THEMATIC SLIDES

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Increasing concern as to how human activities impact the Earth has led to documentation and quantification of environmental changes taking place on land, in the water, and in the air. Through a combination of ground photographs, current and historical satellite images, and narrative based on extensive scientific evidence, this publication illustrates how humans have altered their surroundings and continue to make observable and measurable changes to the global environment. This publication underscores the importance of developing, harnessing and sharing technologies that help provide deeper understanding of the dynamics of environmental change. The words and pictures within these pages also serve as a vivid reminder that this planet is our only current home, and that sound policy decisions and positive actions by societies and individuals are needed to sustain the Earth and the well-being of its inhabitants. The information we provide will not only be useful in the context of the selected locations, but will also underscore the intrinsic value of the harnessing, visualizing and communicating technologies to gain a deeper understanding of the dynamics and impacts of our environmental changes.

UNEP NASA USGS science for a changing world UNIVERSITY OF MARYLAND

ONE PLANET MANY PEOPLE

Atlas of Our Changing Environment

ONE PLANET
MANY PEOPLE
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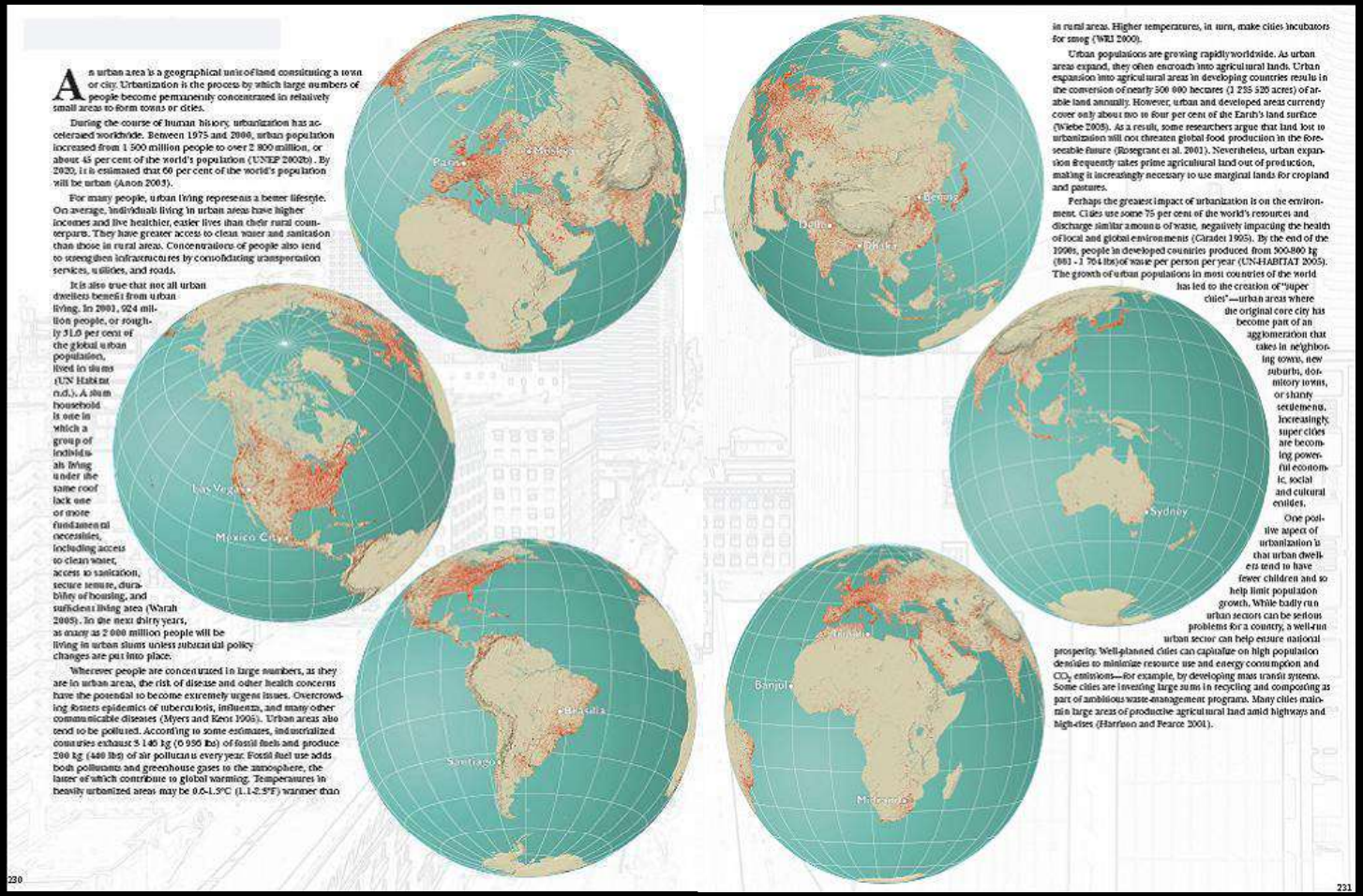
URBAN AREAS



A urban area is a geographical unit of land constituting a town or city. Urbanization is the process by which large numbers of people become permanently concentrated in relatively small areas to form towns or cities.

During the course of human history, urbanization has accelerated worldwide. Between 1975 and 2000, urban population increased from 1 500 million people to over 2 800 million, or about 45 per cent of the world's population (UNEP 2002b). By 2020, it is estimated that 60 per cent of the world's population will be urban (Anon 2003).

For many people, urban living represents a better lifestyle. On average, individuals living in urban areas have higher incomes and live healthier, easier lives than their rural counterparts. They have greater access to clean water and sanitation than those in rural areas. Concentrations of people also tend to strengthen infrastructures by consolidating transportation services, utilities, and roads.

It is also true that not all urban dwellers benefit from urban living. In 2001, 924 million people, or roughly 31.6 per cent of the global urban population, lived in slums (UN Habitat n.d.). A slum household is one in which a group of individuals living under the same roof lack one or more fundamental necessities, including access to clean water, access to sanitation, secure tenure, durability of housing, and sufficient living area (Warah 2003). In the next thirty years, as many as 2 000 million people will be living in urban slums unless substantial policy changes are put into place.

