

# People Are Attracted to Rivers and Floodplains

- Water Supply
- Fertile land
- Flat land
- Transportation Arteries  
often follow floodplain
- Water Supply
- Cities are often located  
at the confluence  
of major rivers,  
like Pittsburgh, PA



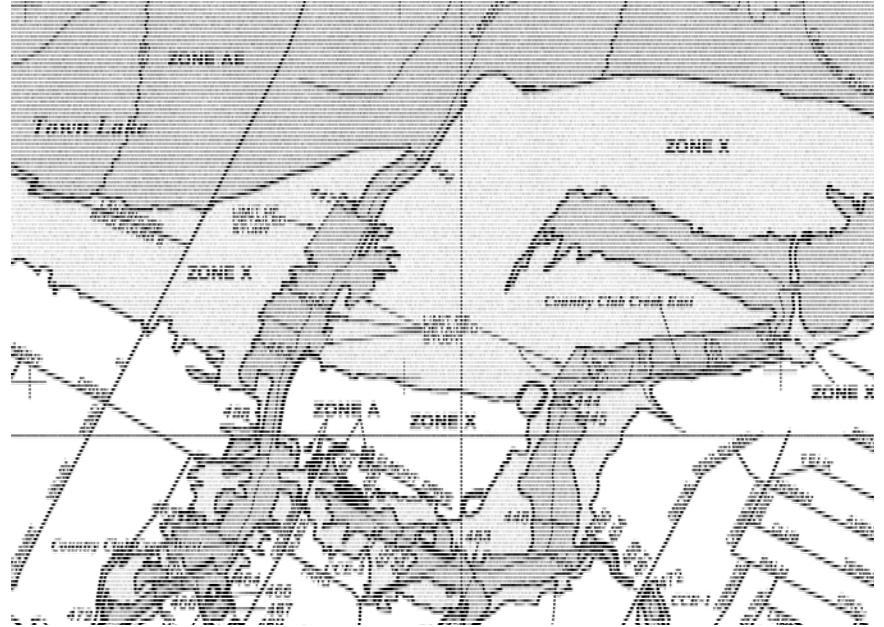
(c)

# Flooding Takes Lives, Destroys Property and Transportation Arteries



# Construction of Dams Is Only Partially Effective at Mitigating Losses Due to Flooding

In spite of all the money spent on dams and other structures to control flooding, damages from flooding continue to increase, so **land use controls** are also used. Most cities have **zoning ordinances** that prohibit building on the on the floodplain. A typical river will flood every 2-3 years. This minimal flood is called a **standard flood**. The floodplain is divided into different zones based on the estimated frequency of flooding. Construction is prohibited on any land within the **100 year floodplain**; land that will be under water once in a hundred years.



Zoning/Floodplain Map for  
Austin, TX

# Civil Works and Pork Barrel Politics

Civil works are construction projects paid for by the federal government currently called “ear marks”. Every member of congress wants to “bring home the bacon” from Washington, D.C. Spending federal dollars can have a huge impact on the local economy. Examples are dams, levees, harbor facilities, military bases and defense industries. Often these are funded by the process of “pork barrel politics” summarized by the term “back scratching”, or you vote for my pet project and I’ll vote for yours.



# The Cost – Benefit Analysis Was Developed to Eliminate Some of the Politics from the Funding Process.

The Long-term Benefits Must Out-weigh the Near-term Costs

## • Costs

- **Construction** includes, design, moving dirt, legal, land acquisition, environment impact.
- Destroy prime farm land
- Destroy wildlife habitat
- Disrupt transportation
- Displace people

## Benefits

- Flood mitigation
- Enhanced navigation
- Water supply
- Hydroelectric (if feasible)
- Recreation

Colorado River Flows Through Desert S.W. into Mexico and Is the Principal Water Resource for the Region.

Since the 1930s, Not a single drop of water from the Colorado has flowed into the Pacific Ocean. It is all used up for irrigated agriculture and to provide water to the rapidly growing cities of the region.



