

Chapter 2

Developing the Territory

2.1. Agricultural regions

Americans are very attached to their rural roots. In 1790, 90% of the population lived directly off the land. Clearly, rural life and agriculture are still considered as an ideal in the United States. President Jefferson believed that democracy was based on the regular settlement of family farms, while industrialization and urbanization based on the British model could only lead to misery and social struggles. US government policy has always favored farmers, especially in the 19th century, when westward expansion was primarily based on voluntary agricultural settlements. The policy of mass immigration can only be understood as part of this desire for settlement and development of the mainland.

The United States has long been the world's agricultural superpower. Their agriculture is strongly capitalized and integrated into the overall economy. As the world's leading exporter of food, one-quarter of cultivated land is devoted to export. The Chicago Board of Trade (CBoT) sets the prices of cereal, which farmers all over the world use. But this exporting dominance does not shelter US agriculture from crisis and it does not exclude environmental problems.

The major difference between the US and Europe is the history of the settlement of each region. The US population is dispersed, and from the very start, with little exception, farmers did not practise subsistence agriculture, but commercial agriculture at the demand of both domestic and external markets. This is why the southern states, with their more crop-friendly climate, specialized early on in tobacco and cotton plantations – the foundations of their distinct, slave-based

economy. As early as the mid-19th century, mechanization helped offset the lack of manpower, and American agriculture quickly became an important export. According to the economic model of Von Thünen (1826), large areas of specialized crops, called belts, developed based on climate, richness of soils, and the distance from urban markets in the East, which were also gateways for exporting to Europe. Family farming in the Great Plains peaked during the First World War. Highly dependent on weather conditions and market prices, it then suffered from a structural crisis in the 1920s, which led it along a path of continual restructuring. Farmers were forced to diversify their production and to adapt to the market and international competition, to the point where the belts were gradually dismantled and became unrecognizable. Rural counties lost their population due to the continuous flow of emigration, which continues today in the Great Plains. Most of the land was taken over by large farms and marginal lands were abandoned. The agricultural crisis which took place during the interwar period was also an environmental crisis, as a result of land overuse and deforestation. Erosion and the decline of productivity caused farmers to leave Oklahoma and the southern Appalachians. Meanwhile, agriculture continued its economic development with intensive mechanization, the introduction of chemicals, and the development of irrigation.

Instead of focusing on agricultural production or regional specializations, this chapter will focus on settlement and land use. What remains today of the agricultural colonization which started in the 19th century?

Today, agricultural land covers less than one-fifth of the territory of the United States. Alaska is virtually uncultivated, as are the Hawaiian Islands (see Figure 2.2). Just in the 48 conterminous states, agricultural land totals 1.8 million km² (see Figure 2.1). Agriculture occupies very little space in the desert of the Southwest, or in New England. Only the states of the Great Plains, from north to south, exceed the national average farmland share (as a percentage of the total area). Iowa, at the heart of the old Corn Belt, is the state with the most agricultural land. Agriculture has declined greatly on the Atlantic coast, except in certain parts of central Florida, southern Georgia, the coastal plain of North Carolina and the borderlands of Pennsylvania and Maryland. Agriculture has left the Appalachian highlands, but is omnipresent in the Midwest. The percentage of land used in agriculture decreases west of the 100th meridian, which is nicknamed the “disaster meridian” because of the variability of precipitation rates from one year to the next. West of the Rocky Mountains, agriculture is concentrated in some fertile and generally irrigated areas; the Snake River valley in southern Idaho, the Columbia River Basin and the Willamette valley are the three main agricultural regions of the Northwest. Agriculture in California, the richest state in the US, is concentrated in the Central Valley and the Imperial Valley.

