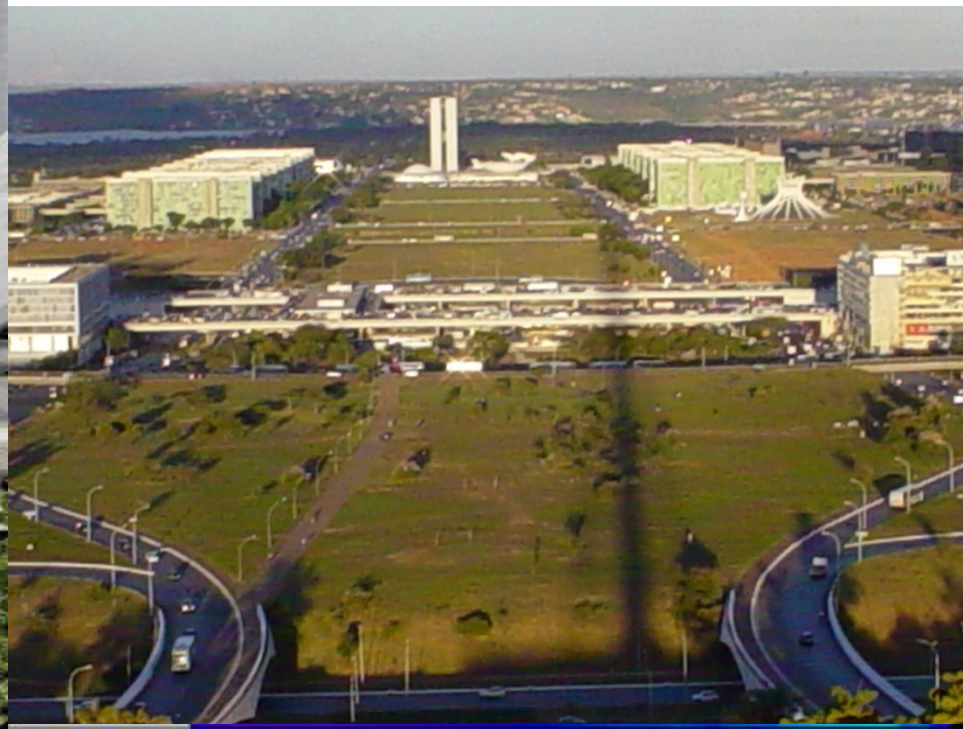
CEE 100
An Introduction to CEE



CEE 100 Schedule

Date	Speaker	Topic
9-Jan	Professor Joe Mahoney CEE Acting Department Chair Tim Larson	Welcome, Overview and Introduction
16-Jan	Professor Steve Kramer	Geotechnical Engineering
23-Jan	Professor Mike Brett	Environmental Engineering & Science
30-Jan	Professor Anne Goodchild	Transportation Engineering
6-Feb	Professor Steve Muench	Construction Engineering
13-Feb	Professor Greg Miller	Structural Engineering & Mechanics
20-Feb	Professor Deb Neimeier Department of Civil and Environmental Engineering UC Davis	Contemporary and future issues in Civil and Environmental Engineering
27-Feb	Professor Anne Steineman	Hydrology, Water Resources, and Environmental Fluid Mechanics
5-Mar	CEE Alumni Panel	Selected UW CEE Alumni
12-Mar	Employers and Organizations	Peace Corps, Engineers without Borders, Selected Employers

Three items about the class…

- No assignments
- Participation in class and attendance is required.
- See Prof. Goodchild about enrollment—we know—the class is full but will try to accommodate.
- Course is designed for freshmen with the goal of assisting you in making an informed decision about CEE as a major.

Topics

- Introduction to engineers
- Engineering students and graduates
- CEE areas of specialization
- A bit of perspective
  - Great projects (the good)
  - Global warming (the bad)
  - A few problems (the ugly)

First, a few numbers for the US

Infrastructure	How much do we have?
Roads and streets	6.5 million km
Bridges	583,000
Drinking water supply system	1.6 million km
Waste water treatment facilities (publicly owned)	16,000

First, a few numbers for the US

Infrastructure	How much do we have?
Airports	15,000 (49,000 worldwide) 5,119 with paved runways
Pipelines	245,000 km petroleum 549,000 km natural gas
Railways	227,000 km

Source: CIA World Factbook 2006

Introduction to Engineers

Numbers of Engineers in the US

Engineer Type	Number	% of Total Engineers
All Engineers	1,449,000	100 (or 0.5% of US population)
Civil	237,000	16
Mechanical	226,000	16
Industrial	177,000	12
Electrical	156,000	11
Electronics	143,000	10
Computer hardware	77,000	5
Aerospace	76,000	5
Environmental	49,000	3

Where do they work?

Sector	Number of Engineers	% of Total
Manufacturing	555,000	38
Services (design firms, etc.)	378,000	26
Construction, Transportation, Telecommunications, Utilities	281,000	20
Federal, State, and Local Governments	194,000	13
Self-Employed	41,000	3

Washington State employment?

