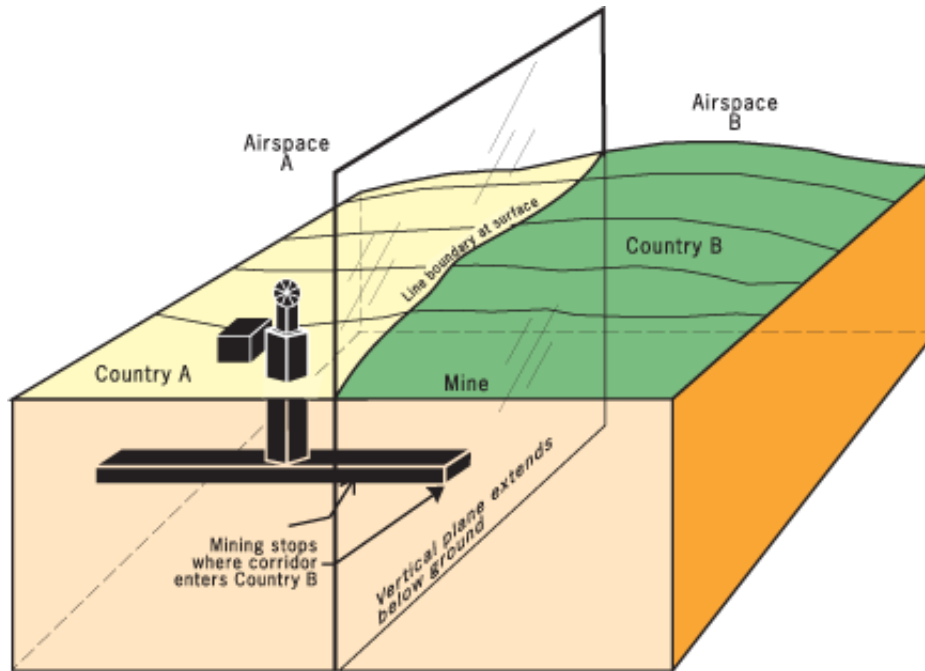


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## HOW ARE BOUNDARIES ESTABLISHED, AND WHY DO BOUNDARY DISPUTES OCCUR?

The territories of individual states are separated by international boundaries, often referred to as borders. Boundaries may appear on maps as straight lines or may twist and turn to conform to the bends of rivers and the curves of hills and valleys. But a boundary is more than a line, far more than a fence or wall on the ground. A **boundary** between states is actually a vertical plane that cuts through the rocks below (called the subsoil) and the airspace above, dividing one state from another (Fig. 8.18). Only where the vertical plane intersects the Earth's surface (on land or at sea) does it form the line we see on the ground.



**Figure 8.18** The Vertical Plane of a Political Boundary.

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Many borders were established on the world map before the extent or significance of subsoil resources was known. As a result, coal seams and aquifers cross boundaries, and oil and gas reserves are split between states. Europe's coal reserves, for example, extend from Belgium underneath the Netherlands and on into the Ruhr area of Germany. Soon after mining began in the mid-nineteenth century, these three neighbors began to accuse each other of mining coal that did not lie directly below their own national territories. The underground surveys available at the time were too inaccurate to pinpoint the ownership of each coal seam.

During the 1950s–1960s, Germany and the Netherlands argued over a gas reserve that lies in the subsoil across their boundary. The Germans claimed that the Dutch were withdrawing so much natural gas that the gas was flowing from beneath German land to the Dutch side of the boundary. The Germans wanted compensation for the gas they felt they lost. A major issue between Iraq and Kuwait, which in part led to Iraq's invasion of Kuwait in 1990, was the oil in the Rumaylah reserve that lies underneath the desert and crosses the border between the two states. The Iraqis asserted that the Kuwaitis were drilling too many wells and draining the reserve too quickly; they also alleged that the Kuwaitis were drilling oblique boreholes to penetrate the vertical plane extending downward along the boundary. At the time the Iraq-Kuwait boundary was established, however, no one knew that this giant oil reserve lay in the subsoil or that it would contribute to an international crisis (Fig. 8.19).



**Figure 8.19** The International Boundary between Iraq and Kuwait.

Kuwait's northern boundary was redefined and delimited by a United Nations boundary commission; it was demarcated by a series of concrete pillars 1.24 miles (2 kilometers) apart. © E. H. Fouberg, A. B. Murphy, H. J. de Blij, and John Wiley & Sons, Inc.

Above the ground, too, the interpretation of boundaries as vertical planes has serious implications. A state's "airspace" is defined by the atmosphere above its land area as marked by its boundaries, as well as by what lies beyond, at higher altitudes. But how high does the airspace extend? Most states insist on controlling the airline traffic over their territories, but states do not yet control the paths of satellite orbits.

## Establishing Boundaries

States typically *define* the boundary in a treaty-like legal document in which actual points in the landscape or points of latitude and longitude are described. Cartographers *delimit* the boundary by drawing on a map. If either or both of the states so desire, they can *demarcate* the boundary by using steel posts, concrete pillars, fences, walls, or some other visible means to mark the boundary on the ground. By no means are all boundaries on the world map demarcated. Demarcating a lengthy boundary is expensive, and it is hardly worth the effort in high mountains, vast deserts, frigid polar lands, or other places with few permanent settlements. Demarcating boundaries is part of state efforts to *administrate* borders—to determine how the boundaries will be maintained and to determine which goods and people may cross them. How a boundary is administered can change dramatically over time, however (Fig. 8.20).