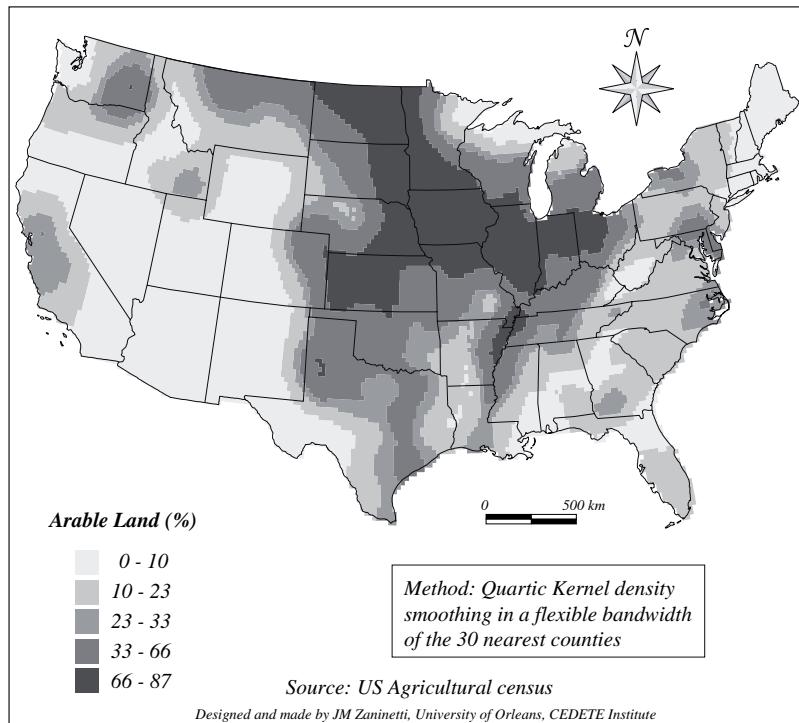


Figure 2.1. Agricultural land 2002

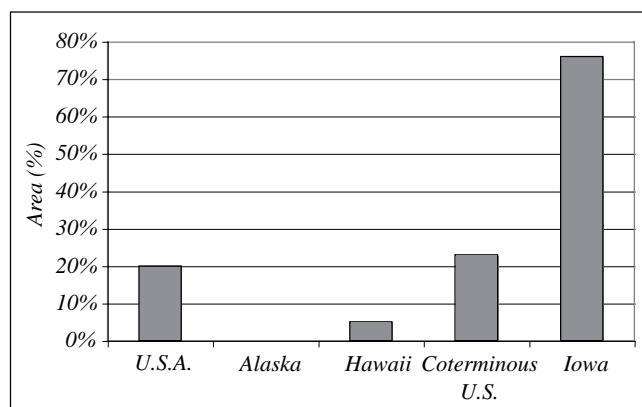


Figure 2.2. Agricultural land in the US in 2002

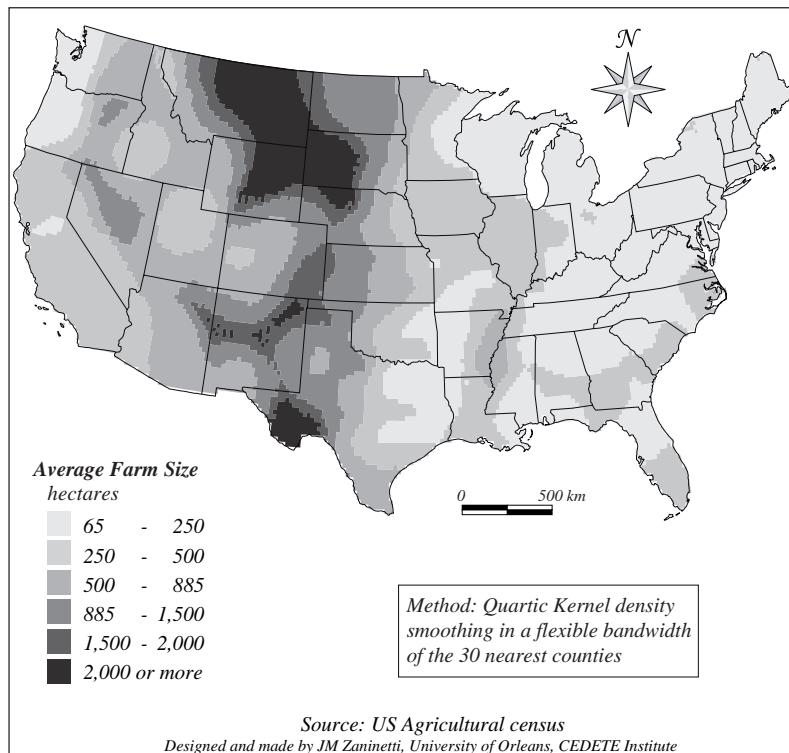


Figure 2.3. Average farm size in 2002

Farms in the US are vast. The average farm cultivates 885 hectares (ha), and sizes range from 170 ha in Rhode Island, to 5,600 ha in Montana (see Figure 2.3). The increase in farm size from east to west primarily reflects the history of settlements, but also the influence of an environment which becomes more and more challenging moving west. Farms have to be vast in order to be able to be cost-effective in the more mountainous and arid regions of the West. Farm sizes get smaller once again in the fertile valleys of the Pacific coast.

Farms are exceedingly large in the northwestern Great Plains (Nebraska, South Dakota, Montana, Wyoming) because of drought and agricultural decline. Yet, the biggest farms of all are found in the arid regions of western Texas. Apart from a few isolated areas of the Appalachians dedicated to subsistence farming, the small family farm no longer dominates in the US, with one exception: the Pacific Northwest (Willamette Valley).

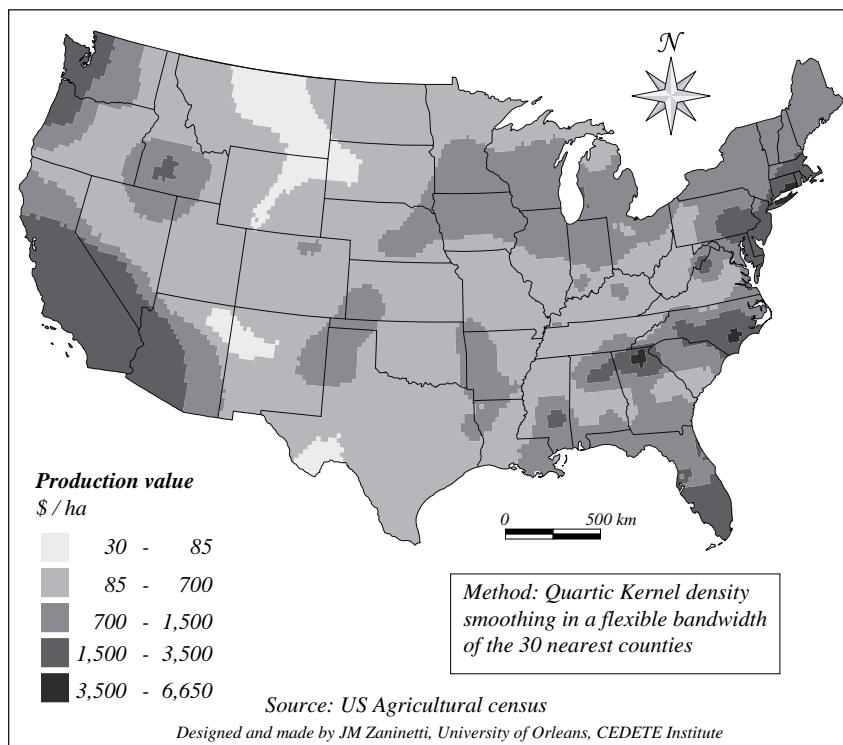


Figure 2.4. Agricultural productivity in 2002

Agriculture in the Great Plains is based on extensive farming. The average yield per hectare was only \$700 in United States in 2002, with a minimum of \$85 in Montana and a maximum of \$3,500 in Connecticut, a state which is located in the dairy and truck farmer belt of New York (see Figure 2.4).

Suburban agriculture tends to specialize in very profitable production because of the inflation of land values as a result of urban development. This is very common on the Northeastern Atlantic coast.

A more intensive agriculture, usually irrigated, developed first in California and Florida, before spreading to the Pacific Northwest and the deserts of Arizona and New Mexico. Meanwhile, agriculture is rather extensive in the Appalachian highlands, in the mountainous West, and in the High Plains.

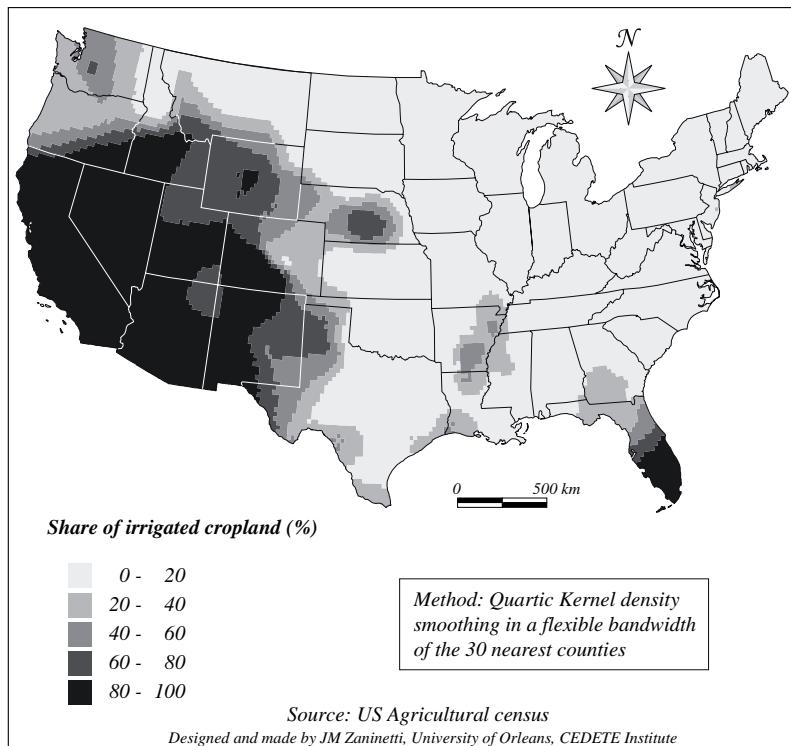


Figure 2.5. Importance of irrigation in 2002

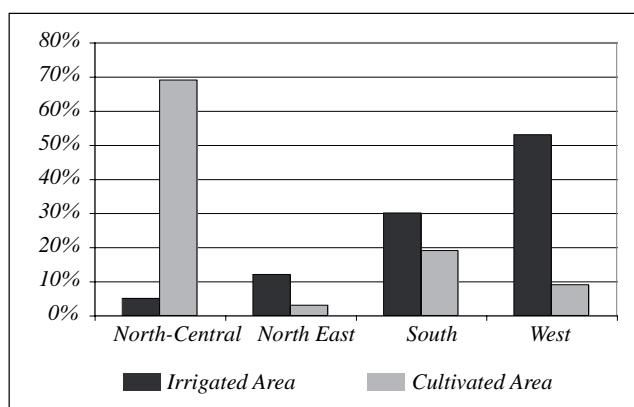


Figure 2.6. Irrigated regions in 2002

In the West, the lack of rainfall led to an early specialization in ranching. Since 1950, crop cultures have been developed with the widespread use of irrigation, based on the Californian model, wherever possible. On average, crops only use half of the agricultural land in the United States; the other half is dedicated to pastures. Over 64 million hectares are irrigated, representing 12% of all cultivated land (see Figures 2.5 and 2.6).