# Construction of Hoover Dam in Black Canyon.

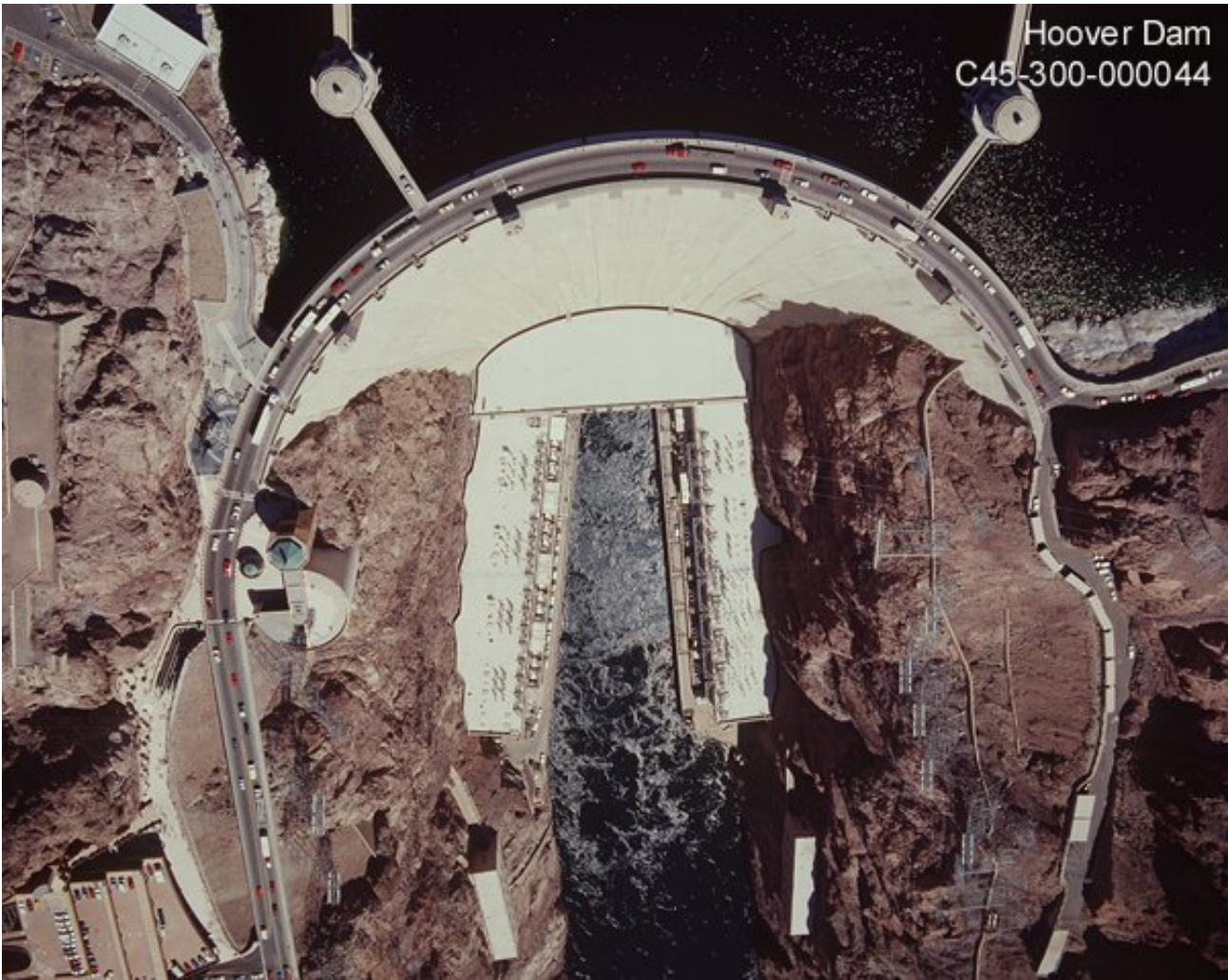


Hoover Dam from Water Level.  
This Was the Tallest Dam in the World.  
It Is About 600 ft. Tall.