Sector	Employment in the State of Washington	% of Total
Natural resources and mining	9,000	0.3
Construction	205,000	7
Manufacturing (wood products and aerospace)	289,000	10
Government	517,000	18
Retail and wholesale trade	452,000	16
Professional and business services	340,000	12
All other employment	1,075,000	37

Source: Washington CEO, as of September 2006 (employment rounded to the nearest thousand). Numbers for all employment—not just engineering.

What are Civil Engineers?

- Civil and environmental engineering is a profession that applies technology to meet society's needs.
- Civil and environmental engineers are essential to provide buildings, clean water, roadways, and the protection of the natural environment.
- With the advent of new information technologies, civil and environmental engineering is at the intersection of the built, natural, and information environments.

Where do Civils work?

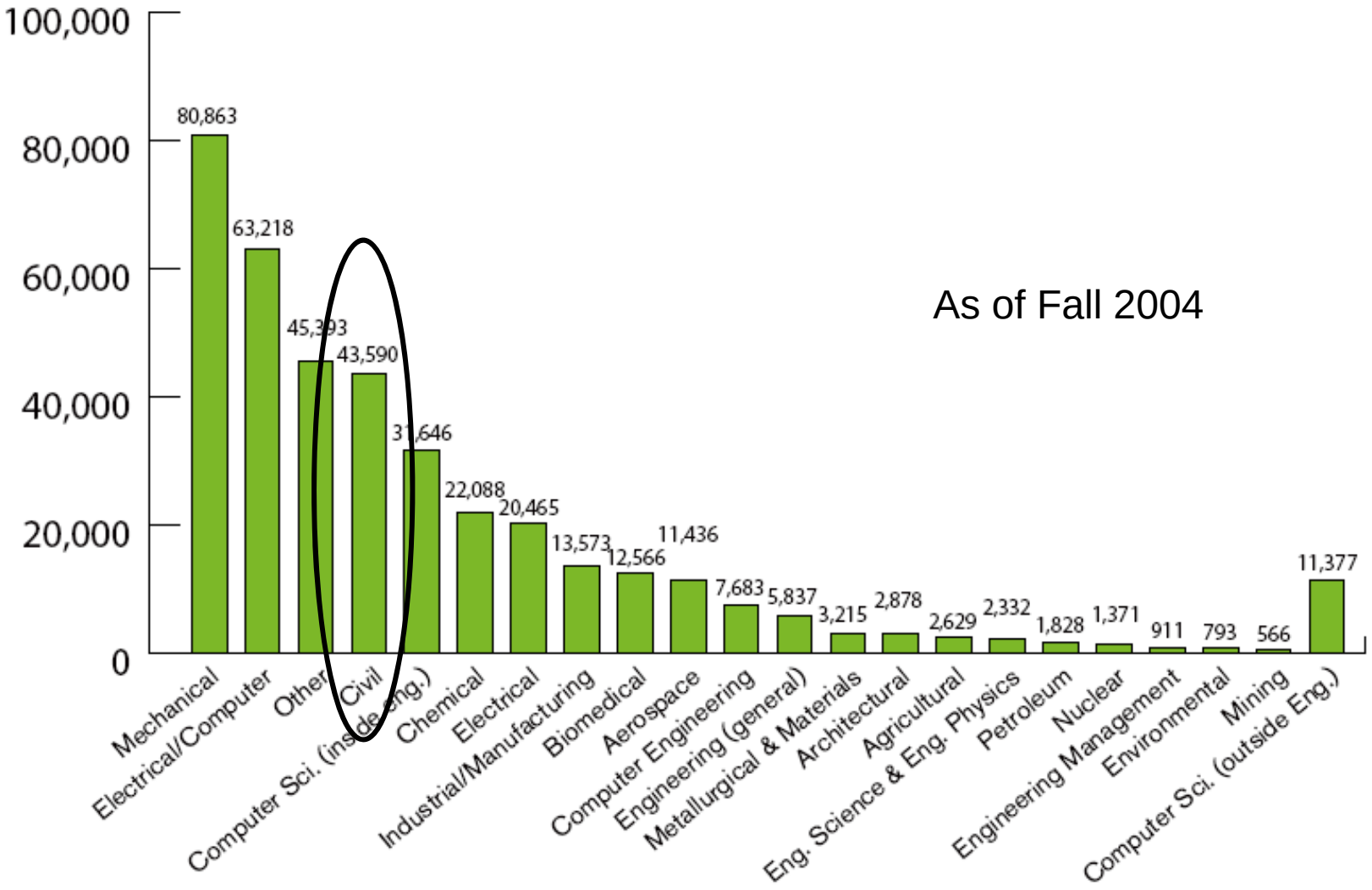
Sector	Number of Civil Engineers	% of Total
Architectural, Engineering, and Related Services	120,000	50
Federal, State, and Local Governments	80,000	33
Construction Industry	40,000	17