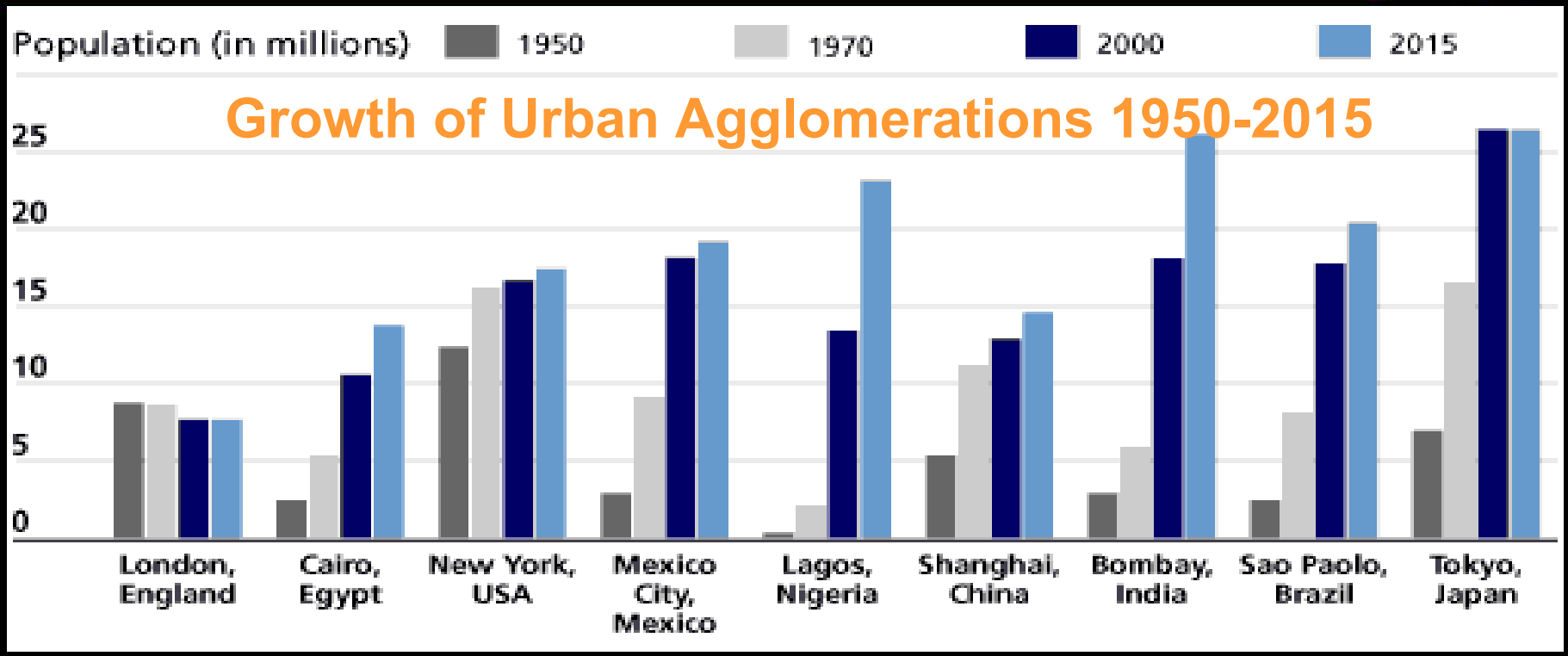
Wherever people are concentrated in large numbers, as they are in urban areas, the risk of disease and other health concerns have the potential to become extremely urgent issues. Overcrowding fosters epidemics of tuberculosis, influenza, and many other communicable diseases (Myers and Kent 1995). Urban areas also tend to be polluted. According to some estimates, industrialized countries exhaust 5 146 kg (6 936 lbs) of fossil fuels and produce 200 kg (440 lbs) of air pollutants every year. Fossil fuel use adds both pollutants and greenhouse gases to the atmosphere, the latter of which contribute to global warming. Temperatures in heavily urbanized areas may be 0.6–1.9°C (1.1–2.5°F) warmer than in rural areas. Higher temperatures, in turn, make cities incubators for smog (WRI 2000).

Urban populations are growing rapidly worldwide. As urban areas expand, they often encroach into agricultural lands. Urban expansion into agricultural areas in developing countries results in the conversion of nearly 500 000 hectares (1 235 520 acres) of arable land annually. However, urban and developed areas currently cover only about two to four per cent of the Earth's land surface (Wiebe 2003). As a result, some researchers argue that land lost to urbanization will not threaten global food production in the foreseeable future (Rosegrant et al. 2001). Nevertheless, urban expansion frequently takes prime agricultural land out of production, making it increasingly necessary to use marginal lands for cropland and pastures.

Perhaps the greatest impact of urbanization is on the environment. Cities use some 75 per cent of the world's resources and discharge similar amounts of waste, negatively impacting the health of local and global environments (Girardet 1995). By the end of the 1990s, people in developed countries produced from 500-800 kg (881 - 1 764 lbs) of waste per person per year (UN-HABITAT 2005). The growth of urban populations in most countries of the world has led to the creation of "super cities"—urban areas where the original core city has become part of an agglomeration that takes in neighboring towns, new suburbs, dormitory towns, or shanty settlements. Increasingly, super cities are becoming powerful economic, social and cultural entities.

One positive aspect of urbanization is that urban dwellers tend to have fewer children and so help limit population growth. While badly run urban sectors can be serious problems for a country, a well-run urban sector can help ensure national prosperity. Well-planned cities can capitalize on high population densities to minimize resource use and energy consumption and CO_2 emissions—for example, by developing mass transit systems. Some cities are investing large sums in recycling and composting as part of ambitious waste-management programs. Many cities maintain large areas of productive agricultural land amid highways and high-rises (Harrison and Pearce 2001).