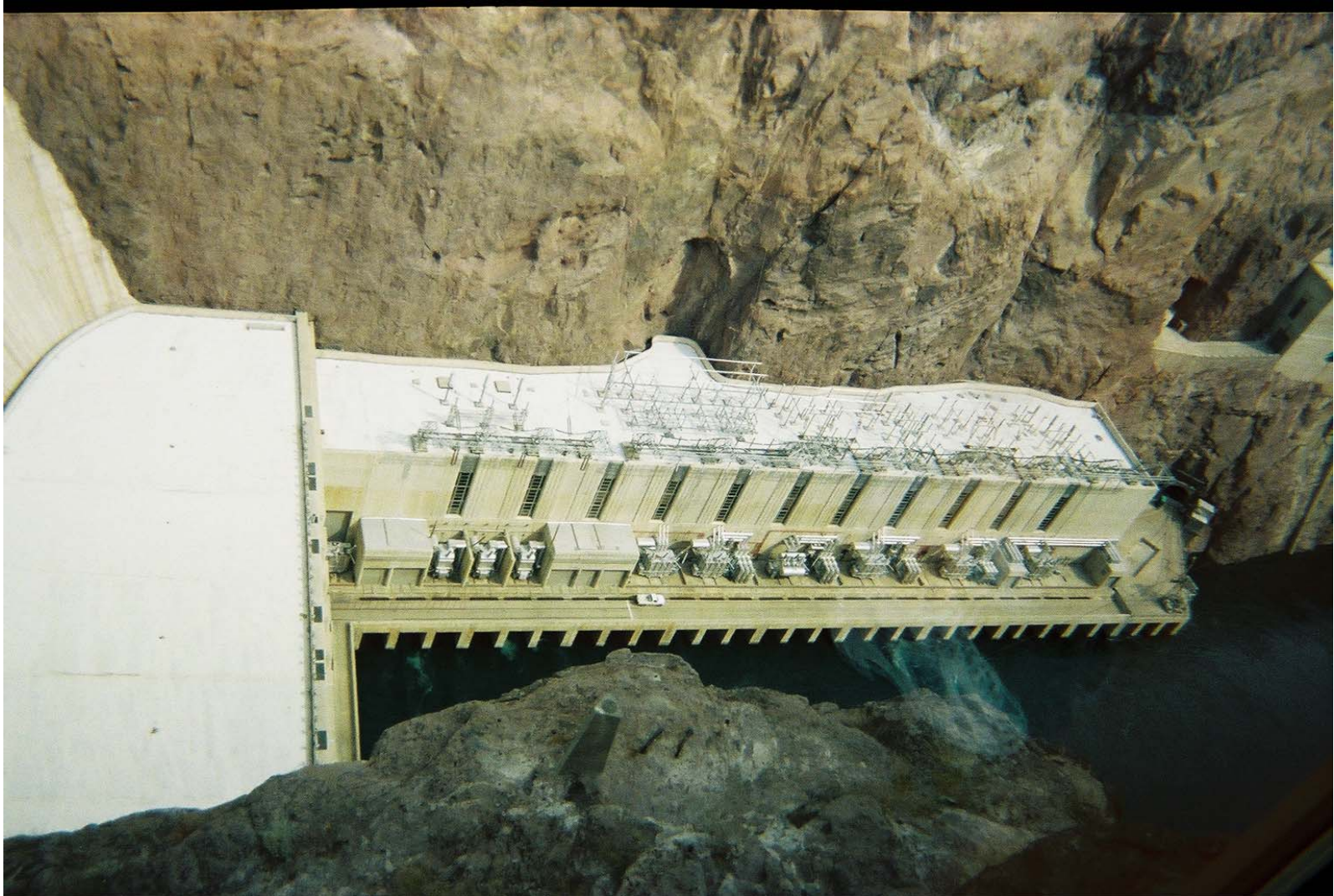


# Aerial View of Hoover Dam



# Power Station at Hoover Dam

An Important Benefit Is the Electricity Generated



# Electricity Generators Inside Hoover Dam



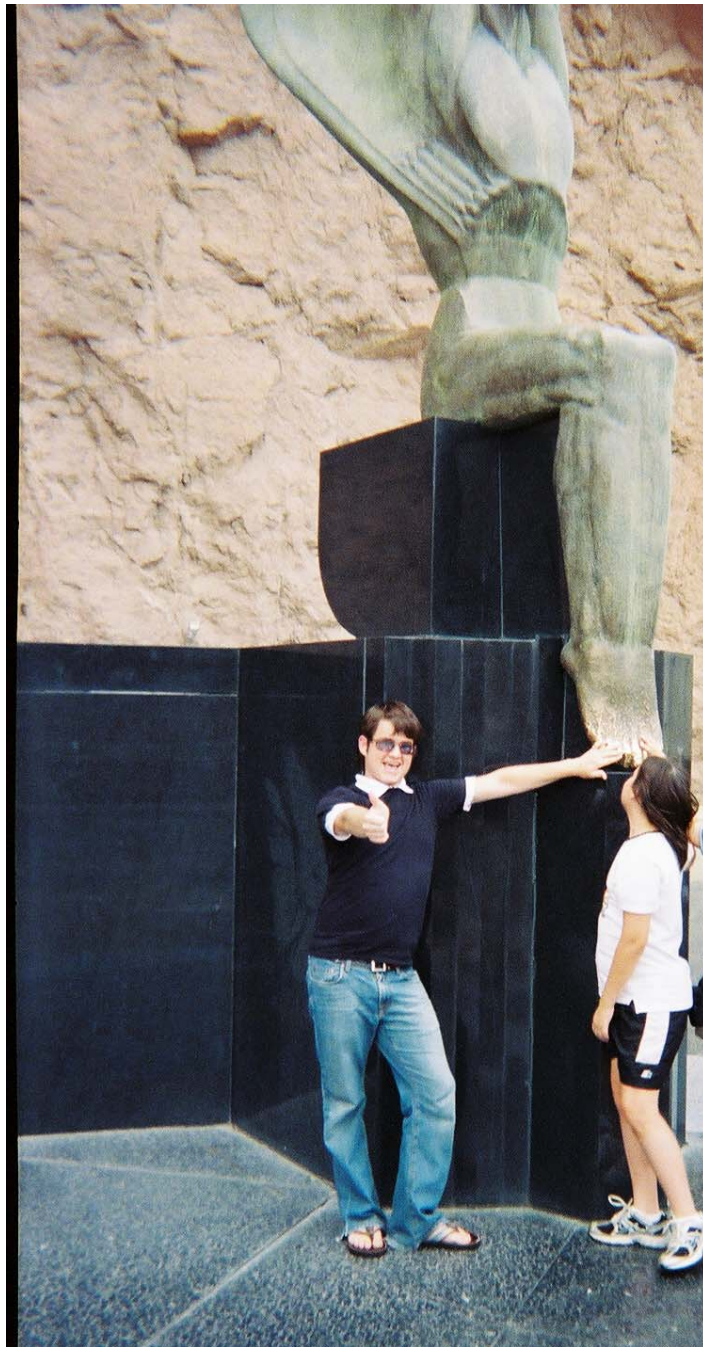
# Turbine Shaft Weighs over 200 Tons



Hoover Dam turbine shafts.

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# Art Deco at Hoover Dam