US Engineering Students

US Engineering Students and Graduates

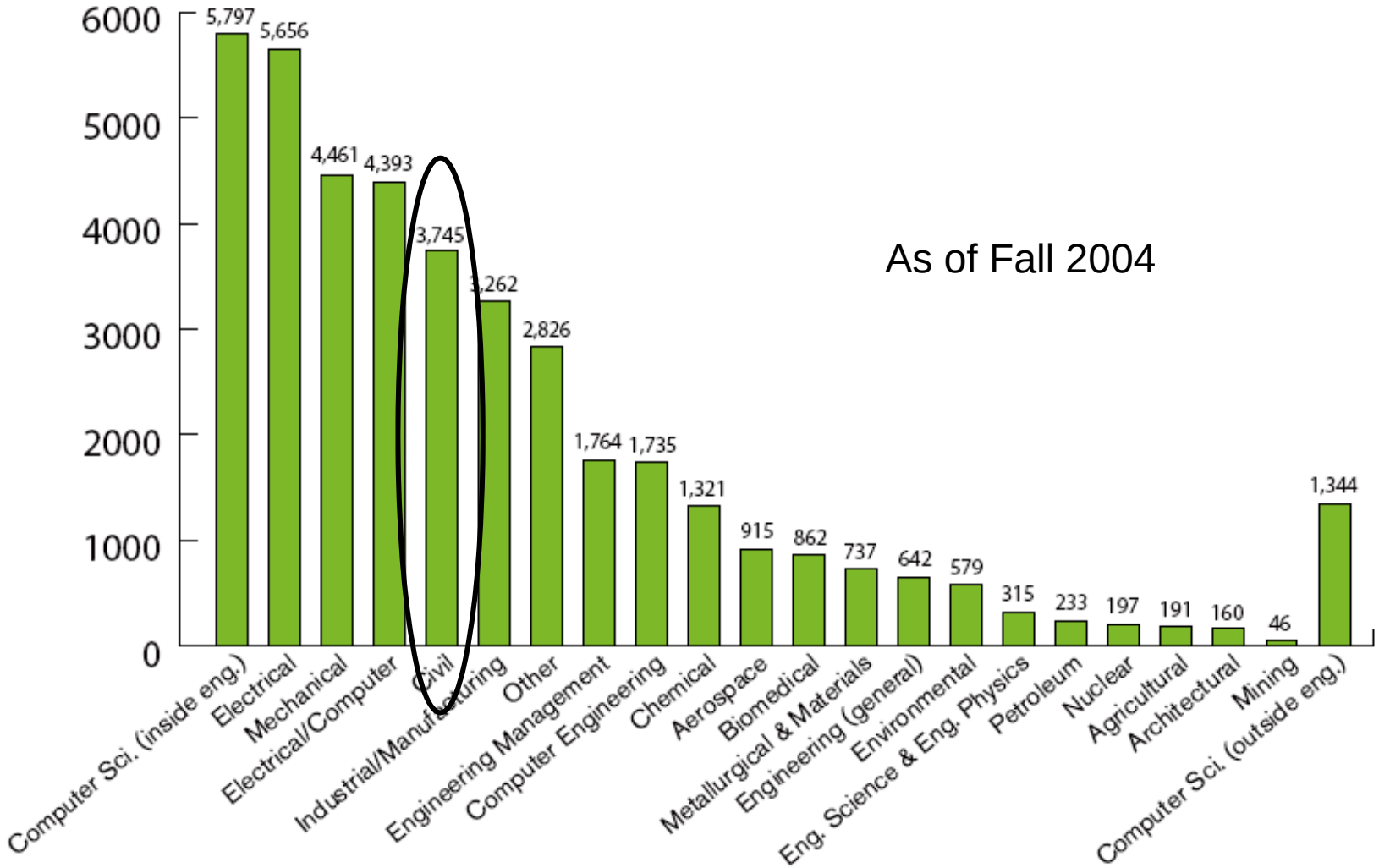
- In 2006, degrees awarded in engineering
  - 73,000 BS (CEE 11% of total)
  - 40,000 MS (CEE 9% of total)
  - 7,000 PhD (CEE 12% of total)