Irrigation is used very little in mid-northern states, with the exception of Nebraska. In the South, irrigation was developed predominantly in Florida, but also in western Texas and along the valleys of the Rio Grande and the Mississippi. In the West however, irrigation is widespread. Virtually all cultivated land is irrigated in Arizona and California, and half of the land is still irrigated in Colorado. As the leading consumer of water, agriculture contributes very little to finance the cost of bringing freshwater to their fields. Today, urban dwellers and farmers fight over access to water resources in the West. While the logic of trade markets would simply provide water to the highest bidder, this would be likely to bring about the demise of the most productive irrigated agriculture of the country. Southwestern states are therefore forced to come to an agreement and regulate the use of water (Colorado Compact). Similar problems arise in the southwestern region of the Great Plains, as well as, paradoxically, in Florida. Indeed, despite a very humid climate, the freshwater resources of Florida, which is a karst region devoid of any major rivers, are disputed by three user-groups: urban consumption, irrigation and the preservation of wetlands.

2.2. An agriculture which does not influence settlement

The number of family farms has continued to decline since 1920. The agricultural census of 2002 counted fewer than 1.1 million farms, which represents 89% of actively operating farms. The remaining farms are all corporate farms, i.e., farms owned by corporations, with farmers who are merely employees (see Figure 2.7).

Family agriculture is still omnipresent in the South, particularly in the uplands of the Appalachians and the Ozark Mountains. Corporate farming, on the other hand, has developed in areas where farming is most profitable, either due to the intensity of production in California, Florida, or the northeastern region of "Atlantic Seaboard", or because of the number of farms concentrated in the western inlands (Montana and Wyoming in particular), or in the fertile Mississippi Valley (Yazoo River valley).

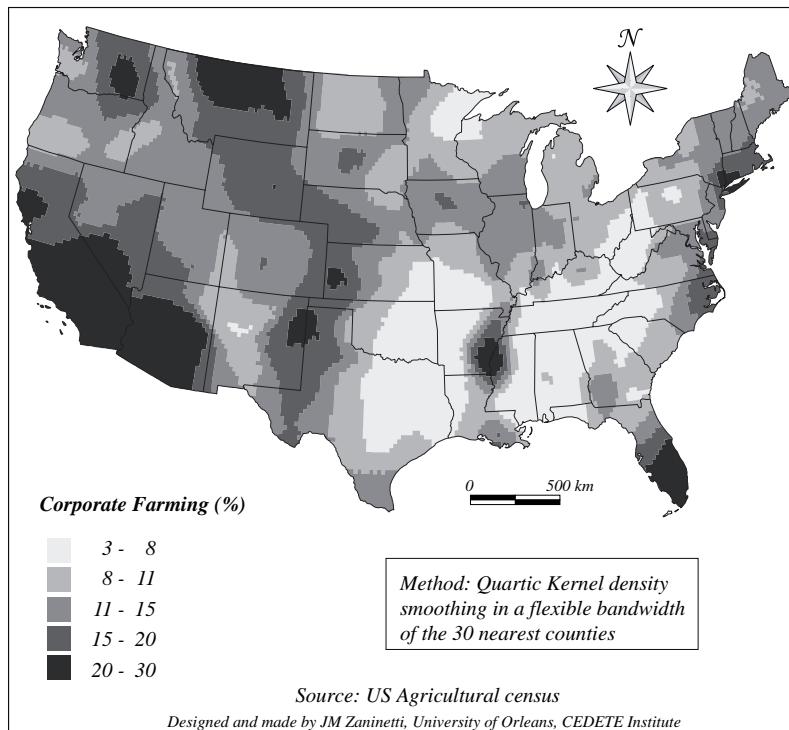


Figure 2.7. Extension of corporate farming 2002

The US Census continues to count the population of farms. In the last decennial census, the farm population did not exceed 3 million people, representing about 1.1% of the total population of the United States (see Figure 2.8).

Rural agricultural density is 0.32 inhabitants/km² for the 48 conterminous states, ranging from 0.1 to 0.6 inhabitants/km² depending on the state. Only in some parts of the Midwestern plains and southeastern Pennsylvania is a population of more than 1 inhabitant per km² able to live directly off the land. West of the 100th meridian, the density of agricultural population declines rapidly. The mountains of the western inlands are deserted countryside. Other areas of low density can be found around Lake Superior, in northeastern Maine, and in southern Florida. In the West, the Willamette Valley and the Central Valley in California are oases of rural settlement.

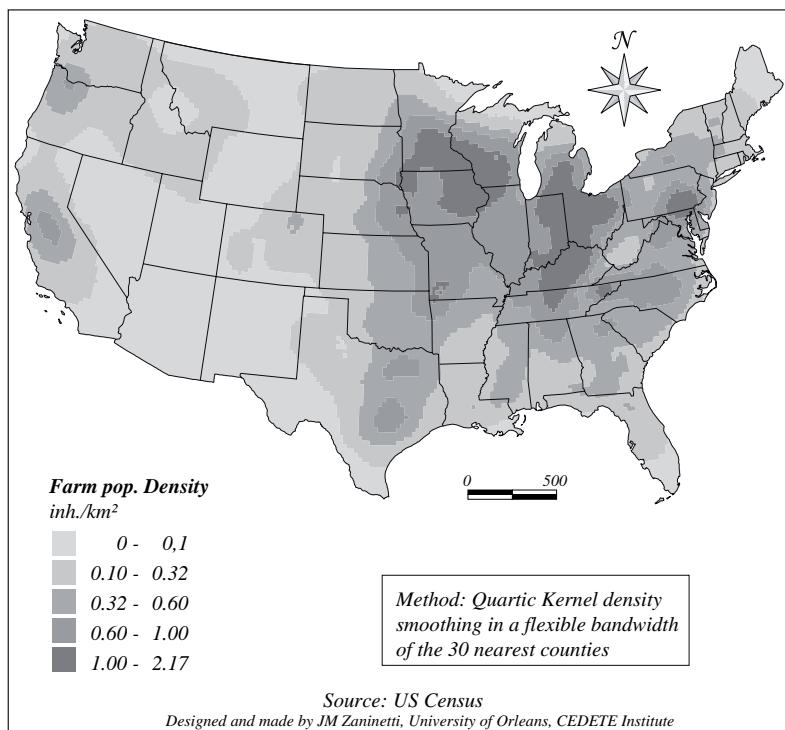


Figure 2.8. Density of the agricultural population 2000

Migration from rural to urban environments is very high. Between 1970 and 2000, the population of farms declined by 64% (see Figures 2.9 and 2.10). Most states lost between 50% and 80% of their farm population within 30 years. Alaska is an exception because of the commitment of its Indigenous population to the traditional lifestyles of hunters and fishermen. It is on the west coast, where agriculture specialized early in the cultivation of highly profitable crops, that the farm population has declined least. In these areas, Hispanic immigration has contributed to the renewal of the farming population. The decline is fastest in the South where the plantation economy pursues its reconversion to forestry and an emerging “poultry belt” and mechanization. Iowa, the Midwestern state considered to typify rural America, experienced a decline similar to that of the national average. The average age of farmers today is high, around 55 in 2002. The end of American family farming is perhaps just around the corner. As the world’s leading producer, will the US know how to develop sustainable agriculture without farmers?