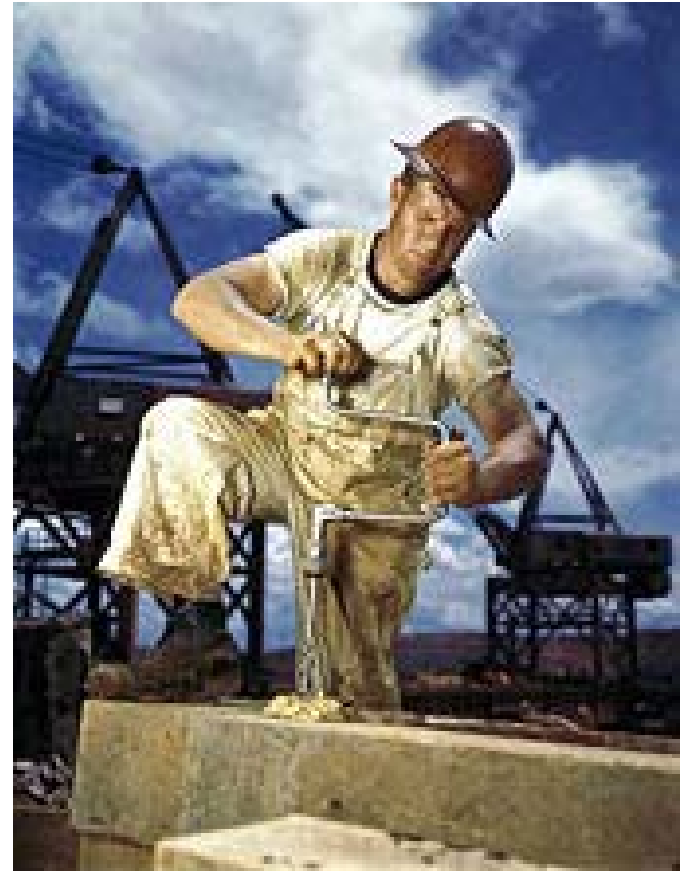
# The Tennessee Valley Authority (TVA) Was One of the Most Ambitious of New Deal Programs

The TVA had both economic and social goals and represented a fundamental change in attitudes about the role of the federal government in U.S. society. It was called “**Social Engineering**”.

