



Human–Environment Interaction

Main Ideas

- The Dutch and the Venetians altered lands to fit their needs by constructing polders and canals.
- Uncontrolled logging and acid rain destroy forests.

Places & Terms

dike	terpen
polder	Zuider Zee
seaworks	Ijsselmeer

CONNECT TO THE ISSUES

POLLUTION Water pollution is creating conditions that kill the fish in Venice’s lagoon.

A HUMAN PERSPECTIVE “1800 DIE IN WIND-WHIPPED FLOOD WATERS!” February 1, 1953, witnessed a disaster in the Netherlands. Winds estimated at 110 to 115 miles per hour piled up gigantic waves that ripped through **dikes**—earthen banks—holding back the North Sea. When the storm was over, 4.5 percent of the Netherlands was flooded, and thousands of buildings were destroyed. The Netherlands is prone to floods because much of its land is below sea level.

Polders: Land from the Sea

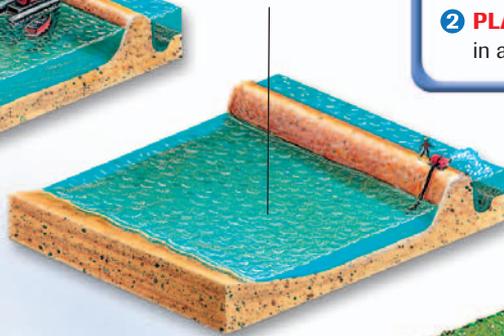
An old saying declares, “God created the world, but the Dutch created Holland.” (Holland is another name for the Netherlands.) Because the Dutch needed more land for their growing population, they reclaimed land from the sea. At least 40 percent of the Netherlands was once under the sea. Land that is reclaimed by diking and draining is called a **polder**.

Making a Polder



1 Earthen dikes are built around a shallow area of water.

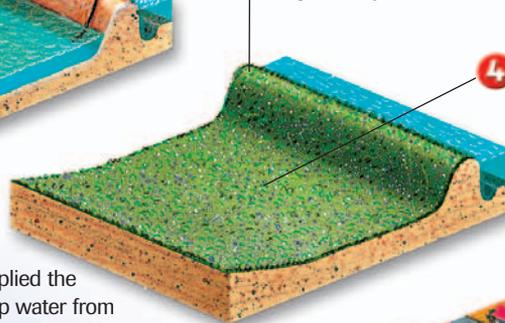
2 The water is gradually pumped away and drained off the land.



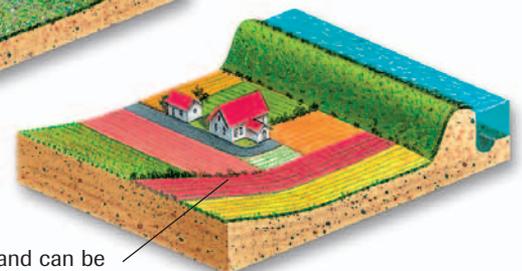
SKILLBUILDER: Interpreting Graphics

- 1 HUMAN-ENVIRONMENT INTERACTION** Why does it take time for polder land to be ready for farming?
- 2 PLACE** How would the process be different if a polder were made in a place where there is freshwater, not saltwater?

3 Seawater leaves salt in the soil. Rain gradually washes the salt away.



4 Alfalfa is often the first crop sown. It has deep roots, which break up soil; alfalfa is also used for livestock feed.



5 In time, the land can be used to grow many crops—such as Dutch tulips.

Windmills once supplied the power used to pump water from polder land. Today electric pumps are used to drain the land.





Making Comparisons

A What are possible disadvantages of windmills and of electric pumps?

SEAWORKS The Dutch erected **seaworks**, structures that are used to control the sea's destructive impact on human life. Those seaworks include dikes and high earthen platforms called **terpen**. The dikes hold back the sea, while the terpen provide places to go for safety during floods and high tides.

Over the centuries, the Dutch found ways to reinforce the dikes and to control water in the low-lying areas the dikes protected. In the 1400s, the Dutch began using their windmills to power pumps that drained the land. When the French conqueror Napoleon viewed a site with 860 windmills pumping an area dry, he reportedly said, "Without equal." Today the pumps use electric motors instead of windmills. **A**

TRANSFORMING THE SEA Another remarkable Dutch alteration of their environment was the transformation of the **Zuider Zee** (ZEYE•duhr ZAY). It was an arm of the North Sea and is now a freshwater lake. The idea was originally proposed in 1667. But it was not until the late 1800s and early 1900s that the Dutch perfected a plan to build dikes all the way across the entrance to the Zuider Zee. Since no saltwater flowed into that body of water, it eventually became a freshwater lake. It is now called **IJsselmeer** (EYE•suhl•MAIR). The land around the lake was drained, creating several polders that added hundreds of square miles of land to the Netherlands.

Waterways for Commerce: Venice's Canals

BACKGROUND

A land link to Venice was built in 1846. A railway bridge connected Venice to the mainland.