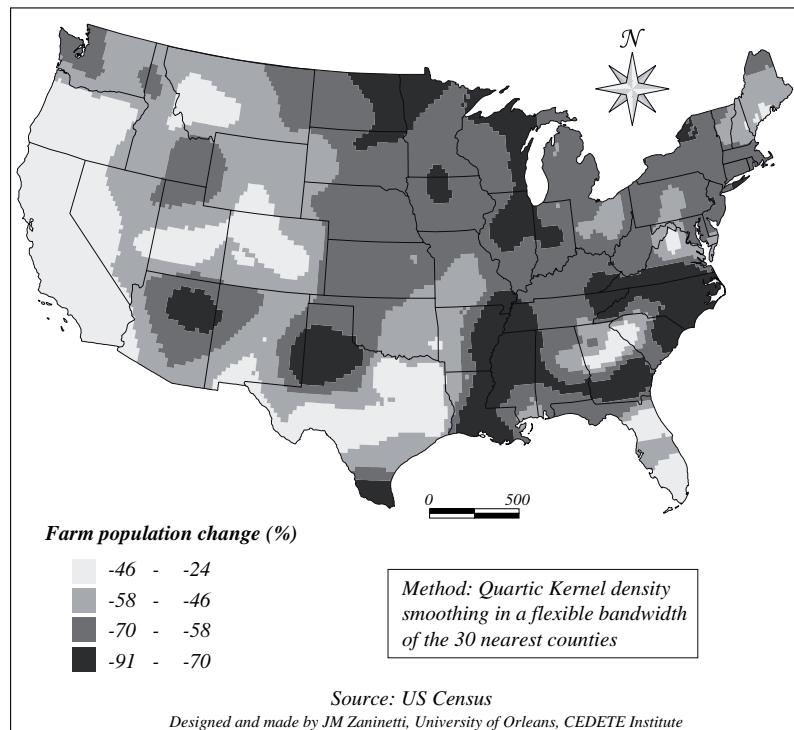


Figure 2.9. Decline of agricultural population 1970–2000

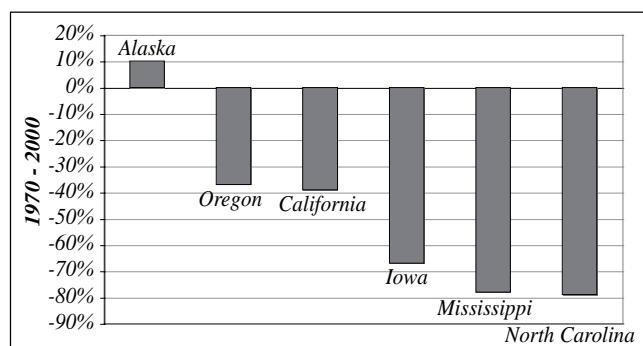


Figure 2.10. Evolution of agricultural population in several states

2.3. The abundance and limits of natural resources

Until the 1920s, the abundance of natural resources and the immense size of the country supported Americans in the belief that their territory was a sort of Promised Land. Their management of renewable and non-renewable natural resources was therefore just as negligent as their manpower was scarce. Meanwhile, entire regions relied on farming for economic development. Gradually, the limits of this development model, and the damage caused by it, began to show. Americans came to realize that some strategic non-renewable resources were being depleted. The United States became particularly dependent on its oil imports, starting in 1950. They were also slow to discover that mining was unsustainable, and caused great pollution. There are many ghost towns in the United States in areas where a mineral resource was fully exhausted or its extraction abandoned. Finally, they have only very recently become aware of the serious consequences of global warming caused by a development model that is based on the unrestrained consumption of fossil fuels, which are responsible for massive emissions of greenhouse gases. The diversity of usable natural resources on US territory is considerable. This book focuses on just one of those renewable resources – the forest. The forest is a good example of the abundance of resources as well as of the incomplete transition from overusing natural resources to sustainably managing them. In the case of fossil fuel resources, the following section will be on non-renewable resources, which are destined to become the main geopolitical, economic and environmental issue for the country to confront in the coming years.

2.4. Working towards the sustainable management of the American forest

As half of the US territory was covered in forest at the start of the colonial period, logging is one of the oldest forms of natural resource exploitation in the United States. Boston's emergence in the eighteenth century as the United States' first city was as a result of the development of shipbuilding¹ be better. While the US territory represents just 6% of the world's inhabited lands, it represents 10% of the world's forests and provides 25% of the world's production of wood and wood products.

Between 1630 and 1907, logging and agricultural clearing reduced American forests which were reduced from an estimated area of 423 million hectares to 307 million hectares, mainly in the Northeast and the South. Today, the forest still covers 302 million hectares, or one-third of the country's total land area. Forest area declined in the 20th century in the West and in the South, but it rose in the North and the East. Forest protection began early. The National Forest Service was founded in 1891. National forest reserves represent the majority of protected forest

areas, spanning 11 million hectares. Approximately 10 million hectares of private forest are also protected. The protected area has doubled since 1953, representing up to 7% of the total US forest area. Most of these forest reserves (75%) are found in the West (see Table 2.1).

Forest Region	North, North-East	South	West and High Plains (including Alaska)	Total
<i>Area (millions ha)</i>	167	216	533	916
Forest 1630	120	143	159	422
Forested area % 1630	72%	66%	30%	46%
Forest 1907	56	95	156	307
Forested area % 1907	33%	44%	29%	34%
Area change 1630–1907 (base 100 in 1630)	47	66	98	73
Forest 1953	65	91	149	305
Commercial Forest 1953	62	83	61	206
Commercial Forest share 1953	95%	91%	41%	68%
Forest Preserves 1953	1	1	8	10
Forest Preserves share 1953	2%	1%	5%	3%
Forest 1997	69	87	147	303
Forested area 1997	41%	40%	28%	33%
Area change 1907–1997 (base 100 in 1907)	123	92	94	99
Commercial Forest 1997	65	81	58	204
Commercial Forest share 1997	94%	93%	39%	67%
Forest Preserves 1997	3	2	16	21
Forest Preserves share 1997	4%	2%	11%	7%
National Forest 1997	5	5	50	60
National Forest share 1997	7%	6%	34%	20%
Other Forest on Federal Domain	12	5	51	68
Forest on Federal Domain share 1997	17%	6%	35%	22%

Table 2.1. *Forest area in the United States*
(Source: National Forest Service Report 2000)

Two-thirds of the American forest, including a large part of national forest, is exploited for commercial purposes. The logging industry exploits less than 40% of the forest in the West, and nearly half of that forest is neither exploited nor protected. This percentage is partly due to Alaska, since taiga has very little commercial value and is also very difficult to access in most of the state. Until the 1930s, the logging industry in America despoiled the land, with the widespread practice of clearcutting. Erosion, caused by the deforestation of the southern Appalachians, began generating greater awareness. Over time, private forest owners began developing management plans for their resources. The majority of exploited forests, including 40% of the area of privately exploited forests, are now sustainably exploited. According to estimates from the National Forest Service, the supply of usable wooded area has increased since 1953. However, this increase is only in the eastern half of the US; supply in the West remains changed. Some over-exploitation of large coniferous trees occurs in western states. The practice of clearcutting has largely been replaced by more selective methods, except in the South where many pine plantations are destined for commercial exploitation. An average of one million hectares of forest is planted each year in the United States, the majority of which is commercial pine forest in southern states (see Figure 2.11).