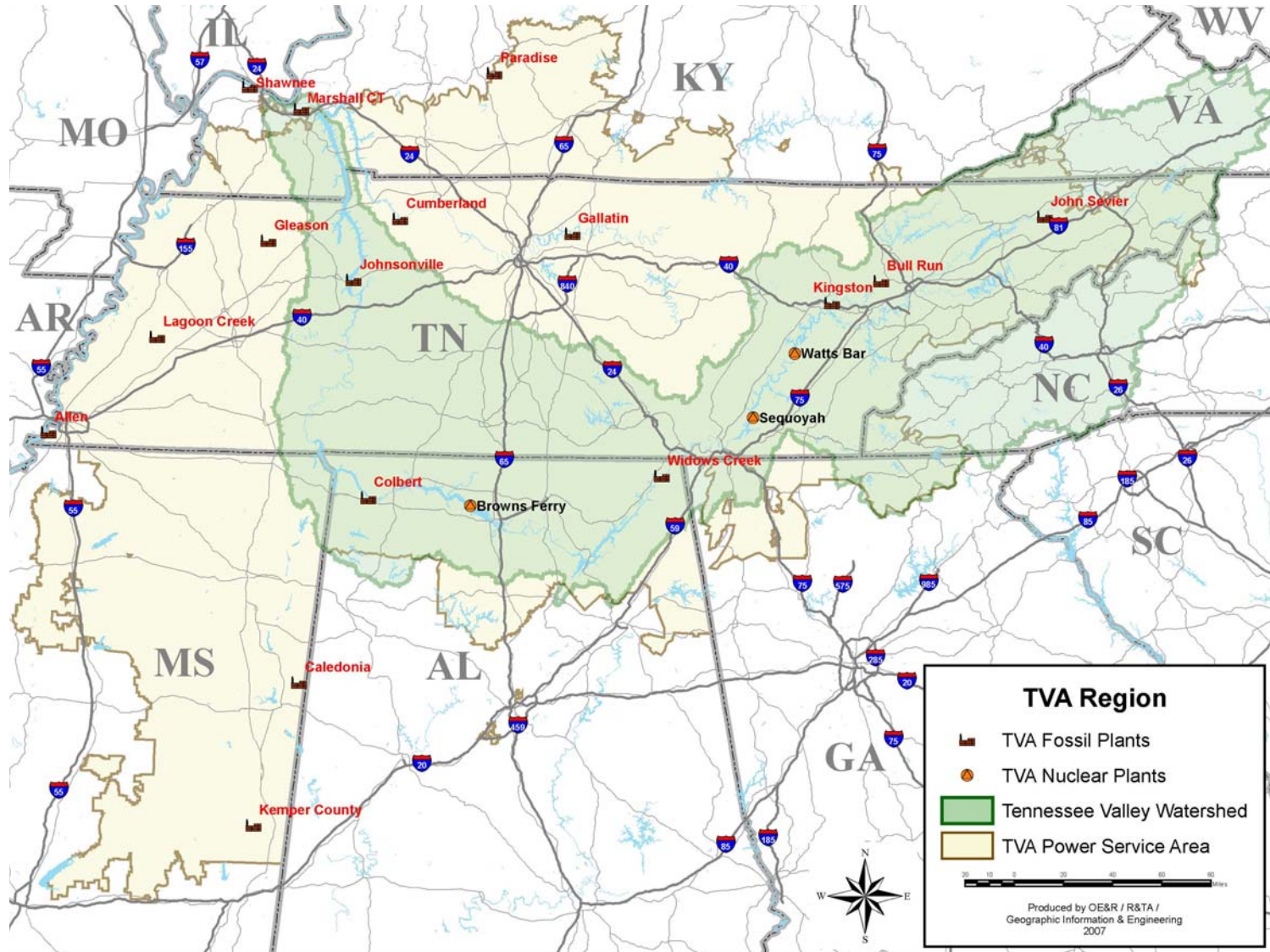
- Bring a poor, backward part of the U.S. in to the mainstream
- Mitigate flooding on the Tennessee River
- Generate Hydroelectricity providing power to the rural south
- Develop the economy of the region by attracting industry

# One of the Principal Goals of the TVA Was Simply to Provide Employment in a Very Poor Part of the Country

Parts of the TVA were completed before World War II. Many industries moved there during the war to take advantage of the cheap electricity. The materials for the atomic bomb were processed at the plant in Oak Ridge Tennessee. After the war, the economy continued to develop and the New South arose.