World Population Growth 1750-2150



• About 3 billion people, or 50 per cent of the global population, already live in urban areas; over the next 25 years, more than 2 billion people are predicted to be added

Source: UN- HABITAT Report 2005; United Nations, World Urbanization Prospects, The 1999 Revision

URBAN AREAS

- Banjul, Gambia
- Midrand, South Africa
- Tripoli, Libya
- Beijing, China
- Delhi, India
- Dhaka, Bangladesh
- Karachi, Pakistan
- Sydney, Australia
- London, United Kingdom
- Moskva, Russia
- Paris, France
- Brasilia, Brazil
- Santiago, Chile
- Mexico City, Mexico
- Vancouver, Canada
- Las Vegas, United States
- San Francisco, United States
- Seattle, United States
- Washington D.C., United States

URBAN FACTS

- Roughly 3% of the earth's land surface is occupied by urban areas, with the highest concentrations occurring along the coasts and waterways
- Of the 10 world's most populous urban agglomerations, 6 are in Asia; global population is around 6.4 billion and growing at 70 million/year, mostly in low income countries
- In 2000, about 47 % of the world's population lived in urban areas
- By 2030, 60 % of the world population is expected to be urban
- In Mexico City, for every increase in ozone of 10 parts per billion, a 0.6% increase of acute mortality and 1% increase in premature mortality can occur
- In Santiago, 4 000 people die prematurely every year from causes related to air pollution

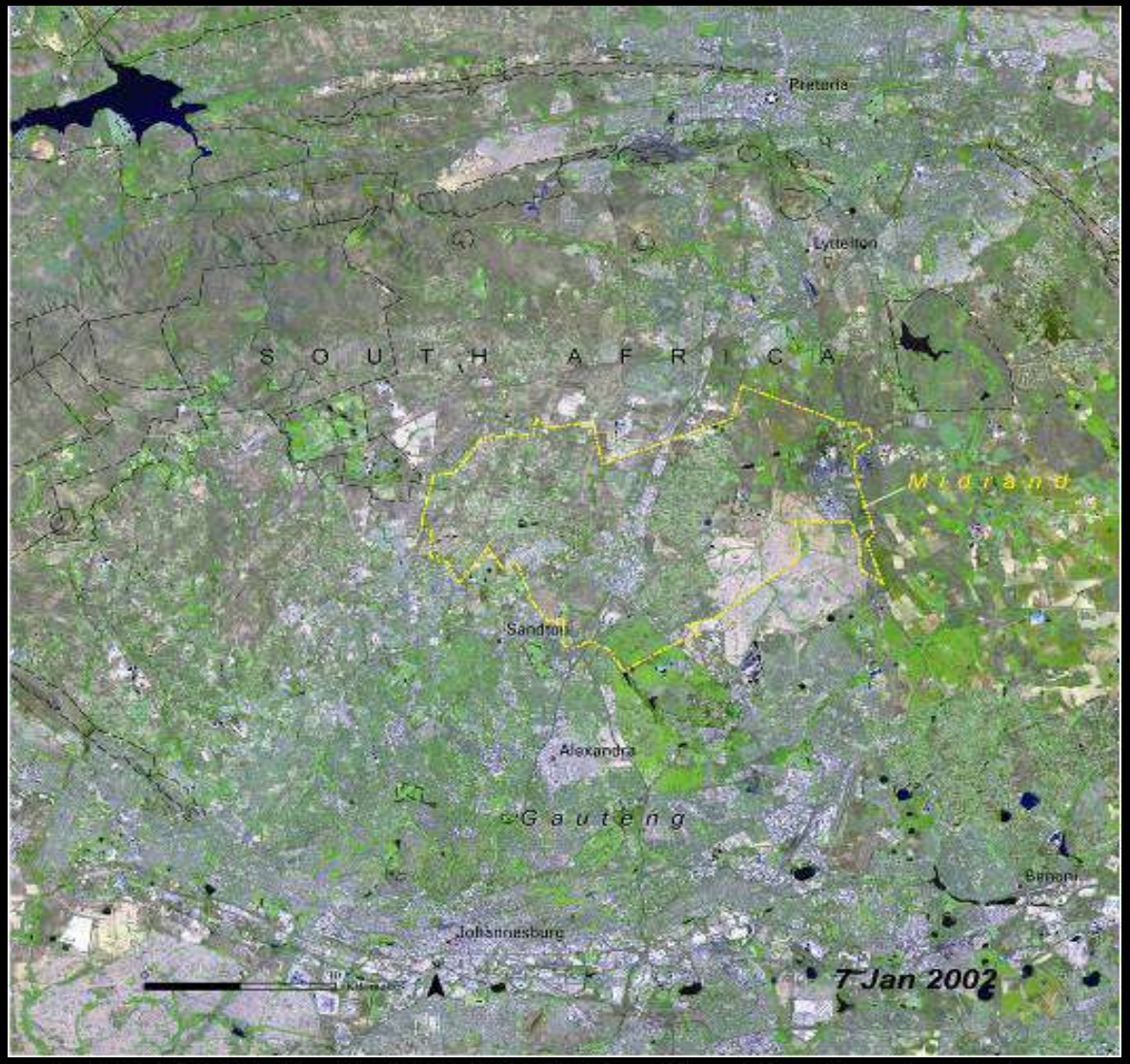
Sources: UNEP, WRI, Population Reference Bureau, 2006; UN/ESA,2005

Urban sprawl and its impact on Banjul Gambia

- 1973: Urban growth and expansion of cropland has led to decline in woodland

- 1999: The Abuko Nature Reserve is an isolated patch of green in the 1999 image

Rapidly transforming Midrand city South Africa



Rapidly transforming city due to population growth, agriculture, mining, and industry