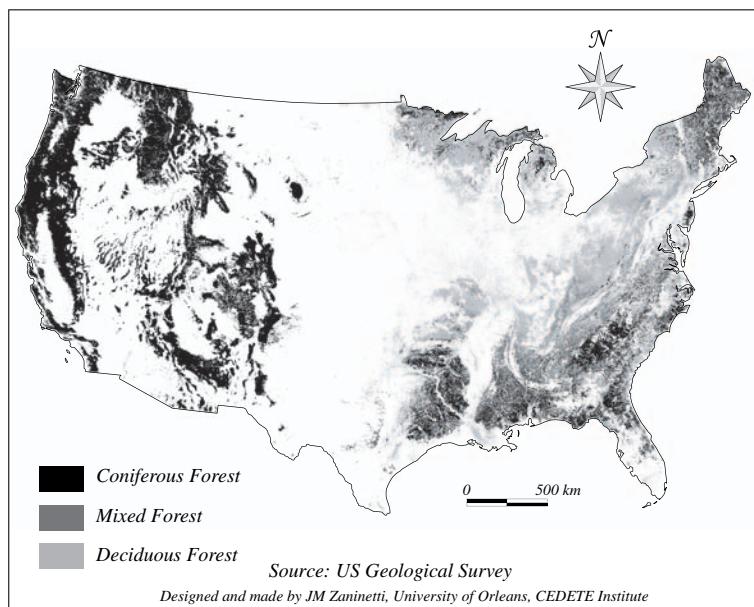


Figure 2.11. Forest area in 2002

2.5. Fossil resources-abundance and dependence

The extraction of mineral and organic resources from the subsoil, which started in the 19th century, contributed to the strengthening of the United States as a superpower. The country is rich in a large variety of mineral resources, which enabled the development of a powerful industrial sector. As with forest resources, in the mid-20th century the United States went from the illusion of having unlimited resources to the understanding that their domestic production of those resources was insufficient to meet the demands of the insatiable consumption of their industry, their transport, and their cities.

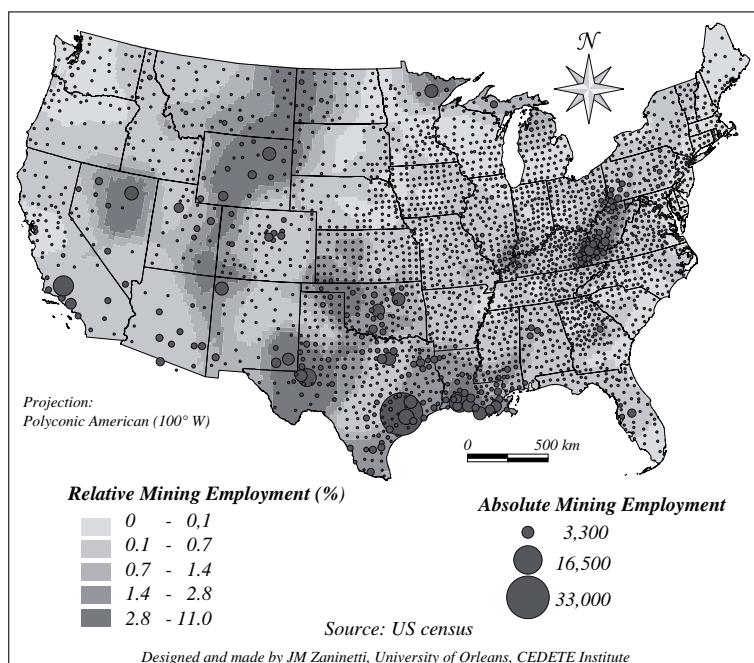


Figure 2.12. Employment in extractive industries in 2000

Although it was less significant than in the 19th century, the mining industry employed more than 0.9 million people in 1999. Its role at a local level can sometimes be very important (see Figure 2.12). In the coal belt of eastern Kentucky and West Virginia, its share of local employment is more than 4 times higher than the national average. A similar rate is found in the iron mines region around Lake Superior, near Duluth. The extraction of hydrocarbons, mainly in offshore oilfields, is one of the main sources of employment in the coastal areas of the states of

Louisiana and Texas. Houston is the undisputed capital of the US oil industry. The western Great Plains is another major area of production of coal and hydrocarbons. The sparsely populated areas of the western mountain regions are often heavily dependent on extractive industries. Gold and uranium mines provide one in three jobs to residents of Elko County in Nevada, which is an important historic site of the nineteenth-century Gold Rush, whose ghost towns have become tourist attractions.

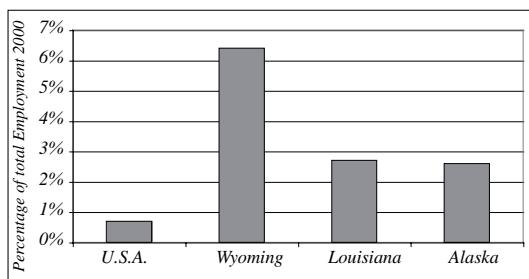


Figure 2.13. Importance of mining industry in several states in 2000

With its sparse population and very rich subsoil, Wyoming is now the state most heavily dependent on extractive industries (see Figure 2.13). Louisiana is ranked second, before Alaska. The dependence on extractive industries makes the economies of these states vulnerable, and often triggers serious environmental problems such as the destruction of land by strip mining, chemical pollution, abandoned mines, and land subsidence. A report from the USGS estimates that 80% of the subsidence of the Mississippi delta is due to the massive extraction of subterranean hydrocarbons.

2.6. The case of fossil fuels

Since the Industrial Revolution, coal, oil, and natural gas have been at the heart of the US and world economies. Endowed with great amounts of primary and secondary sedimentary rocks, the American subsoil has proved to be very rich in fossil fuels.

2.6.1. The world's second largest producer of coal

Vast coal resources in the Appalachians enabled heavy industry in the US to develop during the 19th century, making Pittsburgh, Pennsylvania, the home of the steel barons.

Today, the United States is still the world's second largest producer of steel, after China. The US production of 1 billion tons in 2003 represents 20% of world production for that year. Proven reserves amount to the equivalent of 500 years of production at present rates, although exports are declining. After peaking in the early 1990s to nearly 11% of national production, only 4% of the steady production is currently exported, while imports are increasing due to more competitive prices and the rapid increase in the consumption of coal for producing electricity.

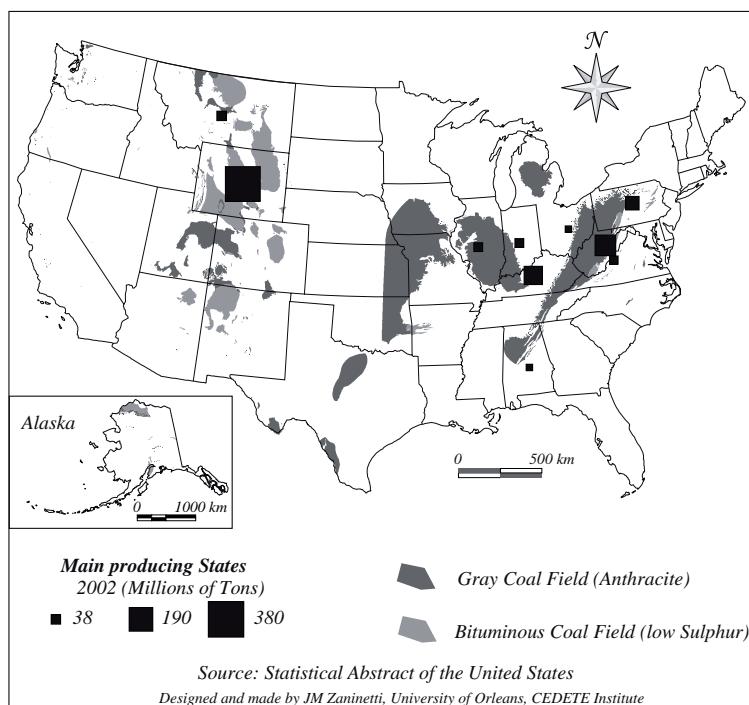


Figure 2.14. Coal regions and production 2002

Eight states are responsible for 81.5% of domestic production (see Figure 2.14). In 1970, 80% of national production (470 million tons) came from the Appalachian states, with Kentucky and West Virginia leading the production ranks. Rich in anthracite, Appalachian coal is ideal for the steel industry. In 2002, production in this region was only 420 million tons or 40% of national production. This was due to the decline of metallurgy and the relatively high cost of extraction. The mountains' deposits are far from being depleted, however, and account for more than 36% of the country's proven reserves. The exploitation of mainland deposits occurs chiefly in