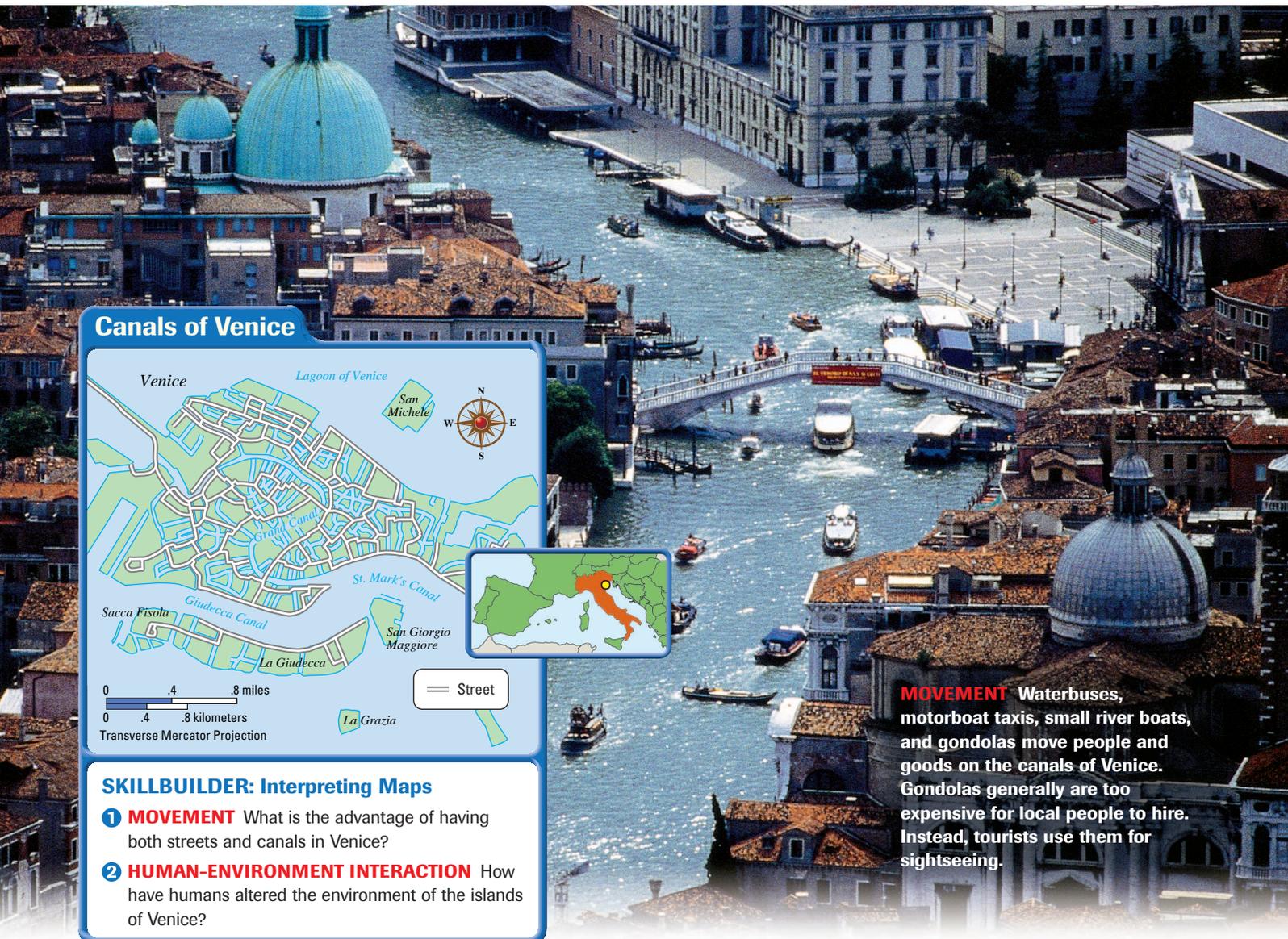
Like the Netherlands, Venice, Italy, is a place where humans created a unique environment. About 120 islands and part of the mainland make up the city of Venice. Two of the largest islands are San Marco and Rialto. A broad waterway called the Grand Canal flows between them.

Moving people or goods in Venice depends upon using the more than 150 canals that snake around and through the islands. Consequently, to get from one place to another in Venice, you generally have two choices: take a boat or walk. Almost anything that is moved on wheels elsewhere is moved by water in Venice.