- 1978: Surrounding area consists largely of agriculture

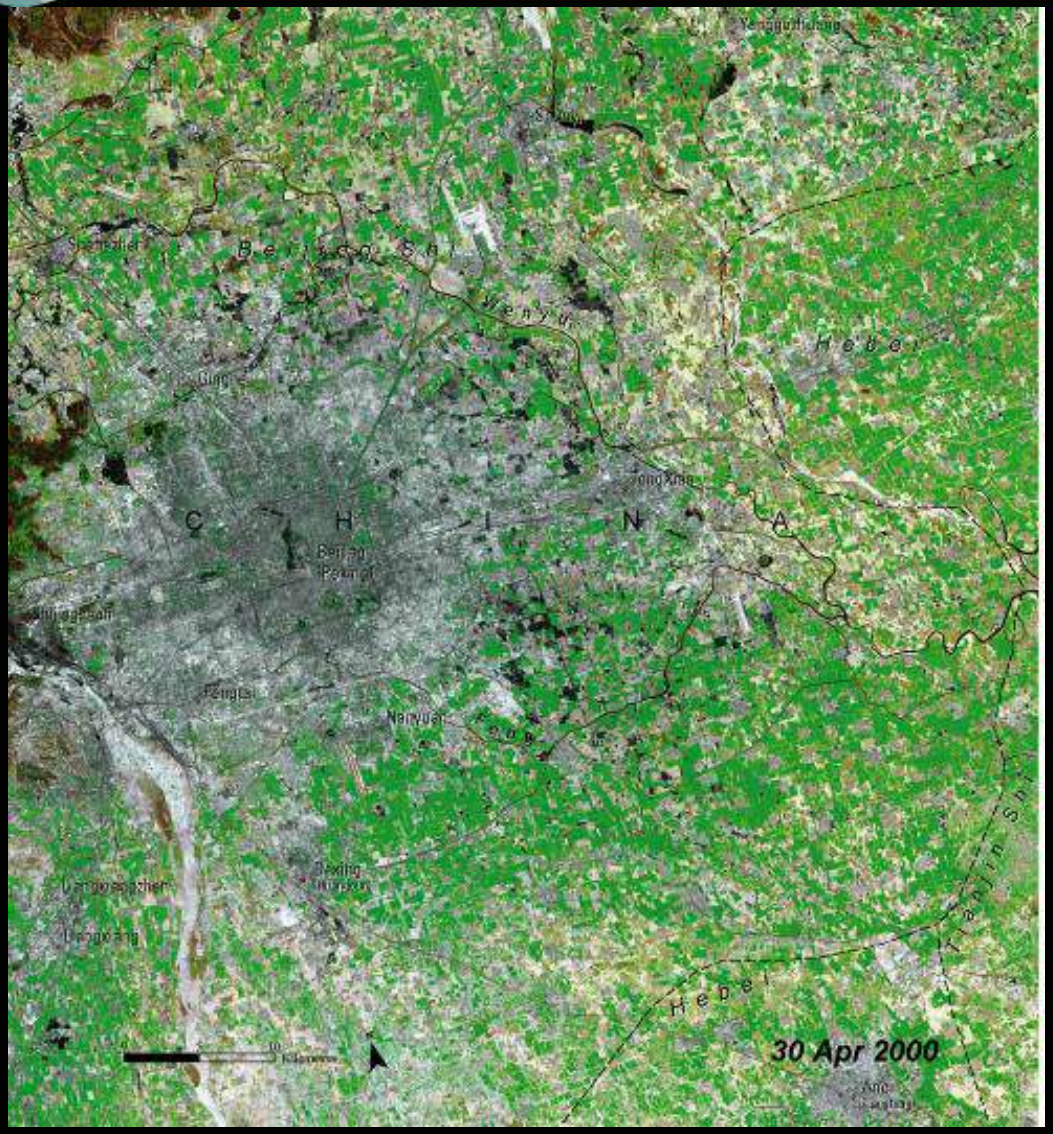
- 2002: High density urban development

Steady urban growth in Tripoli Libya

- 1976: Grasslands have been converted into agricultural fields

- 2002: Urban expansion is especially notable (shades of grey)

Explosive growth in Beijing China

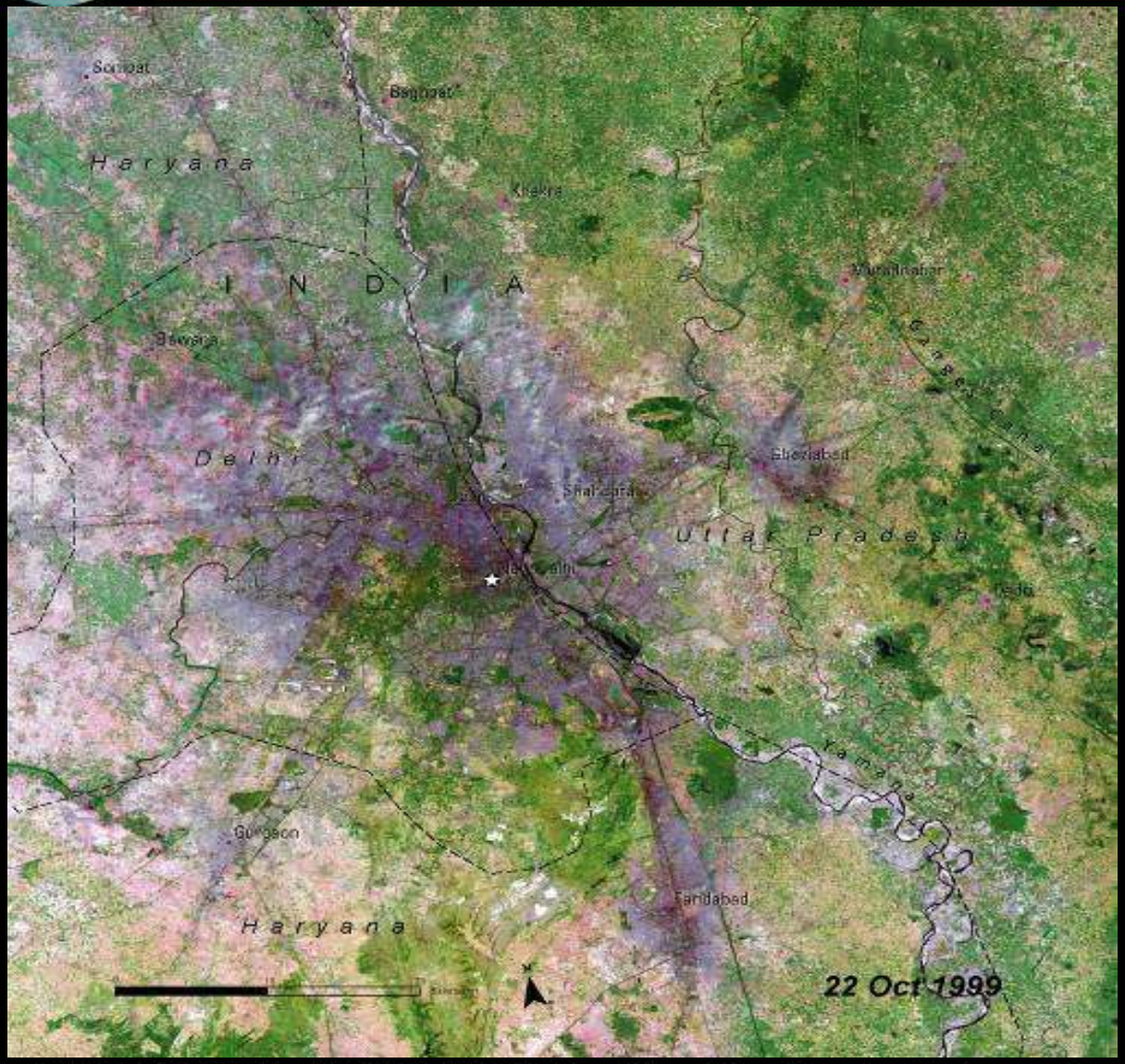


Beijing, the capital city of China, has experienced explosive growth since economic reforms in 1979