the states east of the Mississippi River (Illinois, Indiana, Kentucky), but the states west of the Mississippi and in the South are also home to important reserves. Coal from the Great Plains has a high sulfur content, which makes it less useful for the metallurgical industry and very polluting since the combustion of this coal promotes the creation of sulfur dioxide in the atmosphere which is responsible for acid rain. Its production has still increased due to the insatiable appetite of Americans for electricity, and the need of fossil-fuel power plants for the production of coal. Since 1970, increased awareness of the issue of pollution has favored the exploitation of coal in the West, and more specifically, of bituminous coal – which has a low sulfur content – from Wyoming and Montana. This type of coal is well suited to the needs of electricity since it releases relatively little ash. Insignificant in 1970, the production from these two states has grown rapidly to over 400 million tons in 2001, and today accounts for almost 40% of national production. Although Wyoming is today the leading state for production, the largest reserves are in Montana. Together, the proven reserves of the two states represent 37% of the national total. The United States also has lignite reserves located primarily in the state of North Dakota.

Coal mining is an important element of society in regions where it is extracted. Coal has long dominated the Appalachian economy, at great cost to human and ecological life. Accidents, silicosis, unemployment, low wages, education levels well below the national average, land destroyed by strip mining, water pollution, and acid rain are just a few of its consequences. The Surface Mining Control and Reclamation Act of 1977 required companies to pledge funds for environmental restoration after the cessation of mining activities, before they could even obtain a permit to begin exploitation. Ever since the Act was passed, it has been contested by those who argue that the additional costs weaken the regional economy. This is an example of the debate concerning short-term profits versus the long-term investments required by sustainable development.

After suffering decades of agricultural abandonment, Wyoming and Montana see the coal boom, which is also an oil and gas boom, as an opportunity for economic salvation. The effect of 150 years of exploitation on the Appalachian plateau, however, makes environmentalists skeptical about the long-term benefits of this new economic specialization.

Today, coal supplies nearly 23% of energy currently consumed in the US. It is the only source of fossil energy for which production exceeds consumption and for which proven reserves are substantial. It is also, unfortunately, the fuel which pollutes the most, and it contributes heavily to the production of greenhouse gases. Coal liquefaction and gasification technologies are being researched today as it is likely that they would be cleaner sources of energy.

2.6.2. Oil – a strategic dilemma

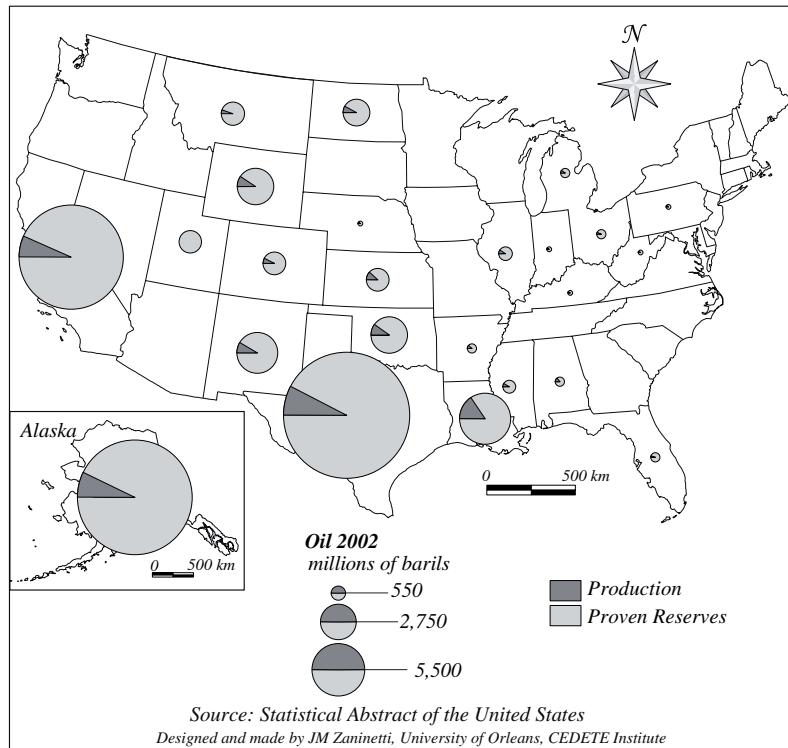


Figure 2.15. Oil production and reserves in 2002

The extraction of petroleum began on the Appalachian plateau in 1859. Although the geological conditions necessary for their formation are different, hydrocarbons are generally found in the same sedimentary rock as coal (see Figure 2.15). Oil extraction gradually spread to the West with the increase in demand that was intensified by the automobile revolution of the 20th century. Domestic production rose from less than 500 million barrels in 1920 to 3 billion barrels in 1940. Imports remained negligible until 1950 because the discovery of huge oil fields in Texas, Oklahoma, Kansas, Louisiana, and California appeared to provide the United States with unlimited resources. While Germany and Japan struggled with fuel shortages, the US had domestic resources that greatly aided the Allies' victory in the Second World War. Since then, oil has been at the heart of American geopolitics, as well as its geography. The oil industry had a much greater influence on the growth of several of the sunbelt cities, including Los Angeles, Houston and Dallas, than

military establishments, or the economy of tourism and recreation. More generally, postwar America grew accustomed to cheap fuel, and the population therefore rapidly decentralized to live in more spacious surroundings. The suburban revolution is the most obvious geographical result of the entrance of America into the Oil Age, and the new, widespread mobility of individuals.

To respond to ever-increasing demand, oil exploration continued actively in the second half of the 20th century. Some oilfields were discovered in the High Plains (Montana, Wyoming, North Dakota), but the offshore resources of the Gulf of Mexico in Texas and Louisiana were the most promising discoveries, and they established Houston as the capital of the US oil industry. In addition, significant deposits were found in northern Alaska, on the shores of the frozen Beaufort Sea in the 1960s (Prudhoe Bay). Despite the extreme weather conditions of the polar environment, the deposits of northern Alaska were exploited from 1973 to 1984, a time when soaring oil prices resulted in an unprecedented economic boom for producing regions. However, after peaking at around 3.5 billion barrels in the early 1970s, domestic production began to decline as the deposits of the Middle West and Appalachian regions diminished, and those of southern California had already passed their peak production.

Domestic production rapidly became insufficient for demand. By 1973, 25% of national consumption was imported. From 1973 to 2002, domestic production dropped by 38%, while overall consumption increased by 20%. Today, 66% of the domestic consumption of crude oil is supplied by imports. Although still the third largest producer of oil after Saudi Arabia and Russia, the United States is now dependent on other countries for its oil supply.