US Undergraduate Enrollment



As of Fall 2004

US Masters Enrollment



As of Fall 2004

BSCE Degrees Awarded—2003

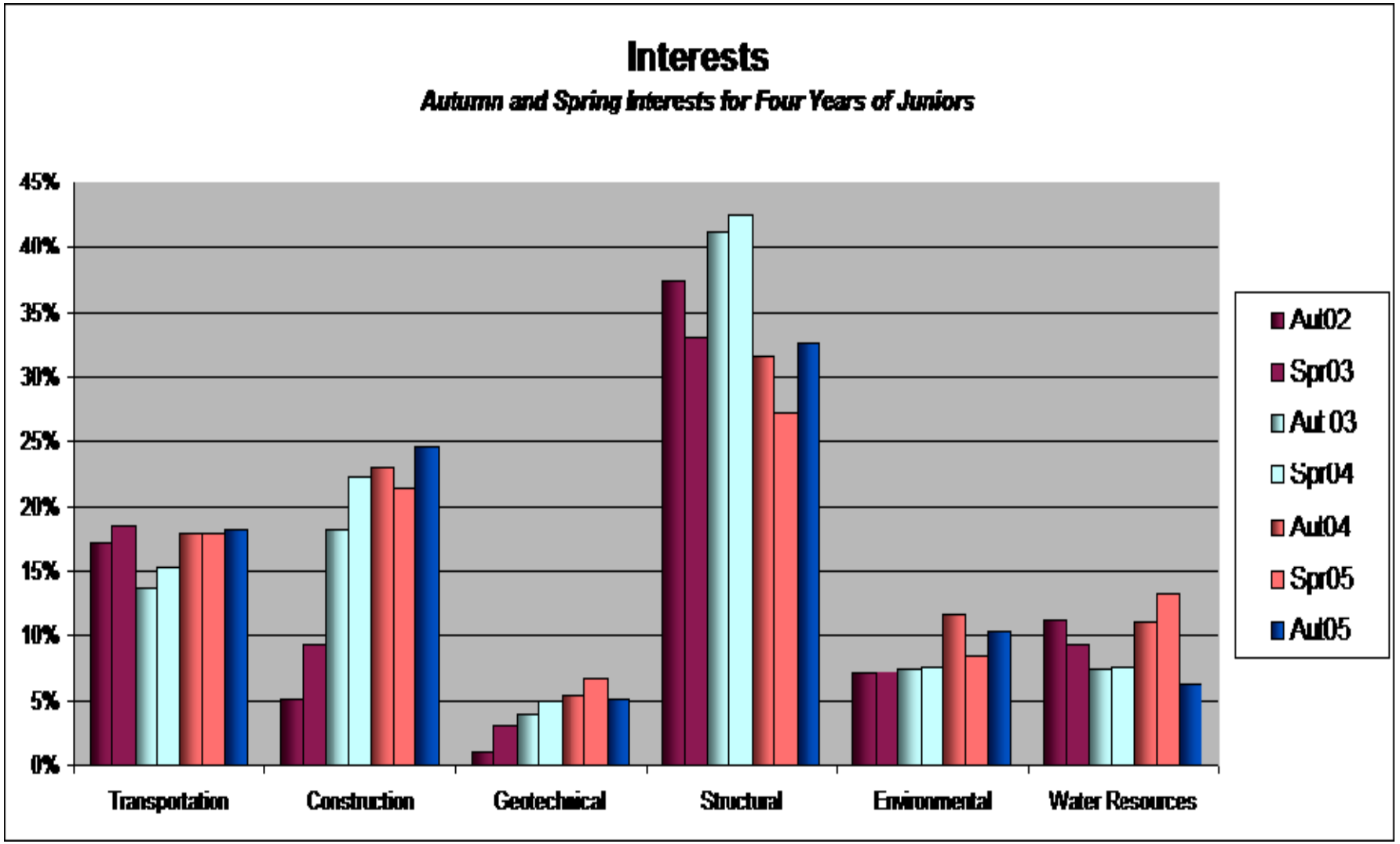
1. Purdue University	176
2. Texas A&M University	157
3. Pennsylvania State University	154
4. Polytechnic Univ. of Puerto Rico	131
5. Univ. of Illinois, Urbana-Champaign	128
6. North Carolina State University	124
7. Georgia Institute of Technology	121
8. California Polytechnic State Univ.	111
9. University of Florida	110
10. Virginia Tech	109
11. Univ. of Puerto Rico, Mayaguez	104
12. North Dakota State University	103
13. Michigan Technological University	101
14. Auburn University	94
14. Univ. of Minnesota, Twin Cities	94
16. Michigan State University	92
17. Clemson University	90
18. Ohio State University	87
19. University of California, Davis	83
20. Colorado State University	82
20. University of Kentucky	82
22. University of Washington	77

CEE Areas of Specialization

CEE Areas of Specialization

- Transportation
- Construction
- Geotechnical
- Structures
- Environmental
- Water Resources