## Types of Boundaries

When boundaries are drawn using grid systems such as latitude and longitude or township and range, political geographers refer to these boundaries as **geometric boundaries**. In North America, the United States and Canada used a single line of latitude west of the Great Lakes to define their boundary. During the Berlin Conference, colonial powers used arbitrary reference points and drew straight lines to establish the boundaries in much of Africa.

At different times, political geographers and other academics have advocated “natural” boundaries over geometric boundaries because they are visible on the landscape as physical geographic features. **Physical-political** (also called natural-political) **boundaries** are boundaries that follow an agreed-upon feature in the natural landscape, such as the center point of a river or the crest of a mountain range. The Rio Grande is an important physical-political boundary between the United States and Mexico. Another physical-political boundary follows the crest lines of the Pyrenees separating Spain and France. Lakes sometimes serve as boundaries as well; for example, four of the five Great Lakes of North America are borders between the United States and Canada, and several of the Great Lakes of East Africa are borders between Congo and its eastern neighbors.

## Field Note

“Seeing the border between Italy and Slovenia marked by a plaque on the ground reminded me of crossing this border with my family as a teenager. The year was 1973, and after waiting in a long line we finally reached the place where we showed our passports to the authorities. They asked us many questions and they looked through the luggage in our trunk. Now that Slovenia is part of the European Union and has signed the Schengen Agreement eliminating border controls between countries, crossing that same border today is literally like a walk in the park.”





**Figure 8.20** Piazza della Transalpina.

A square divided between the towns of Gorizia, Italy and Nova Gorica, Slovenia. © Alexander B. Murphy.

Physical features sometimes make convenient political boundaries, but topographic features are not static. Rivers change course, volcanoes erupt, and slowly, mountains erode. People perceive physical-political boundaries as stable, but many states have entered territorial conflicts over borders based on physical features (notably Chile and Argentina). Similarly, physical boundaries do not necessarily stop the flow of people or goods across boundaries, leading some states to reinforce physical boundaries with human-built obstacles (the United States on the Rio Grande). The stability of boundaries has more to do with local historical and geographical circumstances than with the character of the boundary itself.

## Boundary Disputes

The boundary we see as a line on a map is the product of a complex series of legal steps that begins with a written description of the boundary. Sometimes that legal description is old and imprecise. Sometimes it was dictated by a stronger power that is now less dominant, giving the weaker neighbor a reason to argue for change. At other times the geography of the borderland has actually changed; the river that marked the boundary may have changed course, or a portion of it has been cut off. Resources lying across a boundary can lead to conflict. In short, states often argue about their boundaries. Boundary disputes take four principal forms: definitional, locational, operational, and allocational.

*Definitional boundary disputes* focus on the legal language of the boundary agreement. For example, a boundary definition may stipulate that the median line of a river will mark the boundary. That would seem clear enough, but the water levels of rivers vary. If the valley is asymmetrical, the median line will move back and forth between low-water and high-water stages of the stream. This may involve hundreds of meters of movement—not very much, it would seem, but enough to cause serious argument, especially if there are resources in the river. The solution is to refine the definition to suit both parties.

*Locational boundary disputes* center on the delimitation and possibly the demarcation of the boundary. The definition is not in dispute, but its interpretation is. Sometimes the language of boundary treaties is vague enough to allow mapmakers to delimit the line in various ways. For example, when the colonial powers defined their empires in Africa and Asia, they specified their international boundaries rather carefully. But internal administrative boundaries often were not strictly defined. When those internal boundaries became the boundaries between independent states, there was plenty of room for argument. In a few instances, locational disputes arise because no definition of the boundary exists at all. An important case involves Saudi Arabia and Yemen, whose potentially oil-rich boundary area is not covered by a treaty.

*Operational boundary disputes* involve neighbors who differ over the way their border should function. When two adjoining countries agree on how cross-border migration should be controlled, the border functions satisfactorily. However, if one state wants to limit migration while the other does not, a dispute may arise. Similarly, efforts to prevent smuggling across

borders sometimes lead to operational disputes when one state's efforts are not matched (or are possibly even sabotaged) by its neighbor. And in areas where nomadic ways of life still prevail, the movement of people and their livestock across international borders can lead to conflict.

*Allocational boundary disputes* of the kind described earlier, involving the Netherlands and Germany over natural gas and Iraq and Kuwait over oil, are becoming more common as the search for resources intensifies. Today many such disputes involve international boundaries at sea. Oil reserves under the seafloor below coastal waters sometimes lie in areas where exact boundary delimitation may be difficult or subject to debate. Another growing area of allocational dispute has to do with water supplies: the Tigris, Nile, Colorado, and other rivers are subject to such disputes. When a river crosses an international boundary, the rights of the upstream and downstream users of the river often come into conflict.



People used to think physical-political boundaries were always more stable than geometric boundaries. Through studies of many places, political geographers have confirmed that this idea is false. Construct your own argument explaining why physical-political boundaries can create just as much instability as geometric boundaries.

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