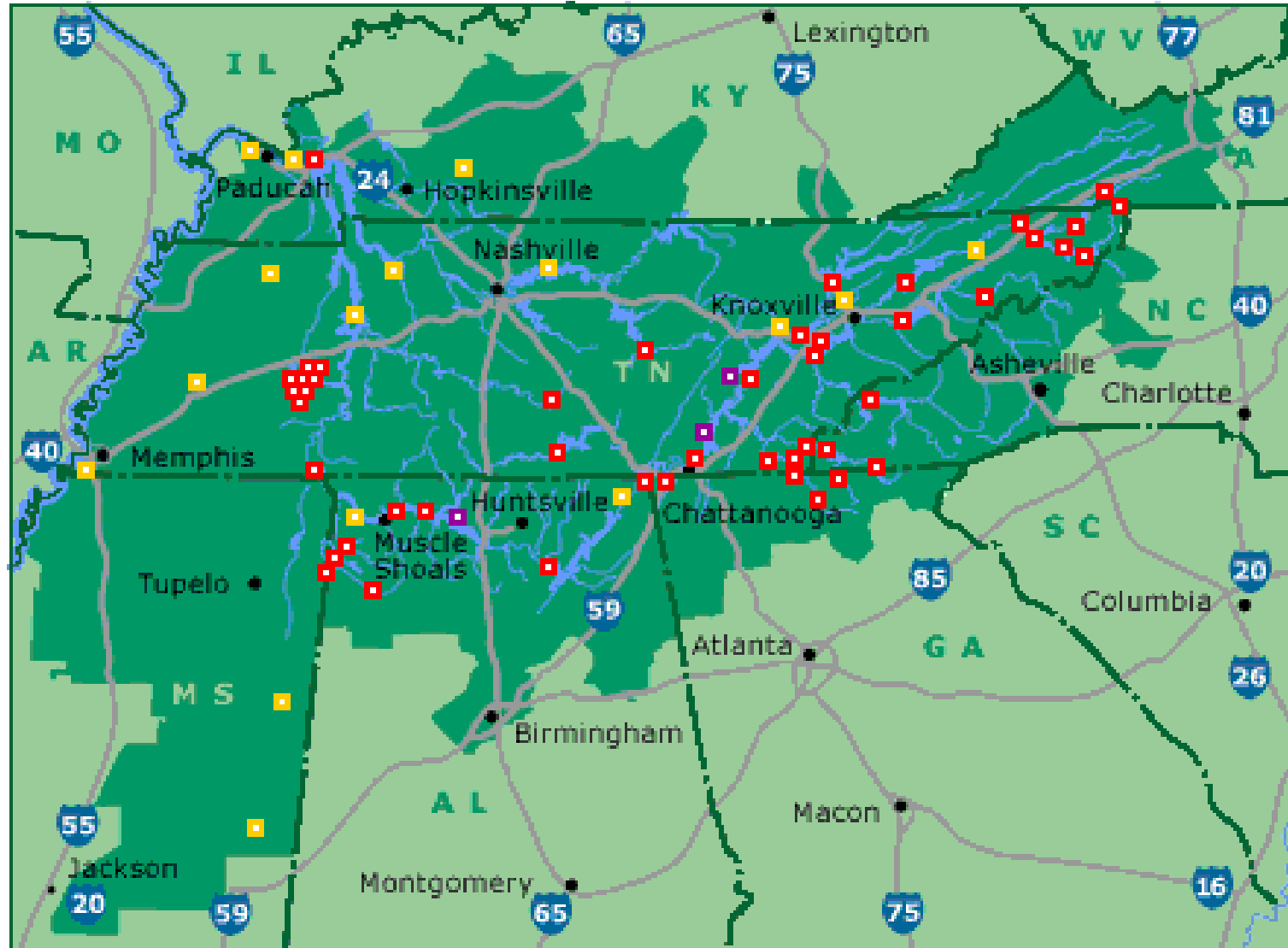


# The Tennessee River Is a Nearly Continuous Series of Lakes





TVA Facilities, Red are Dams, 47,  
Yellow are Coal Fired Power Plants, 16,  
Purple are Atomic, 3



98% of Egypt's  
Population  
Live within 10 miles of  
the Nile River



The Nile Delta is one of the most densely populated places on the earth.



# Egyptian Farmer Working Irrigated Field

## The Nile Floodplain and Delta Have Been Cultivated Continuously for Nearly 5000 Years

The classic problem with irrigated agriculture in desert environments is that salts build up in the soil eventually making it impossible to grow food.

So, there has to be something very special about the Nile valley for crops to be grown there continuously for millennia.



# The Nile Floods Every Year.

## This Leaches the Salts Out of the Soil and Applies a New Layer of Silt Keeping the Soil Fertile.

On almost any other river, flooding is a disaster destroying lives and property. However, the Nile floods every year, so the people are used to it and it has obvious benefits.