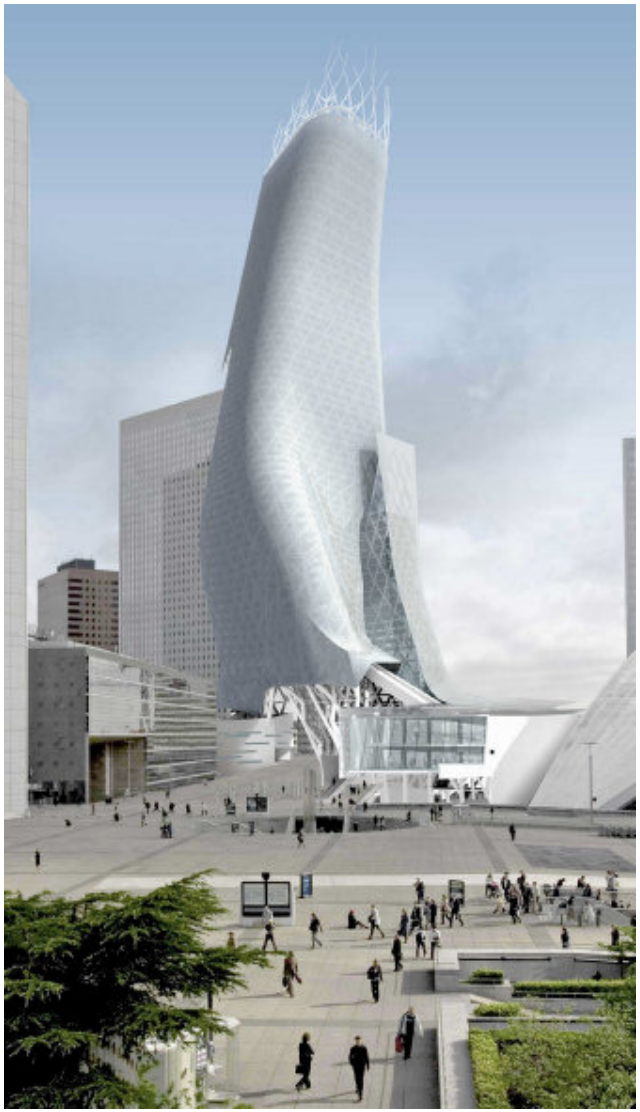
Student Specialty Interests



A bit of perspective…

Illustrations of good…

Civil Engineers do…

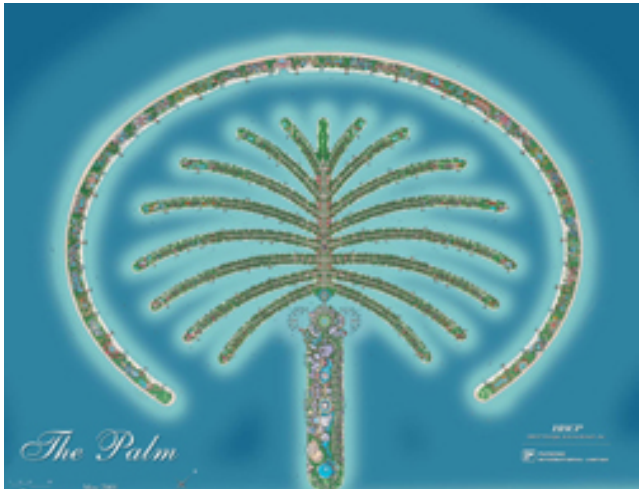


Le Phare Tower (The Lighthouse), Paris

300 m height, $1.35 billion

Civil Engineers also do…

Dubai, UAE

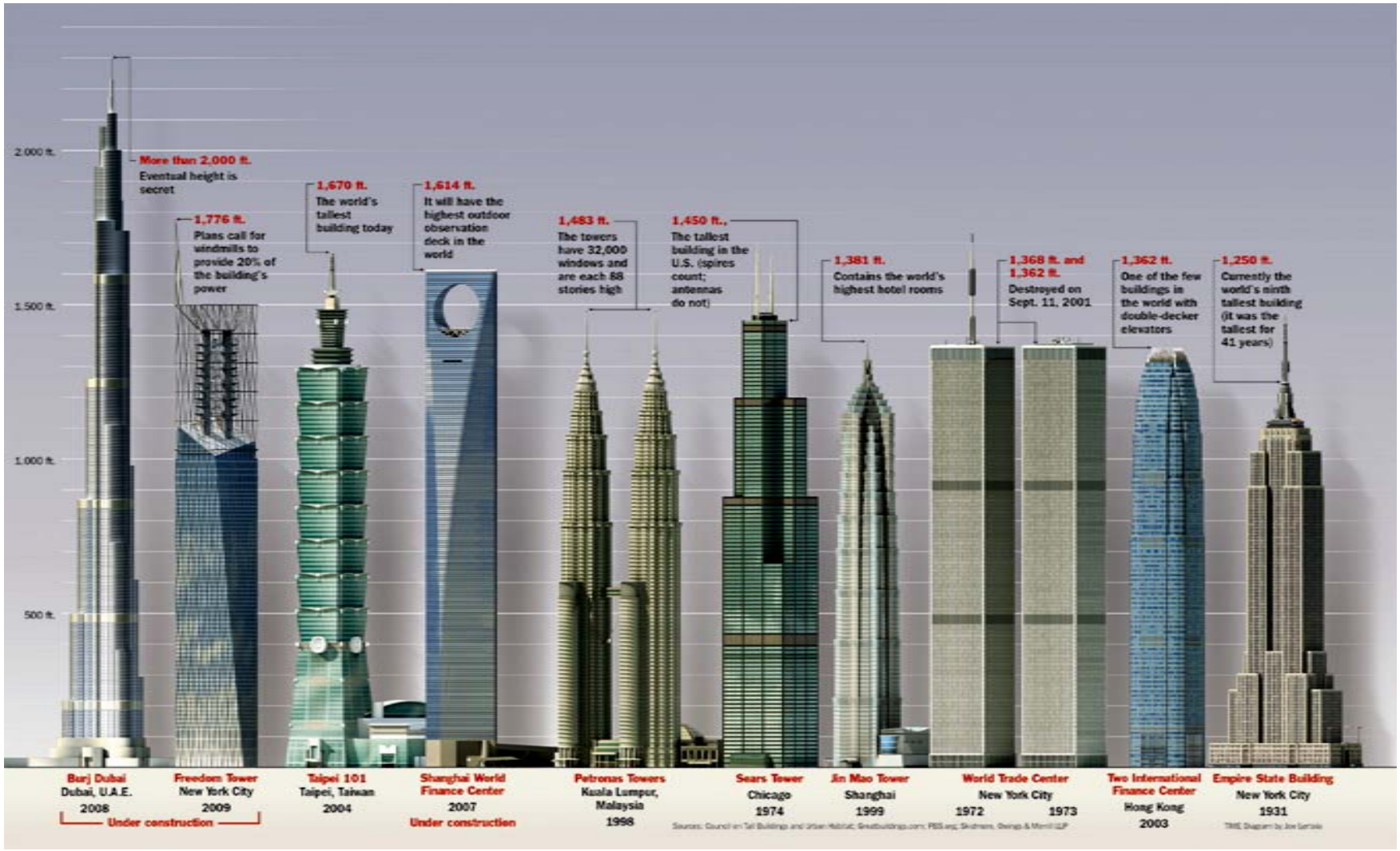


Wonderful buildings in Dubai…