- 1978: Beijing in 1978

- 2000: Extent of urban expansion is clearly visible

Growing Delhi and its suburbs
India



1977-1999: The population of Delhi was at 4.4 million in 1975 and grew to 12.4 million in 2000

Phenomenal growth in Dhaka Bangladesh

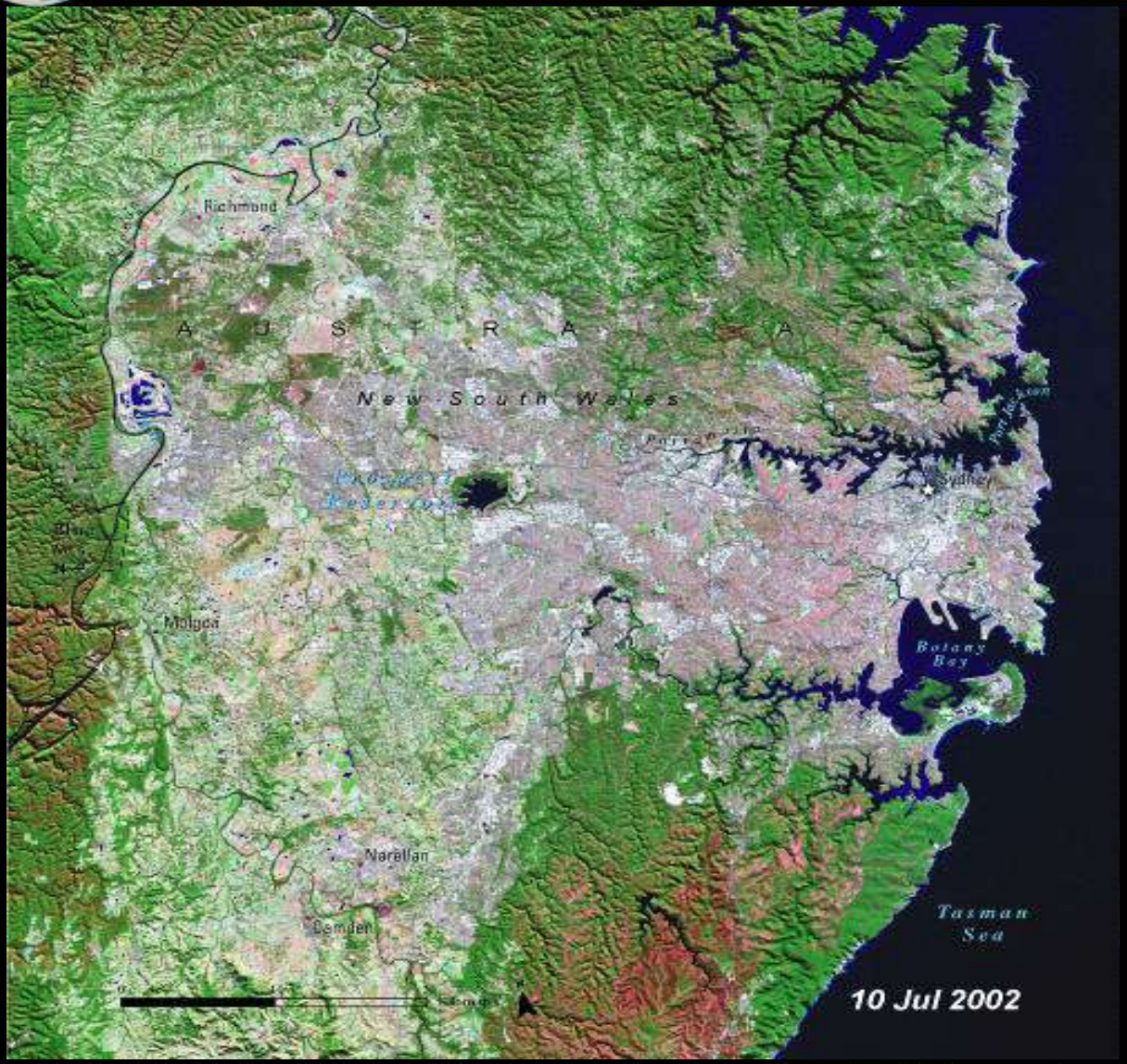
1977-2000: the capital of Bangladesh has grown from a city of 2.5 million more than 10 million

Rapid urban growth in Karachi Pakistan

- 1975: Karachi before the urban sprawl

- 2001: Note the change in aerial extent

Sydney – the country's largest city
Australia



1975-2002: Over the last several decades, Sydney has been expanding westward toward the Blue Mountains

