystem they formed is destroyed. Some mines pollute nearby ground water and surface water. For example, coal mines release salty water. Sometimes the land surface above an underground tunnel sinks to a lower level. This can disturb ecosystems, especially around wetlands. After a mine is closed, the plants and animals that come to live on the land may be different from the ones that used to live there.

Substances that are mined

Many valuable substances are mined:

- **Precious metals** are metals that people value highly. Some are used to make jewellery.
- **Gemstones** are valuable and beautiful stones. Some are used to make jewellery. Industrial diamonds are used to cut other things.
- **Coal** is a hard black rock that is burned to make heat.
- **Petroleum** is an oily liquid. Petrol, the fuel used by car engines, is refined from petroleum.
- **Uranium** is a radioactive metal used in nuclear reactors to generate electricity.
- **Sand** is made up of particles from rocks that have been broken up or worn away. It is used to make cement.
- **Gravel** consists of small stones and pebbles. It is used to make cement and roads.

Reducing the effects of mining

When a mining company wants to open a new mine, it must prepare a report, called an ‘environmental impact statement’, that describes the damage that the mine could do to the environment. While a mine is operating, miners try to minimise water and wind erosion at the mine. After a mine is closed, miners prepare the land for a new use. They fill the hole with rock and grow new plants. If there is not enough rock to fill the hole, it may be used for waste disposal, water storage or wetlands.
Agriculture is a threat to biodiversity

If land is overfarmed, it may become permanently damaged. Crops remove nutrients from the soil and livestock eat the plants that protect the soil from erosion. On many dryland farms the soil becomes less fertile, more salty, more acidic or eroded. Agriculture is a major user of water in Australia. On many irrigated farms, farmers have problems with rising watertables and irrigated land salinity because they are not using the best irrigation methods for their land. Many farms pollute rivers with fertilisers, animal manure and pesticides.

For more information, see "Curriculum Resource Pack: Threats to Plants and Animals © Kimberley Jane Pryor/Macmillan Publishers Australia 2012 ISBN 978 1 4202 9844 4"
Soil erosion is a threat to biodiversity

The surface soil, or topsoil, contains most of the nutrients plants need. When soil erosion occurs, topsoil containing nutrients and micro-organisms is lost. Plants may not grow as well in the soil that is left. They may not grow at all in severely eroded soil.

The soil that has been lost also causes damage. Soil carried by water may cause silt to build up in rivers, and damage roads, train tracks, bridges and buildings. Soil carried by wind can smother plants and form choking dust storms. Shifting dunes may cover roads and buildings.

Managing soil erosion

Farmers across Australia are planting millions of native shrubs and trees. They are grazing fewer sheep and cattle, and are controlling the numbers of European rabbits so the plant cover will not be eaten away. Some farmers are changing the type of crop they grow on a piece of land so the soil will not lose its nutrients. They are ploughing across hills (contour ploughing) to stop rainwater rushing down. Many farmers are planting trees as windbreaks to control wind erosion.
Soil salinisation is a threat to biodiversity

Soil salinisation makes soils less fertile because the salt kills soil micro-organisms such as bacteria and soil animals such as earthworms. Plants become damaged or die when salty ground water reaches their roots. More kinds of plants die as the soil gets saltier. Soil erosion is more likely to occur when plants die because the soil is left bare. Salty soil may not support plants in the future. Salty ground water may leak into streams and rivers and cause salinity problems downstream.

Government in action
The Australian government’s Sustainable Grazing on Saline Lands sub-program helped sheep farmers understand and manage their saline land.

Soil salinisation overseas
Salt-affected soils occur in more than 100 countries around the world.

Managing soil salinisation
Farmers are learning new irrigation methods. They are planting native trees and crops with long roots, such as lucerne, to lower the watertable.

Some farmers are using salty soil as a resource. Some are growing saltbush, a plant that can grow in salty soil, to feed to their sheep. Others are harvesting the salt and selling it to be made into table salt and chemicals such as sodium carbonate.

People are making maps of areas that are affected by soil salinisation and developing ways to manage them.
Soil acidification is a threat to biodiversity

Most plants grow best in slightly acidic soil. However, if the soil becomes more acidic, plants get too much of some nutrients and not enough of other nutrients. They grow poorly or die because they do not get the right balance of nutrients. Soil erosion is more likely to occur when plants die because the soil is left bare.

Rainwater flows over acid sulfate soils and washes acid into nearby streams. This makes the water in the streams more acidic. Some plants and animals cannot live in the streams when they become more acidic.

Managing soil acidification

Farmers are treating soil acidification by putting lime sand or crushed limestone on the soil. This method works well in most areas.

Farmers are learning new methods of fertilising their land. Some farmers are changing the kind of crop they grow on a piece of land.

People are making maps of areas that are affected by soil acidification. They will use this information to manage acid sulfate soils and the drainage of acid into rivers and estuaries.

Acids and soil acidification

Acids are liquids or compounds that can burn a person’s skin or clothes. Lemon juice and vinegar contain weak acids. The acids give them a sour taste.