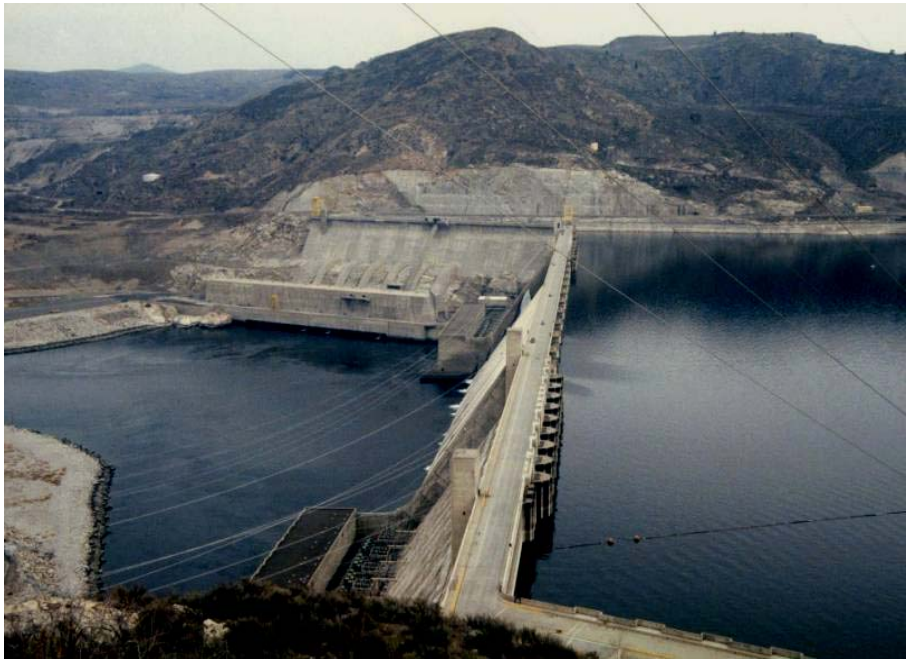
Burj Dubai

Ski Dubai

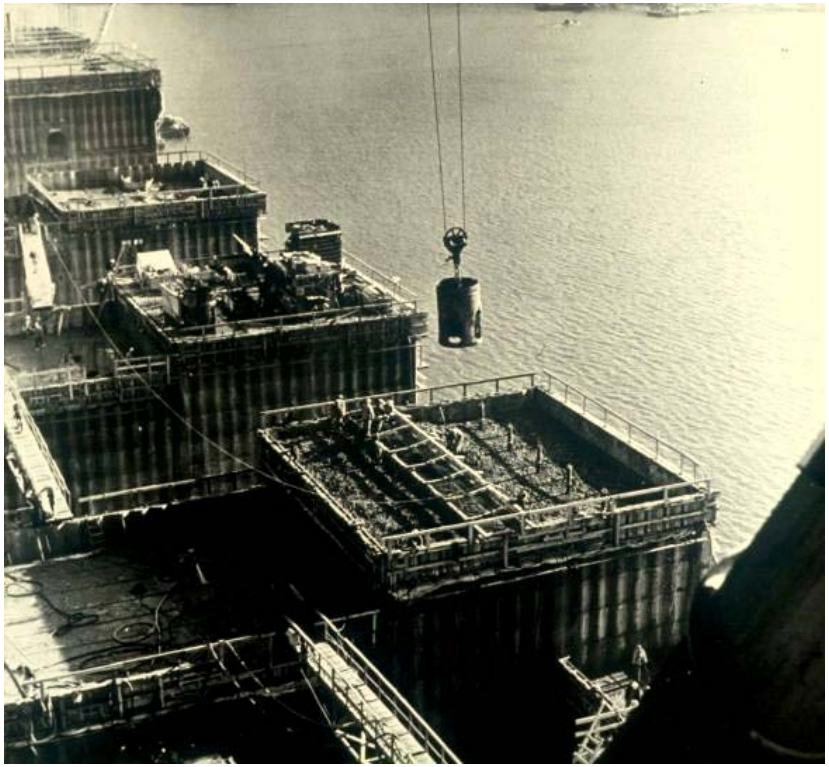
Actually, lots of buildings…



Big projects…such as Grand Coulee Dam



Big projects…such as Grand Coulee Dam

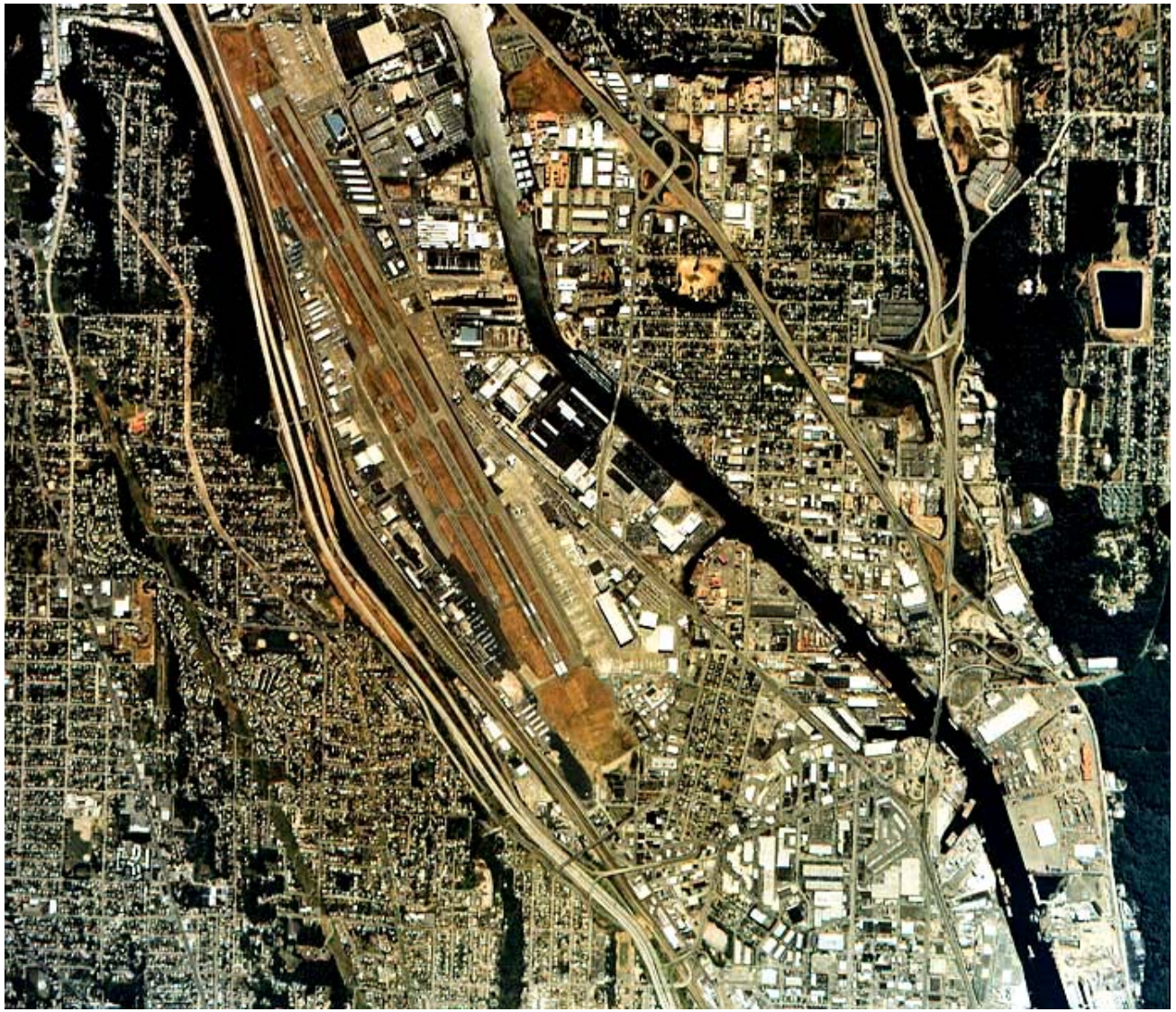


However, Grand Coulee not world's largest hydro dam…

- Three Gorges Dam
  - 27 million m^3 of PCC
  - 18,200 megawatts of electricity
- Grand Coulee Dam
  - 9.2 million m^3 of PCC
  - 6,000 megawatts of electricity

Photo sources: Wikipedia

Design and construction of airports and Interstate highways



Boeing Field

Facilities were rather basic in 1933 for the Boeing Model 247

Source: Boeing Photo

But airports became a bit more interesting as illustrated by Brasilia International Airport