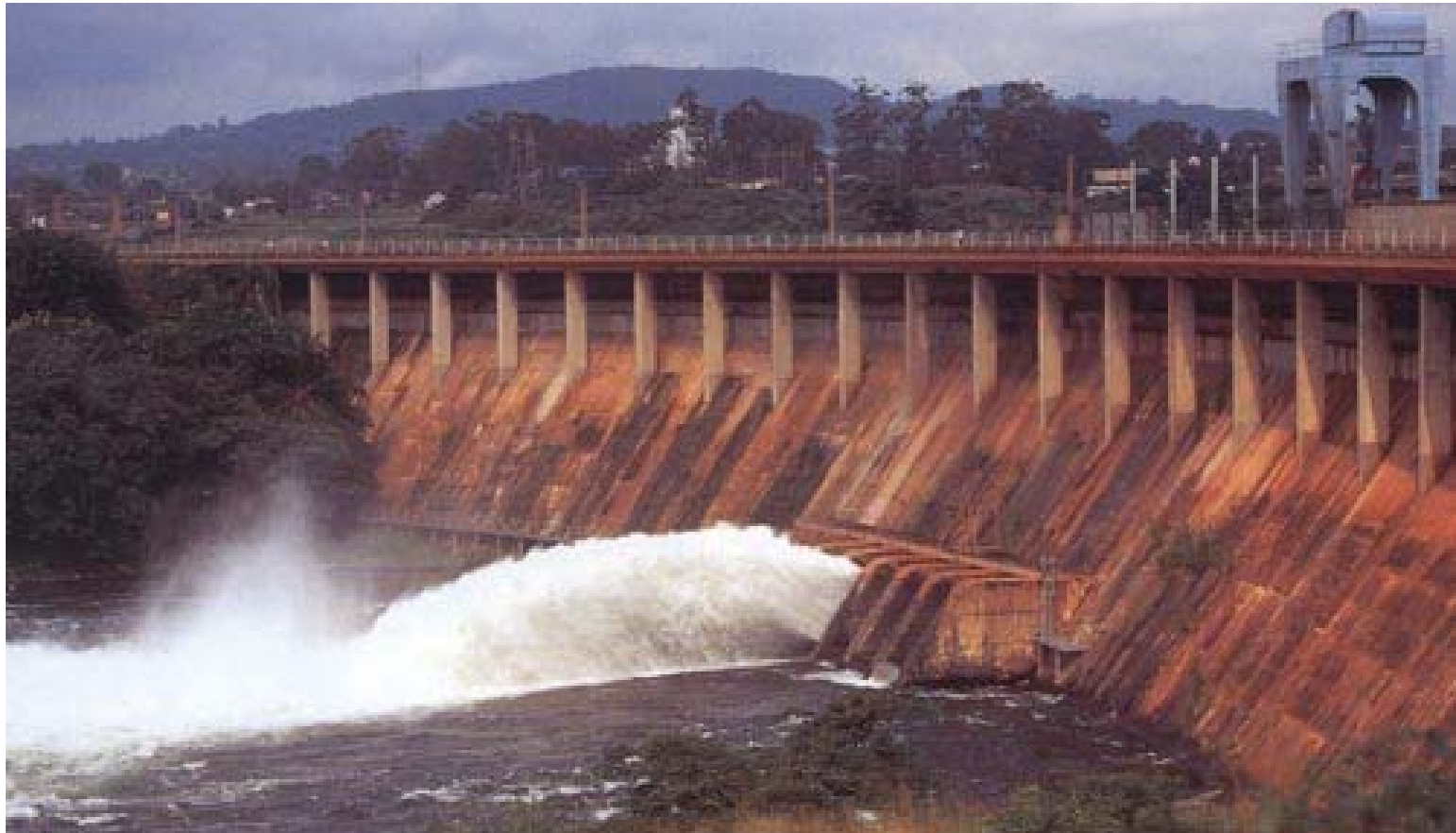
The Nilometer measured the height of the annual Nile flood in cubits.

- 18 = Disaster
- 16 = Abundance
- 15 = Security
- 14 = Happiness
- 13 = Suffering
- 12 = Hunger

From the Roman scholar Pliny



# The Egyptian Government Decided to Build a Dam Across the Nile at Aswan and Eliminate the Annual Flooding and All of Its Benefits



The Aswan High Dam is primarily Earth Fill.  
The Soviets Built It.



# The Egyptian Government Realized That There Were Numerous Costs Associated with the Dam

## Problems

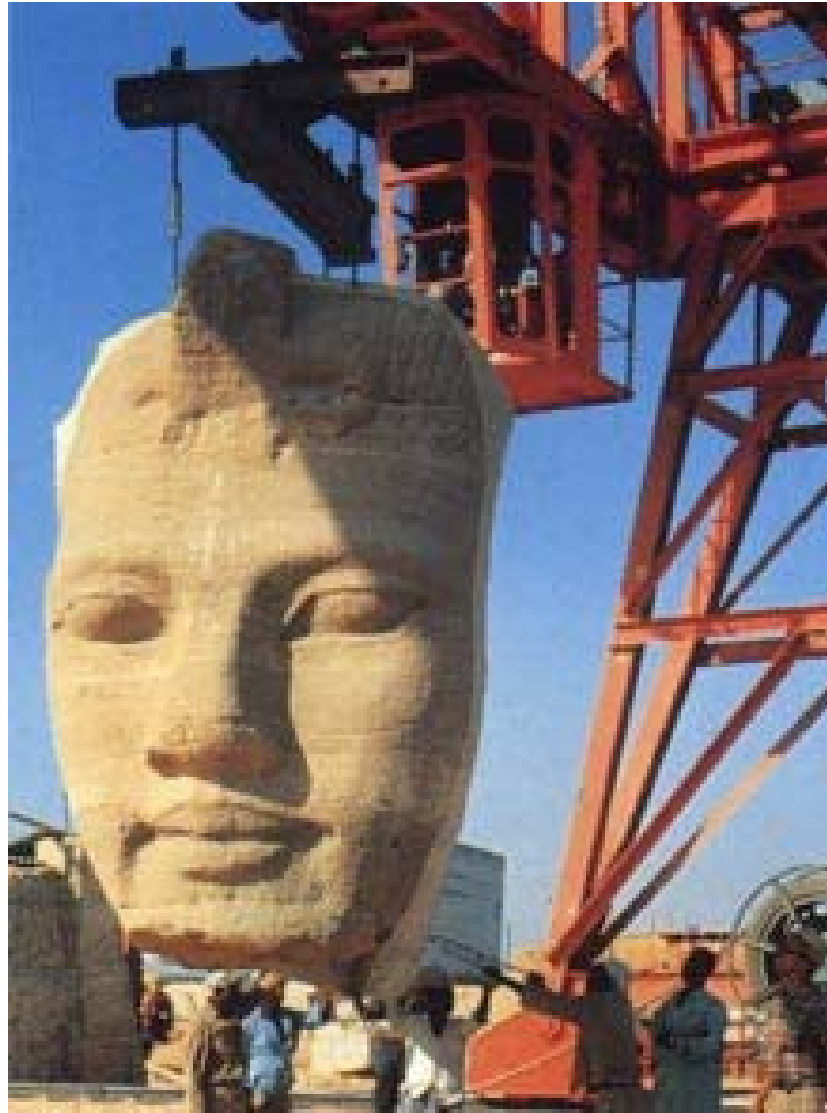
- Loss of soil fertility
- Eliminate the fishery in the eastern Mediterranean
- Cause the Nile delta to erode
- Possible increase in disease
- Flood antiquities and archaeological sites