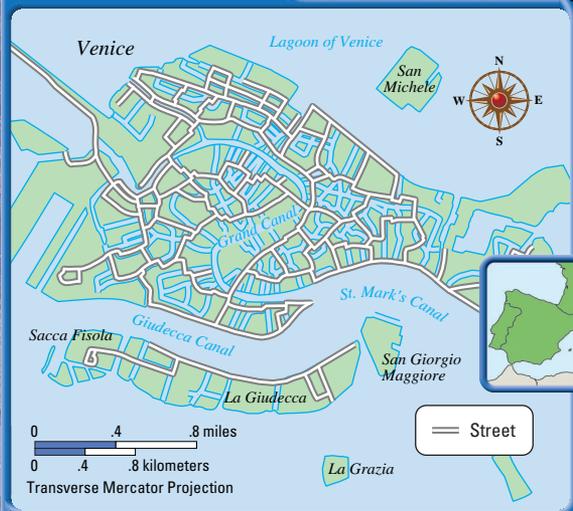
AN ISLAND CITY GROWS Venice began when people escaping invaders took shelter on inhospitable islands in a lagoon. They remained there and established a settlement that eventually became Venice. The city is located at the north end of the Adriatic Sea, a good site for a port. As a result, trade helped Venice grow.

BUILDING ON THE ISLANDS Building Venice required construction techniques that took into account the swampy land on the islands. Builders sunk wooden pilings into the ground to help support the structures above. So many pilings were required that oak forests in the northern Italian countryside and in Slovenia were leveled to supply the wood. The weight of the buildings is so great that it has compressed the underlying ground. This is one of the reasons that Venice is gradually sinking. Other reasons include rising sea levels and the removal of too much groundwater by pumping.

PROBLEMS TODAY Severe water pollution threatens historic Venice. Industrial waste, sewage, and saltwater are combining to eat away the



Canals of Venice



SKILLBUILDER: Interpreting Maps

- 1 MOVEMENT** What is the advantage of having both streets and canals in Venice?
- 2 HUMAN-ENVIRONMENT INTERACTION** How have humans altered the environment of the islands of Venice?

MOVEMENT Waterbuses, motorboat taxis, small river boats, and gondolas move people and goods on the canals of Venice. Gondolas generally are too expensive for local people to hire. Instead, tourists use them for sightseeing.

foundations of buildings and damage the buildings themselves. Erosion has allowed increased amounts of seawater into the lagoon. Because of this, floods also endanger the city. In November 1966, six feet of floodwater engulfed the city and ruined many of its buildings and the artwork that they housed. Agricultural runoff flowing into Venice's harbor creates conditions that promote algae growth, sometimes called "killer algae." These algae grow rapidly and, after they die, decay. The decaying process uses up oxygen in the water, so that fish also die. Dead fish attract insects and create a stench, especially in warm weather.

A Centuries-Old Problem: Deforestation

Throughout history, humans have damaged and destroyed Europe's forests. The term deforestation means the clearing of forests from an area. Often when we think of deforestation, we think of losing the great rain forests of the world, such as those in South America, which you learned about in Unit 3. But people have also been clearing the forests of Europe since ancient times. Forests provided wood to burn for fuel and to use as building material for ships and houses. When Europeans began to develop industry in the 1700s and 1800s, they needed even



HUMAN-ENVIRONMENT INTERACTION A forest in Bohemia in the Czech Republic is dying from the effects of acid rain. **Why would restoring the forest be a slow process?**

more wood to make charcoal for blast furnaces. Eventually, they used coal as a fuel in place of wood, but not before huge areas of Europe had lost their native forests.

ACID RAIN STRIPS FORESTS In the 1960s, people noticed that many trees of the Black Forest in Germany were discolored, losing needles and leaves, and dying. In time, scientists identified one cause of the tree deaths as acid rain. Europe's factories produce high amounts of sulfur dioxide and nitrogen oxide emissions. These combine with water vapor and oxygen to form acid rain or snow. Winds carry the emissions to other parts of Europe, affecting an estimated one-fourth of all European forests. This problem has hit Scandinavia particularly hard, since the prevailing winds blow in that direction. As mentioned earlier, the Black Forest in Germany also has suffered extreme damage. To save the remaining forests, nations must work together to reduce air pollution. You can read more about this in Chapter 14. **B**

As you will read in Chapter 13, the ways people live upon the land and interact with each other make up the human geography of Europe.

CONNECT TO THE ISSUES

UNIFICATION

B How might a union of nations affect the clean-up effort?

SECTION 3 Assessment

1 Places & Terms

Identify and explain where in the region these would be found.

- dike
- polder
- seaworks
- terpen
- Zuider Zee
- IJsselmeer

2 Taking Notes

HUMAN-ENVIRONMENT INTERACTION Review your notes for this section.



- What are examples of human adaptation to the environment?
- What are examples of an environment changed by humans?

3 Main Ideas

- How have the people of the Netherlands been able to create more land for their country?
- How has pollution affected the city of Venice?
- How has industrialization hurt the forests of Europe?

4 Geographic Thinking

Making Comparisons

What is similar about the ways that the people of the Netherlands and the people of Venice interact with their environments? **Think about:**

- seaworks in the Netherlands
- canals in Venice

S See Skillbuilder Handbook, page R3.



SEEING PATTERNS Pollution has affected both Venice and the forests of Scandinavia. Create two **cause-and-effect charts** outlining the causes and effects of pollution in each place. Then write a sentence or two summarizing the similarities.