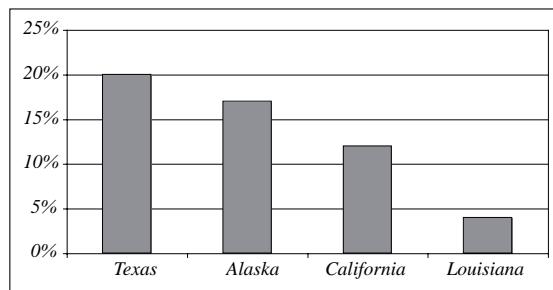


Figure 2.16. *Leading states in domestic oil production in 2004*

Nowadays, domestic production is mainly concentrated in the West (see Figure 2.16). Alaska's supply crosses the taiga towards regions in demand, via a north-south pipeline, before being loaded onto tankers at Valdez on the state's Pacific shores. California was still the third largest state producer in 2004, but Texas comes in first place. The location of known proven reserves is roughly the same as that of today's production. Unlike coal, in 2004, the United States had only 11 years of proven reserves at the current rate of extraction, with more than half of deposits in offshore platforms (Gulf of Mexico, Beaufort Sea).

Producing regions experienced an economic crisis, starting in 1985, when they were hit by the aftershocks of the oil crisis. Exploration slowed down considerably until 2003, which was the year when crude oil prices began to rebound. The recent revival of the oil industry was prompted by soaring prices (2003–08). There was talk of extending exploration and development in northern Alaska and in the eastern Gulf of Mexico towards Florida – two of the most promising regions. Recent controversy has led to a shift in attitude however, and the two development projects now face strong resistance. In Alaska, oil companies covet lands situated on nature reserves and Native Indian lands. In Florida, residents of the eastern coast are opposed to the risk of coastal pollution caused by offshore drilling platforms.

Influenced by the interests of the oil industry and increasingly embarrassed by the country's dependence on imports from the Middle East, the Bush administration supported the development of domestic production, but scandals (Enron in 2001) and environmental crises (Hurricane Katrina in 2005) gave rise to growing opposition from the public. The development of the oil industry has turned into a political issue. Meanwhile, oil continues to provide 40% of the energy consumed in the United States. This dependency is even further aggravated by international issues.

The dilemma is first geopolitical. The military adventure in Iraq was motivated by an attempt to plunder oil resources, which had been nationalized in 1970. The profits from the sale of this oil were to fully fund the military expedition, and more. Unfortunately, this strategy failed completely because the instability in the region was such that production could not be developed. Meanwhile military costs, expenses, and the loss of life continued to increase, and the strategic position of the United States in the region became hopeless.

Since 2006, Americans have finally been convinced that the Iraq situation presents difficulties which mirror those of the Vietnam War, and they now seek to disengage without shattering strategic interests and, if possible, without losing face.

The obstinacy of President G.W. Bush on this issue required the country to wait until 2009 to find a way out of this strategic impasse.

The dilemma is also technological. After the nuclear accident at Three Mile Island in 1979, the US froze its civil nuclear program. As a result, most of the electricity consumed in the United States is produced in thermal power stations fueled by coal, gas or oil.

There is now talk of reviving the nuclear program and the production of electricity from renewable energy sources. In his State of the Union address in 2006, President Bush proposed a plan along these lines (Advanced Energy Initiative); meanwhile, his administration continued to support the development of domestic oil production, which clearly contradicts the Advanced Energy Initiative.

The third dilemma is related to the environment. After much stalling and denial of the obvious, American public opinion is now convinced that the burning of fossil fuels is responsible for global warming which is in turn threatening the security of the country itself, particularly on the coasts with coastal erosion in Alaska, increased hurricane hazards in South-Eastern states, the threat of coastal regions being permanently submerged under water, and the excessive heat and forest fires in the West.

Other more indirect problems result from global warming. Insect infestation of forests and the arrival of new diseases of tropical origin are two examples. After the West Nile virus traveled from Africa to New York by plane in 1999, the mosquitoes that carry this tropical disease grew accustomed to the United States. In 2001, cases of this virus were identified throughout the eastern half of the country. The West has been infested since 2003, and the number of cases increases every year.

The main problem is that the transportation sector in the United States, entirely dependent on oil, already represents 28% of the total domestic consumption of energy, and this consumption continues to grow. Air transportation has become crucial to facilitating mobility within the national territory just as road transport has become essential to ensuring connections within cities that are extremely spread out. To reduce the country's dependency on oil would therefore either require radical changes in lifestyle and a reorganization of territory – both difficult to imagine – or radical innovations in technology (biofuels, hybrid vehicles, hydrogen engines, etc.) capable of completely remodeling the transportation industry. Today, the United States seems to be engaging in this second approach, which also has the advantage of providing promising economic growth opportunities.

2.6.3. Natural gas – a highly desirable resource

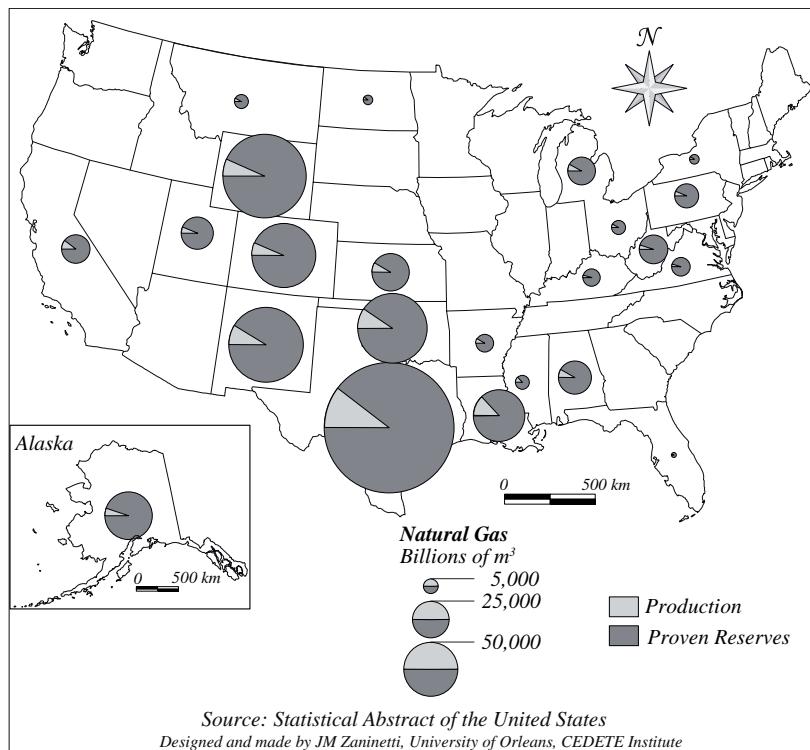


Figure 2.17. Natural gas production and reserves in 2002

Natural gas and oil production usually go together (see Figure 2.17). At first, natural gas was merely a by-product which was burned. Its exploitation at an industrial level began in the 20th century in Louisiana¹ and in the Appalachians. Natural gas was transported by pipeline from the extraction sites to the cities of the East Coast and Great Lakes where it was then consumed.

Domestic production subsequently increased steadily to peak at almost 21,700 billion m^3 in 1970, and then stabilized at the high level of around 20,000 billion m^3 per year. The United States is now the world's second largest producer of natural

1. The first gas pipeline was built in Louisiana in 1908.

gas, after Russia. Until 1990, domestic production was able to meet domestic demand.

But the success of the new gas-fueled power stations – more efficient and less polluting than coal stations – generated such enthusiasm that the country began to import more. Nearly 18% of the gas consumed in the United States is now imported from fields in Alberta, Canada, via pipeline.