Soils become more acidic when the plants that grow in them use a nutrient called nitrogen. Legume crops such as alfalfa and soybean use nitrogen. Some fertilisers add nitrogen to the soil. Soils become more acidic when plants use this added nitrogen. Organic fertilisers such as animal manure also make soils become more acidic. Soils that contain iron sulfides become more acidic when they are exposed to the air. Soils also become more acidic if they are polluted by acid rain or acidic industrial waste.

Types of soil acidification

There are two types of soil acidification:

- **Agricultural acidity** occurs when farming methods cause the soil to become more acidic. Legume crops and pastures, animal manure and fertilisers based on nitrogen make soils more acidic.
- **Acid sulfate soils** develop when soils or rocks that contain iron sulfides are exposed to the air. This can happen during mining. Iron sulfides react with oxygen in the air when there is salty ground water in the soil. They form an acid called ‘sulfuric acid’.

FACTS ABOUT SOIL ACIDIFICATION

Soil acidity is the amount of acid in the soil. Many Australian soils are naturally acidic. The acid may have come from the rocks from which the soil was formed. Soils may also become acidic because of human activities. Soil acidification is an increase in the amount of acid in the soil.
Desertification is a threat to biodiversity

Native dryland plants and animals have adapted to a dry climate. They can recover from low rainfall and droughts. But if the land becomes a desert, some native dryland plants and animals will become extinct. Many grain crops were once native dryland plants. We will lose the chance to discover new crops if native dryland plants become extinct.

Farmers cannot grow crops or graze animals on barren land. All people, including city people, depend on the land for food production.

Managing desertification

People are planting trees to protect the soil from soil erosion and soil salinisation. Farmers are removing livestock from land that is in danger of being overgrazed, and are selling livestock during droughts. They are controlling the numbers of European rabbits, which eat away the plant cover. They are leaving pieces of land unplanted, so the soil can have a break from growing crops. Farmers are learning better irrigation methods so they can prevent waterlogging and irrigated land salinity.
Changes to freshwater ecosystems are a threat to biodiversity

When people change the water flow or water quality of a river, they also change the number and types of plants and animals that can live in it. If people cut down trees in a river catchment, silt will wash into the river. If people clear away plants on a riverbank, water will erode the riverbank. When people build a dam across a river, fish cannot swim upstream (past the dam) to spawn. When people discharge sewage, stormwater and industrial waste water into a river, they pollute the water with nutrients, litter, detergents, chemicals and heavy metals.

Types of surface waters

There are a number of different types of surface waters:

- **Streams** are small bodies of flowing water.
- **Rivers** are large bodies of flowing water.
- **Lakes** are large bodies of still water.
- **Reservoirs** are bodies of water with a wall called a ‘dam’ at one end to hold the water back.
- **Billabongs** are pools near a river that are separate from the flowing water. Temporary billabongs dry out for part of the year.
- **Wetlands** are areas that are temporarily or permanently flooded with water. The water is shallow, still or slowly moving, and may be fresh, brackish or salty. Swamps, lakes, estuaries, lagoons and floodplain forests are different kinds of wetlands.

Reducing the effects of changes to freshwater ecosystems

Freshwater ecosystems need good quality water so they can provide healthy habitats for plants and animals. People can improve river catchments by planting trees. They can preserve wetlands and riverside plants. Governments can reduce the amount of water that people take out of a river so the water flow is not too slow. People can improve water quality by reducing the number and types of pollutants that enter freshwater ecosystems.

**In Brief**

- **Changes to freshwater ecosystems are a threat to biodiversity because they damage habitats, change water flow or reduce water quality.**
- **People can reduce the effects of changes to freshwater ecosystems by planting trees in river catchments, preserving wetlands and riverside plants, and reducing water pollution.**
Coastal development is a threat to biodiversity

Coastal development destroys or damages the habitats of plants and animals. When coastal land is cleared for houses, factories or tourist resorts, the habitats of plants and animals are destroyed. People who live or work in coastal towns and cities generate waste. Liquid waste, such as sewage, stormwater and industrial waste water, contains nutrients, litter, chemicals and heavy metals. It is released into coastal waters, where it poisons plants and animals.

Leafy seadragons live among seaweed and seagrass in the coastal waters of southern Australia. They are at risk because the seagrasses are dying, due partly to sewage and stormwater being discharged into coastal waters.

Types of coastal waters

There are three main types of coastal waters:

- **Estuaries** are the lowest parts of creeks, rivers and lakes, where fresh water meets salty water from the sea. Estuaries have many different habitats such as mangrove swamps, seagrass meadows, reedbeds, sandflats and mudflats.
- **Coastal lagoons** are small ponds found at the mouth of an estuary. They often have a wall of sand. Water from the river or sea usually flows into and out of coastal lagoons.
- **Marine waters** are the salty waters that lap against the Australian coastline. Marine waters have many different habitats such as beaches, rocky reefs, coral reefs, islands and the continental shelf.