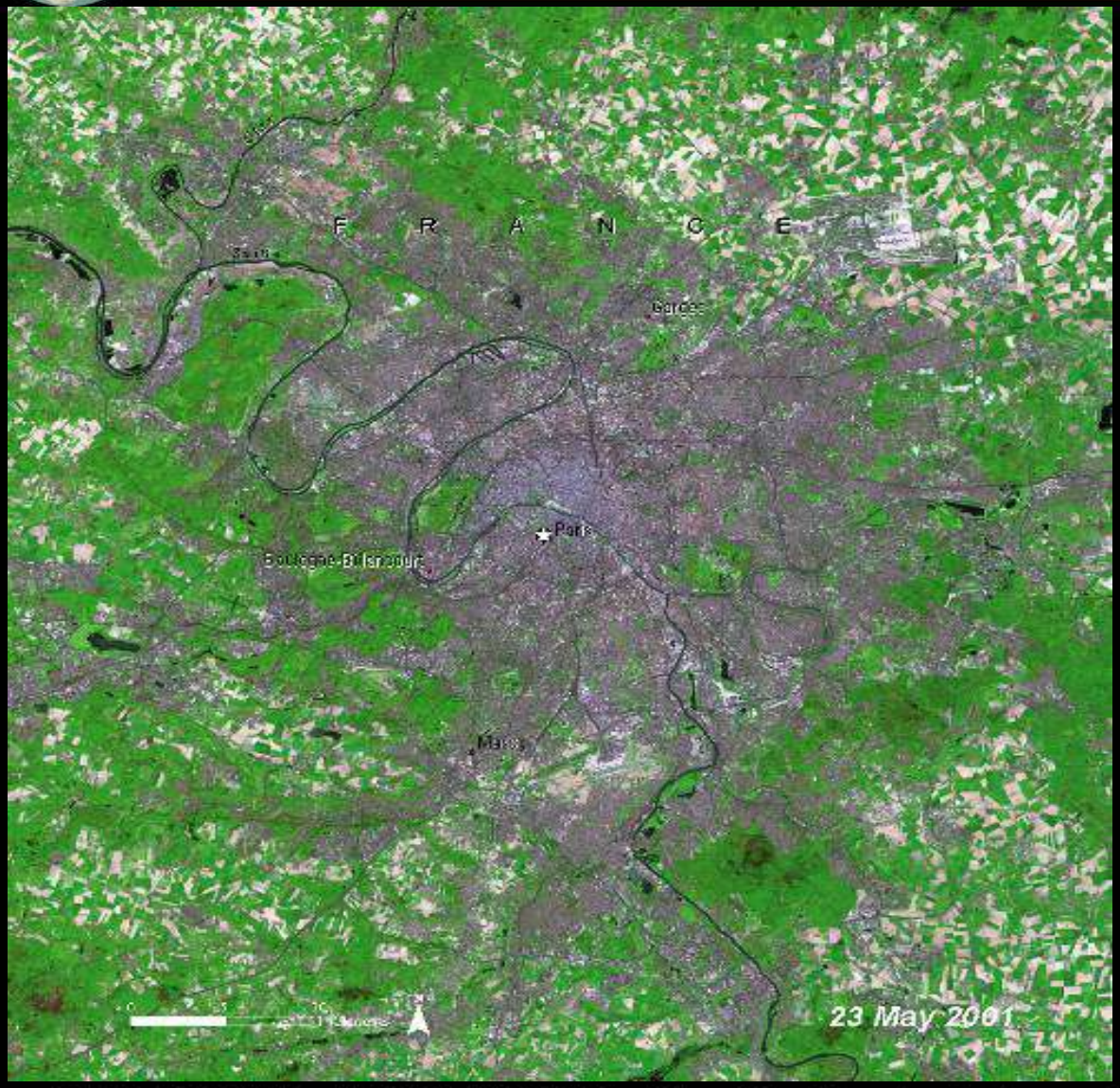
Growing London city
United Kingdom

- Over 7 million residents
- Population projected to approach 8 million by 2021

Urbanization in Moskva Russia

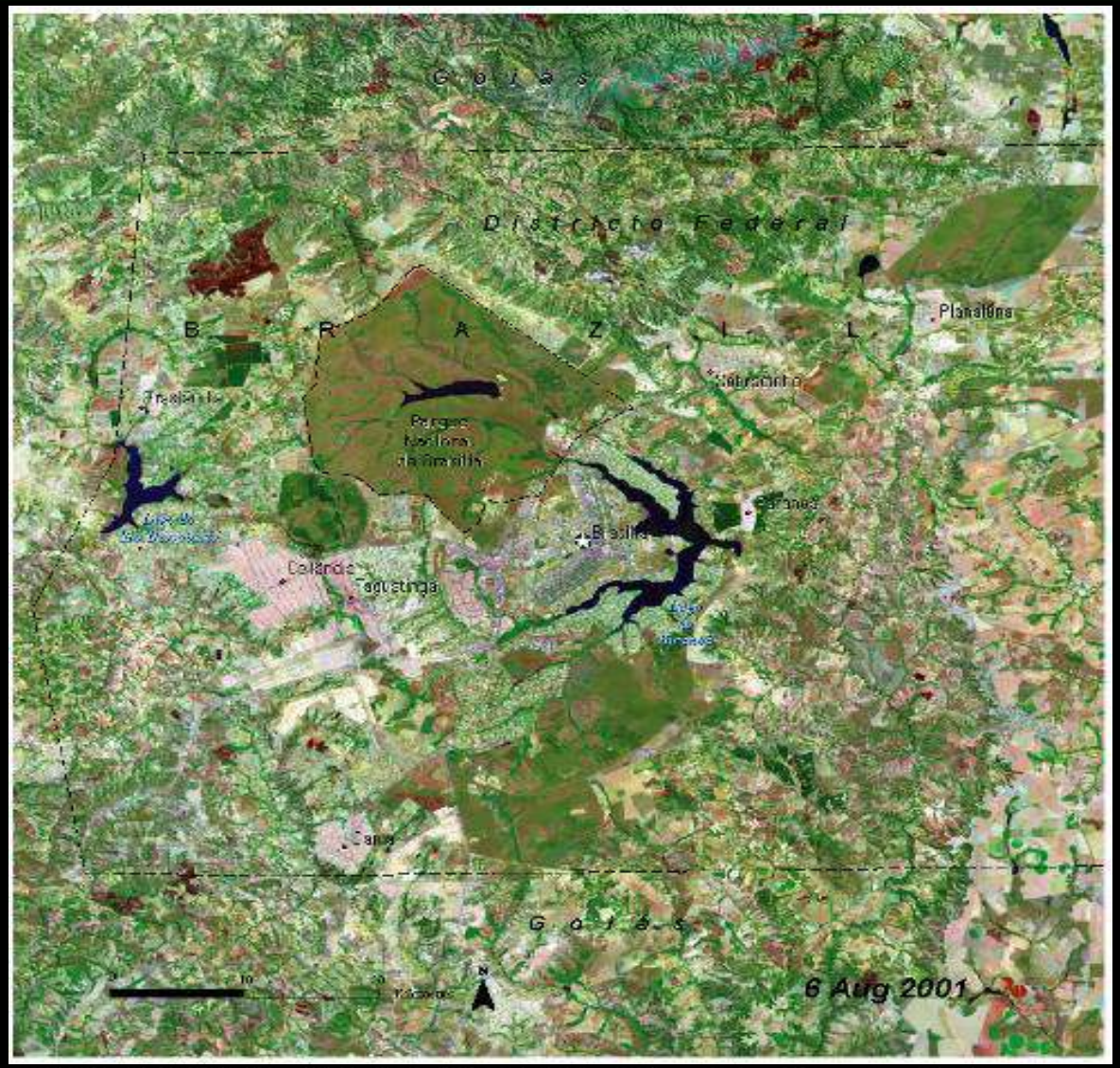
1975-2001: Images show urban expansion during the last 25 years of the 20th century

Seine River dissecting Paris France



1976-2001: Images show expansion of city into the surrounding rural areas

Unplanned urban developments in Brasilia Brazil



•1973-2001: Unplanned urban development resulted in a collection of urban "satellites" around the city