## Benefits

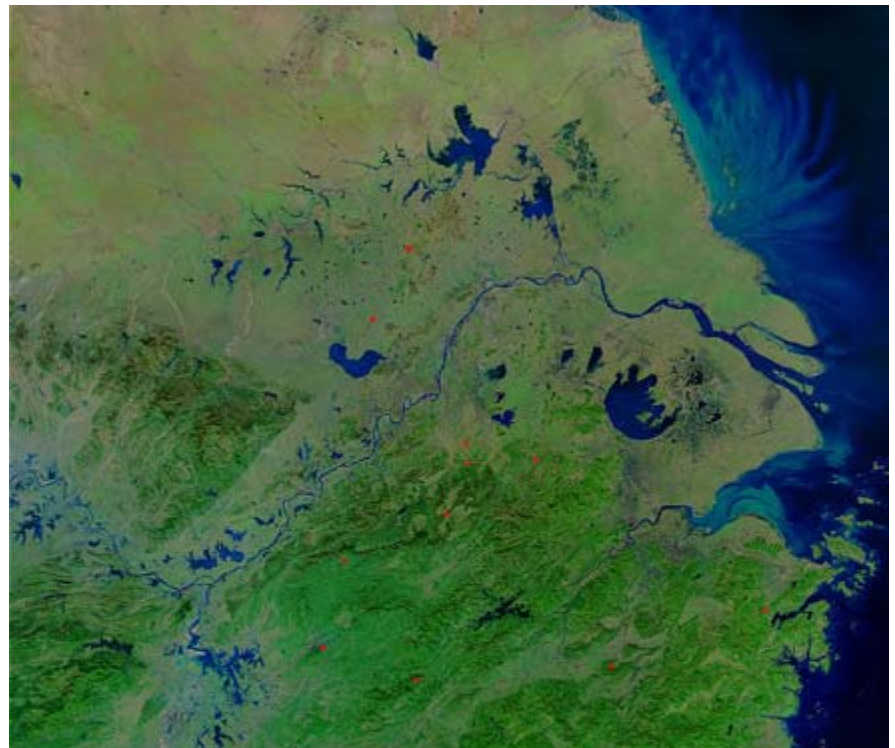
- Generate  $\frac{1}{2}$  of Egypt's electricity at the time
- Improved irrigation and control of water
- Grow two crops per year instead of one
- Use power to produce modern chemical fertilizers



# Ancient Egyptian Monuments Relocated to Higher Ground



The Yangtze River Was Called “China’s Sorrow” Because Periodic Flooding Has Killed Tens of Thousands of People at a Time and Left Millions Homeless.



# Three Gorges Dam in China Has Been Called the Biggest Structure Ever Built

It will help control flooding on the Yangtze River and generate  $\frac{1}{4}$  of the China's electricity.

It is an extremely controversial project because of its size, expense, environmental and human impact.



# Displaced People and Village Destroyed in China. The 3 Gorges Dams Will Displace Well Over a Million People



# Three Gorges is One of the Most Scenic Regions in China and Has Attracted Visitors for Hundreds of Years. Parts of Will be Flooded



# Three Gorges Dam Under Construction



May 15, 2006



July 17, 2000

# Visitors Center at the Dam



Locks at Three Gorges Dam Are Some of the Largest in the World and Have to Raise and Lower Boats 200 ft.





# The Biggest Dam in the World

7500 ft. Long and 331 ft High



# About 1/3 of Dam