Naturally, the geography of the production of natural gas is similar to that of oil. The state of Texas is the country's leading producer, providing 26% of national production. In Wyoming, exploration efforts were multiplied and production more than tripled between 1985 and 2004, making the state the second producer in the country, with a jump from 2% to 7.3% of national production. Deposits found in the "Midcontinent" – Texas, New Mexico, Oklahoma and Kansas – are the most significant. Those of the Rocky Mountains and of the Gulf of Mexico follow closely behind, in the states of Wyoming, Colorado and Utah, and Texas, Louisiana, Mississippi, and Alabama, respectively. California contributes less than 2% of national production, and operations in Alaska are limited to a production rate of 2.3% of the country's overall total. Unlike the oil fields, the Appalachians' natural gas deposits have not yet been depleted.

Proven reserves of natural gas 2004, however, represent only 10 years of production at current extraction rates. In 2004, natural gas contributed to 23% of national energy consumption. With relatively little pollution and fewer greenhouse gas emissions than other fossil fuels, natural gas has become the most popular energy resource. The problem is that at the current rate of consumption, if no new deposits are discovered, the United States will fully deplete its resources by 2015.

Just as in the past with oil, the United States is becoming dependent on imports for its supply of natural gas, and most of the world's reserves are located in unreliable countries like Iran, Russia, and Saudi Arabia. Natural gas is therefore not a sustainable alternative to oil for America.

Americans are accustomed to having abundant and cheap access to energy, thanks to their natural resources in fossil fuels. Today, they are preparing for the transition, over a short period of time, from a situation of abundance of hydrocarbons to one of shortage. In such a vast country where geographical and climatic conditions require high levels of consumption, this presents a tremendous challenge for the upcoming years.

2.7. Environmental protection

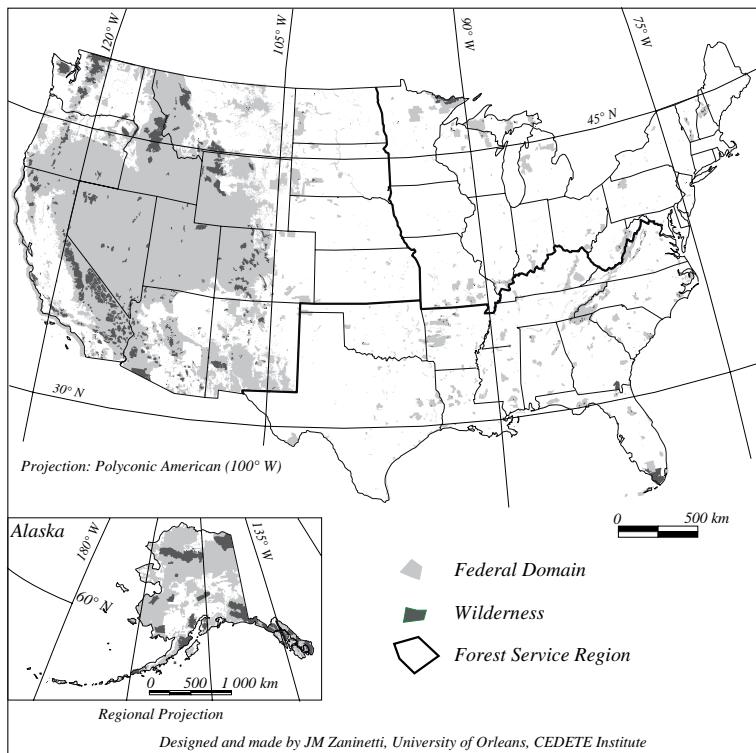


Figure 2.18. Wilderness, protected areas, and federal lands in 2005

In contrast with Europe, part of the US territory is considered to be completely wild and deserted in the classic sense of the term “wilderness”, even though most of this wilderness is found in Alaska (54% of 42.7 million hectares). This represents just under 4.7% of the country’s total surface area, far below the 12% recommended by the Brundtland Report on Sustainable Development (1987). Land which has never been subject to any contract of sale is considered federal property, which represents nearly 3.3 million km², or almost 36% of the territory. Federal land covers almost three-quarters of the territory of Alaska, but less than 30% of the territory of the 48 conterminous states, where it is found mainly in the West. Less than 9% of federal lands lie east of the 100th meridian (see Figure 2.18).

This land distribution is inherited from the past. In the early 19th century, federal lands west of the Appalachians were sold to settlers for agricultural development.

The federal government liquidated a large part of its property in the 19th century through the free distribution of land to settlers in the Great Plains (Homestead Act 1862), while most of the arid or mountainous areas situated west of the Rocky Mountains remained within its jurisdiction. After 1890 and the “closing” of the American frontier, a process of re-evaluation of the value of marginal land in the West began. With the creation of the Yellowstone National Park in 1872 in Wyoming, the United States became a pioneer in the creation of policies to protect its natural heritage. The administration of President Theodore Roosevelt (1902–09) was very supportive of the development of the National Forest Service (founded in 1891) as well as that of national parks. Today there are 52 national parks, mostly located in the mountains of the West, and among which the Yellowstone Park is undoubtedly the most famous. Unfortunately, excessive tourism is damaging its ecosystem.

Outside the system of national parks, the primary mission of the US Forest Service is to protect what remains of the primary forest from damage caused by private owners. The following debate arose: should we work to *conserve* nature, i.e., to regulate human interaction with nature in natural heritage sites, or should we work to *preserve* nature, i.e., to exclude human interaction all together?

During the late 19th and early 20th centuries, the first idea prevailed. Federal authorities proceeded to delimit 186,000 km² of national park land, 757,000 km² of forest land, mostly destined to be used for commercial purposes, and 121,000 km² of natural reserves in this huge area which would otherwise mostly have been conceded to farmers, foresters or prospectors. Another evaluation of the environment occurred after the Second World War. Since the Wilderness Act of 1964, areas which are still “natural” or “unaltered by man” are classified as protected areas. Other laws followed in an effort to improve the management of these federal lands. The 1974 Forest and Rangeland Renewable Resources Planning Act required the creation of a management plan for each national forest, to be updated every five years with public consultation. The 1976 Federal Land Policy and Management Act imposed a similar program for all federal lands. These management efforts came in response to mounting criticism in the West (Sagebrush Rebellion) from voices who were challenging the legitimacy of federal property in the states of the West.

Federal action for environment protection is not limited to the management of federal property. Since the first law on air quality (Clean Air Act of 1963), a series of environmental protection laws have been adopted, some of which are concerned primarily with public health (laws on air, water, pesticides), while others define protected areas and preserve natural heritage sites and reserves. The 1964 Act established the National Wilderness Preservation System. A law on the protection of

coastal regions was passed in 1972. The management of national forests was reformed in 1976 to favor protection and discourage exploitation. A mining law, taking into account the need to restore the environment in mining areas, was passed in 1977. Some laws were recently revised (Clean Air Act of 1990), but in the eyes of environmental activists no major breakthrough has been recorded since 1981, and logging and mining companies, as well as polluting industries, have even benefited from a certain degree of leniency on the part of federal authorities. Environmental protection is more the responsibility of each state than of the federal administration.

Today the United States is lagging behind the EU member countries in terms of environmental protection. The omnipotence of oil and coal lobbyists in Republican administrations under the successive presidencies of Reagan (1981–88), George H. Bush (1989–92) and George W. Bush (2001–08) led to an easing of protection regulations. The blindness of the federal government went so far as to completely deny, for as long as possible, the reality of global warming, as well as the responsibility of humans in this phenomenon. The US has consistently refused to sign the Kyoto Protocol (1995) for the reduction of greenhouse gas emissions. This negligence on the part of federal authorities is more or less compensated for locally by state actions for environmental protection. Today, environmental protection measures in the United States are very decentralized, which means that local situations are increasingly inconsistent.