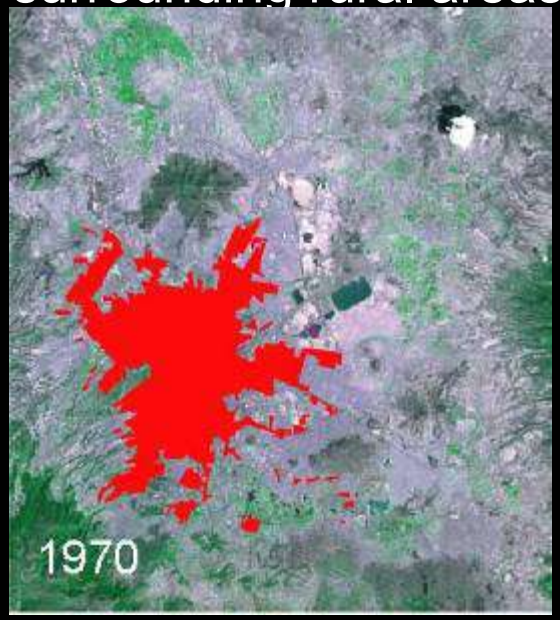
Rapid growth in Santiago Chile

The explosive growth of Santiago's urban area

Fastest growing megalopolis in the world - Mexico City, Mexico

- 1973 -Urban growth is concentrated in the center of the city

- 2000 -Now expands dramatically into surrounding rural areas

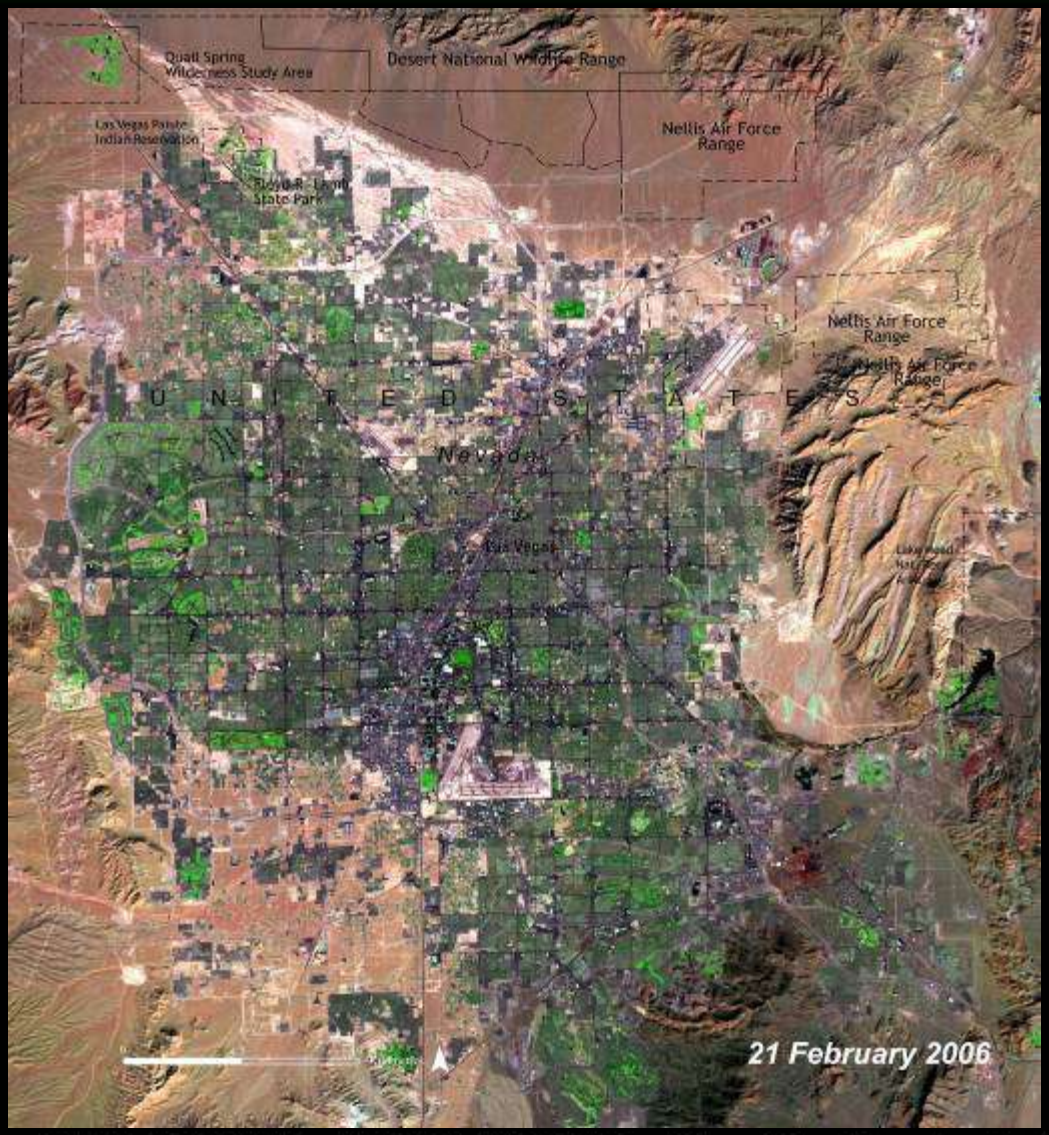


Growth of a mega city

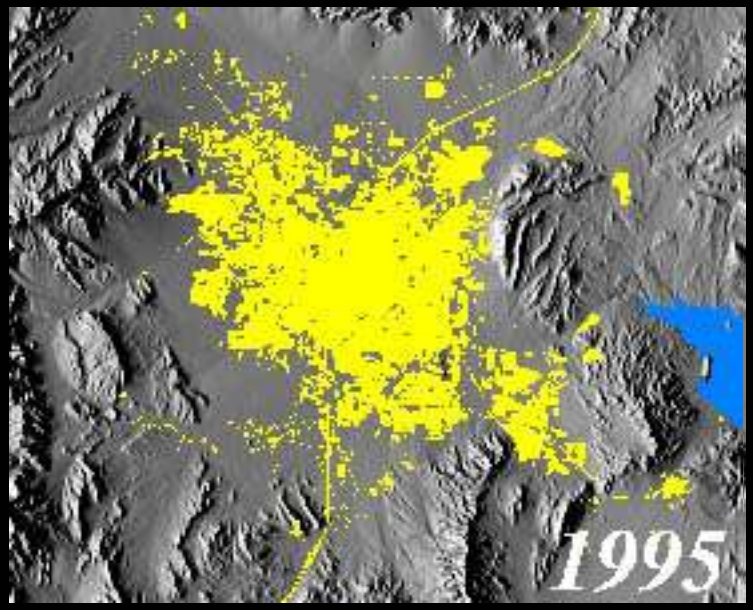
Denser Vancouver, Canada

•1976-2000: The city's population in 2001 was nearly 2 million, compared to 1.3 million in 1976