Reducing the effects of coastal development

People can protect coastal habitats by controlling coastal development. They can reduce the number of pollutants in liquid waste. Most sewage is treated at a sewage treatment plant before it is discharged into coastal waters. Sewage that has been highly treated does not have as many pollutants in it. People can reduce the pollutants in stormwater by making sure that organic matter, dog poo, detergents, sediment, litter, oil and chemicals do not get washed down stormwater drains. Factories can trap oil and grease so they are not released into coastal waters.

In Brief

✗ Coastal development is a threat to biodiversity because it destroys coastal habitats and leads to the pollution of coastal waters.

✔ People can reduce the effects of coastal development by controlling the amount of coastal development and by reducing the number of pollutants in liquid waste.

Government in action

The Federal government manages marine protected areas that are Commonwealth reserves under the Australian Environment Protection and Biodiversity Conservation Act 1999. Marine protected areas, such as the Great Barrier Reef Marine Park, are areas dedicated to the protection and maintenance of biodiversity.

Coastal development overseas

In Florida, in the United States of America, mangroves were torn up and sand was imported to create Miami Beach.
Bushfires are a threat to biodiversity

When a bushfire roars through a forest, it kills animals that cannot move out of its way. It destroys rainforest and wetland plants. However, it stimulates some grassland, woodland and forest plants to send out new shoots or release their seeds. Ecosystems take years to recover from a bushfire. If they are burned too often, some plants and animals may become extinct. When trees burn, smoke pollutes the air and carbon dioxide is released into the atmosphere.

Reducing the effects of bushfires

Prevention is the best way to stop bushfires. People should be careful with barbecues, campfires and cigarettes, and should not light fires when there is extreme fire danger. People can ring 000 if they see smoke, fire or people behaving strangely in bushland.

Firefighters use prescribed burning to lower the chance of a major bushfire. They make firebreaks by using bulldozers to clear an area of fuel. When a bushfire is burning, firefighters may light a controlled fire ahead of it to burn the fuel it needs. This is called ‘backburning’.

Government in action

The 2009 Victorian Bushfires Royal Commission was held to investigate the causes and responses to the 2009 Black Saturday bushfires. It made 67 recommendations to improve bushfire safety.

Bushfires overseas

Recent wildfires in Israel, Russia, Greece and the United States of America killed people and destroyed buildings and forests.

In Brief

✗ Bushfires are a threat to biodiversity because they burn vast areas of land, kill countless plants and animals and generate huge clouds of smoke.

✔ People can reduce the effects of bushfires by taking care when using fire, by using prescribed burning before the bushfire season starts and by backburning during bushfires.
Habitat destruction is the most important threat to biodiversity. If people do not control it many native plants and animals will become extinct.

**Department of Sustainability, Environment, Water, Population and Communities**

The Australian government’s Department of Sustainability, Environment, Water, Population and Communities works to protect the environment and heritage, and to encourage sustainable living.

**Caring for our Country**

The Australian government’s Caring for our Country program is providing money for projects that will improve the environment. It is working to ensure the environment is healthier, better protected, well-managed, resilient and able to provide essential ecosystem services in a changing climate.

Caring for our Country is focusing on six main areas:

- Northern and remote Australia
- Community skills, knowledge and engagement
- National Reserve System
- Biodiversity and natural icons
- Coastal environments and critical aquatic habitats
- Sustainable farm practices

Caring for our Country is asking people to help protect and improve wetlands.
GLOSSARY

acidic contains acid
acid rain rain that is polluted with a strong acid such as sulfuric acid or nitric acid
brackish slightly salty
catchments all the land over which water runs before it flows into a river
continental shelf a rocky shelf covered by shallow sea around a continent, or land mass, such as Australia
ecosystems communities of organisms interacting with one another and with the environment in which they live, such as a forest or a river
extinct the last plant or animal has died out forever
feral domestic animals, such as cats, that live in the wild
fertile able to grow healthy plants
genes information inside a cell about how a plant or animal looks or behaves
habitat the natural home of a plant or animal
immigrate to come to a new country to live
key threatening process a process that threatens the survival of a plant, animal or ecosystem
land degradation a reduction in the soil’s ability to grow healthy plants
land salinity salty soils
legumes plants of the family Leguminosae (peas and beans)
micro-organisms tiny plants or animals that are too small to be seen, or to be seen clearly and in detail, by the naked eye
migratory fish fish that swim regularly from one habitat to another to have young or find food
nutrients substances that give a plant or animal energy
old-growth forests mature forests that have not been disturbed by human activities such as logging, land clearing and road building
overfarmed when a piece of land is always planted with crops, which drains the soil of nutrients
population growth an increase in the number of people who live in a place
prescribed burning the lighting of a controlled fire to burn fuel, such as dry grass, in the bush
ringbarking to cut away the bark in a ring around a tree trunk in order to kill the tree
soil erosion the loss of soil from a place
soil salinisation an increase in the amount of salt in the soil
spawn to release eggs or sperm into the water
sustainable using resources such as water and forests carefully so they will continue to be healthy in the future
watertables the top surface of the layer of water in the ground (which is called ground water)
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