Las Vegas – Fastest growing metropolitan area in the United States



- 1973: A small settlement
- 2000-2006:The landscape is now dramatically modified



Images courtesy USGS

Expanding Las Vegas, United States

Drought in the Western United States

Lake Mead

Hoover Dam and Lake Mead

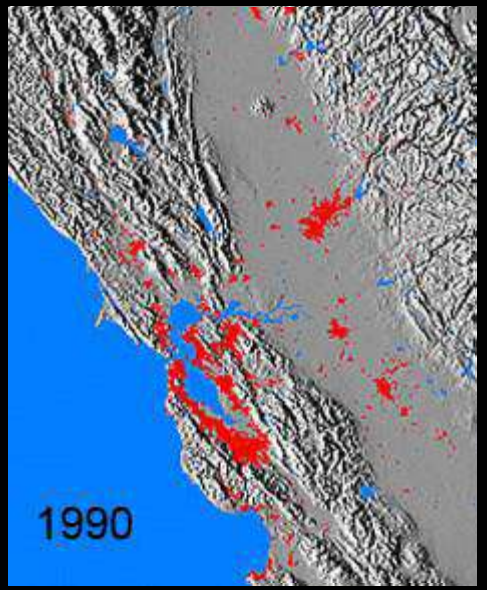
Golf courses springing up around Lake Mead United States

New Golf Courses since 2001

Expansion of Golf Courses around Lake Mead

Growth of San Francisco United States

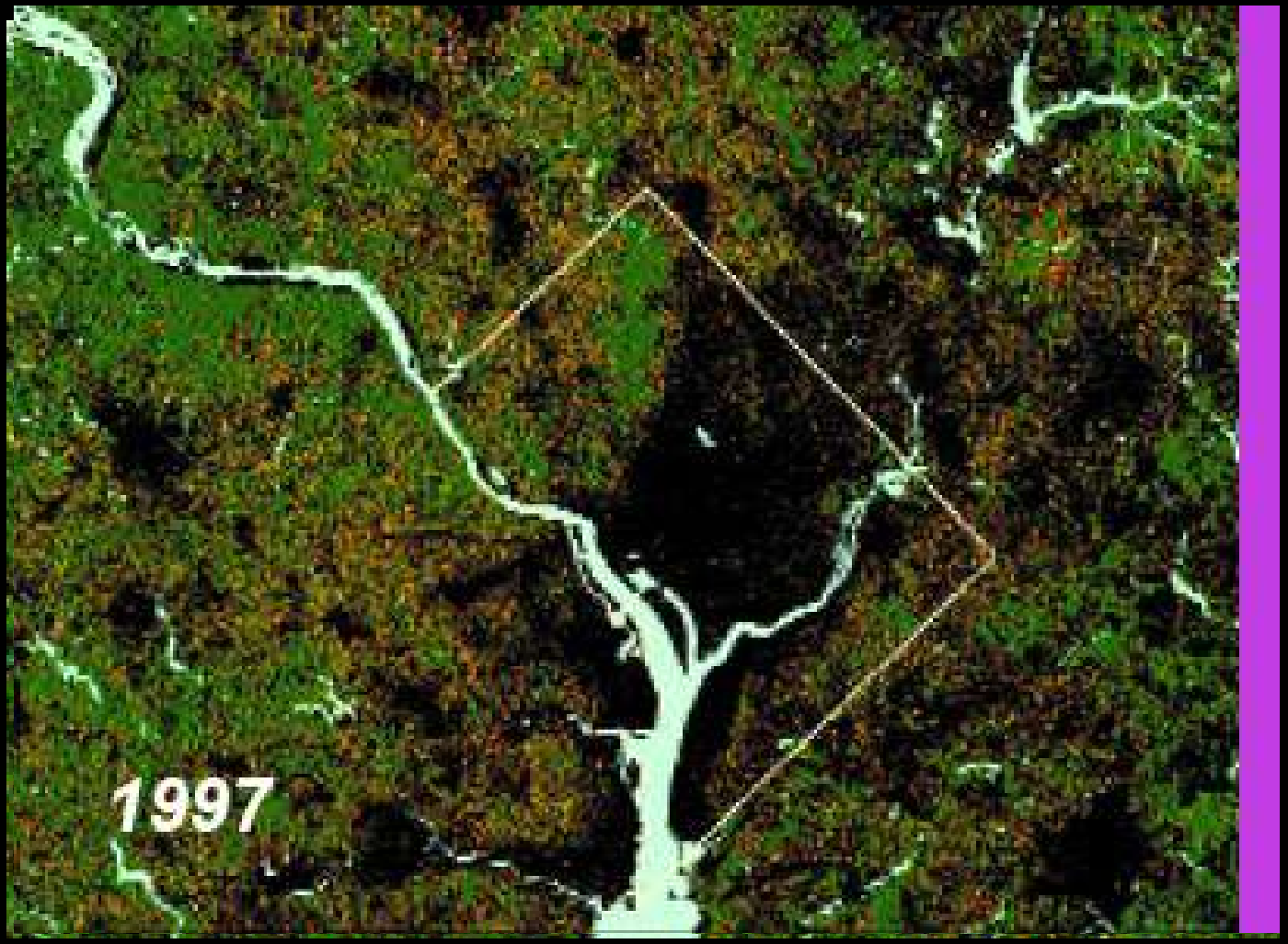
1970-2000: Population grew from 4.6 million to 7.2 million in the Bay Area



Sprawling in Seattle, United States

•1972-2000: Seattle has sprawled since 1980s, with the current metropolitan population estimated at 3.8 million

Urban Forest in Washington D.C. United States



Satellite images showing the dramatic loss of trees in the District

Urban Forest in Washington D.C. United States

Satellite images show urban forest in Washington D.C.

Photo: Digital Globe

Fort McMurray, Canada

1974-2004: Massive oil extraction from oil sands have remarkably changed the land area of Fort McMurray in Alberta

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Thank You!

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