Photo source: Google Earth

Brasilia International Airport

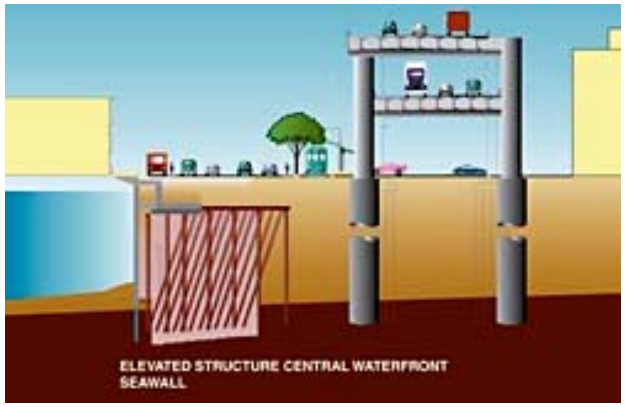
Brasilia International Airport

A bit on Washington roads and traffic…

Civil Engineers designed and built US 99 Seattle—and they will be part of the replacement solution

All traffic data from 2004 WSDOT estimates.

Civil Engineers designed and built US 99 Seattle—and they will be part of the replacement solution

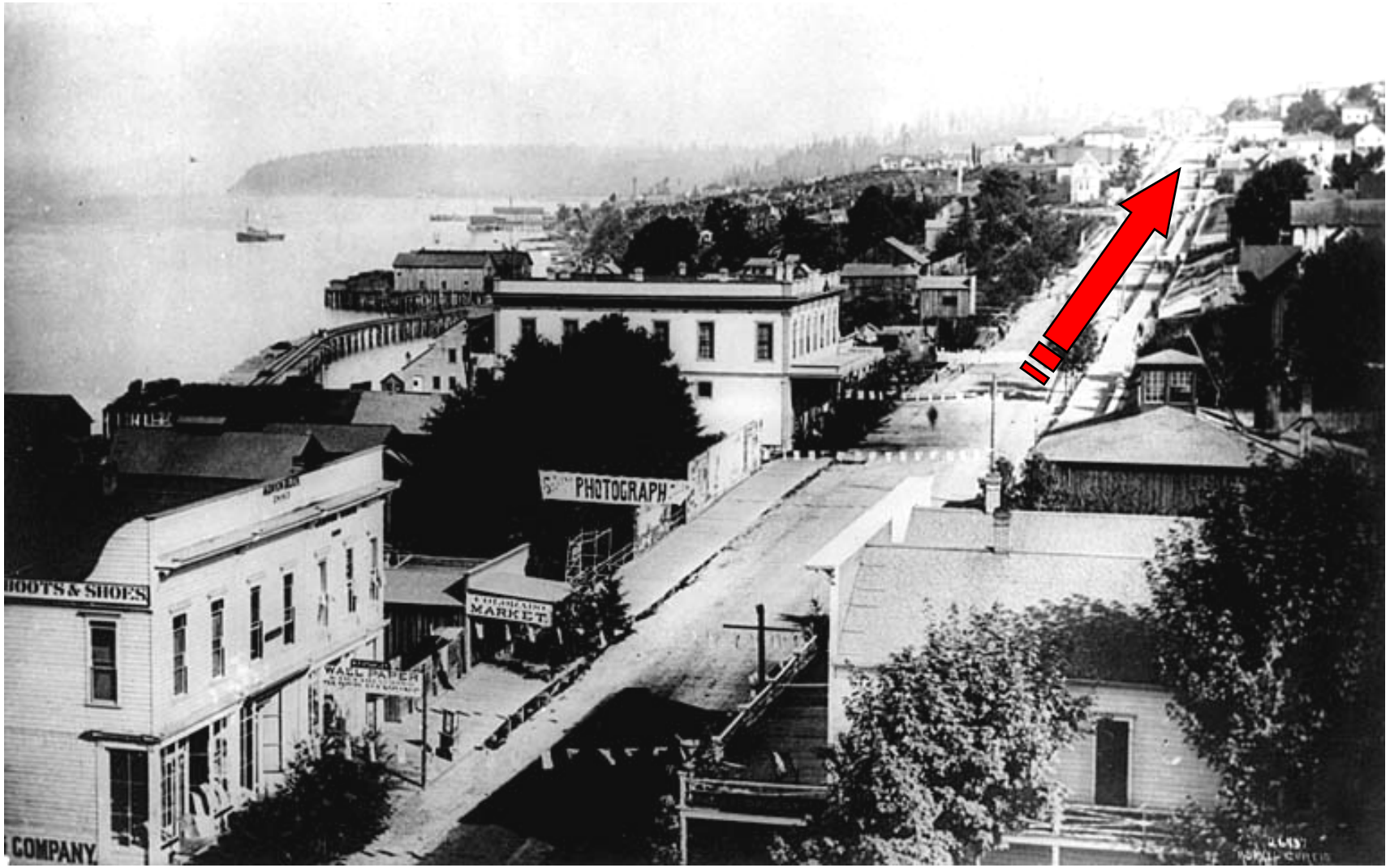


I-5 Seattle

First Avenue (1878)

University of Washington Libraries

First Avenue (1889)



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Sketch used by Sam Hill to illustrate the need for properly graded roads (ca. 1910)

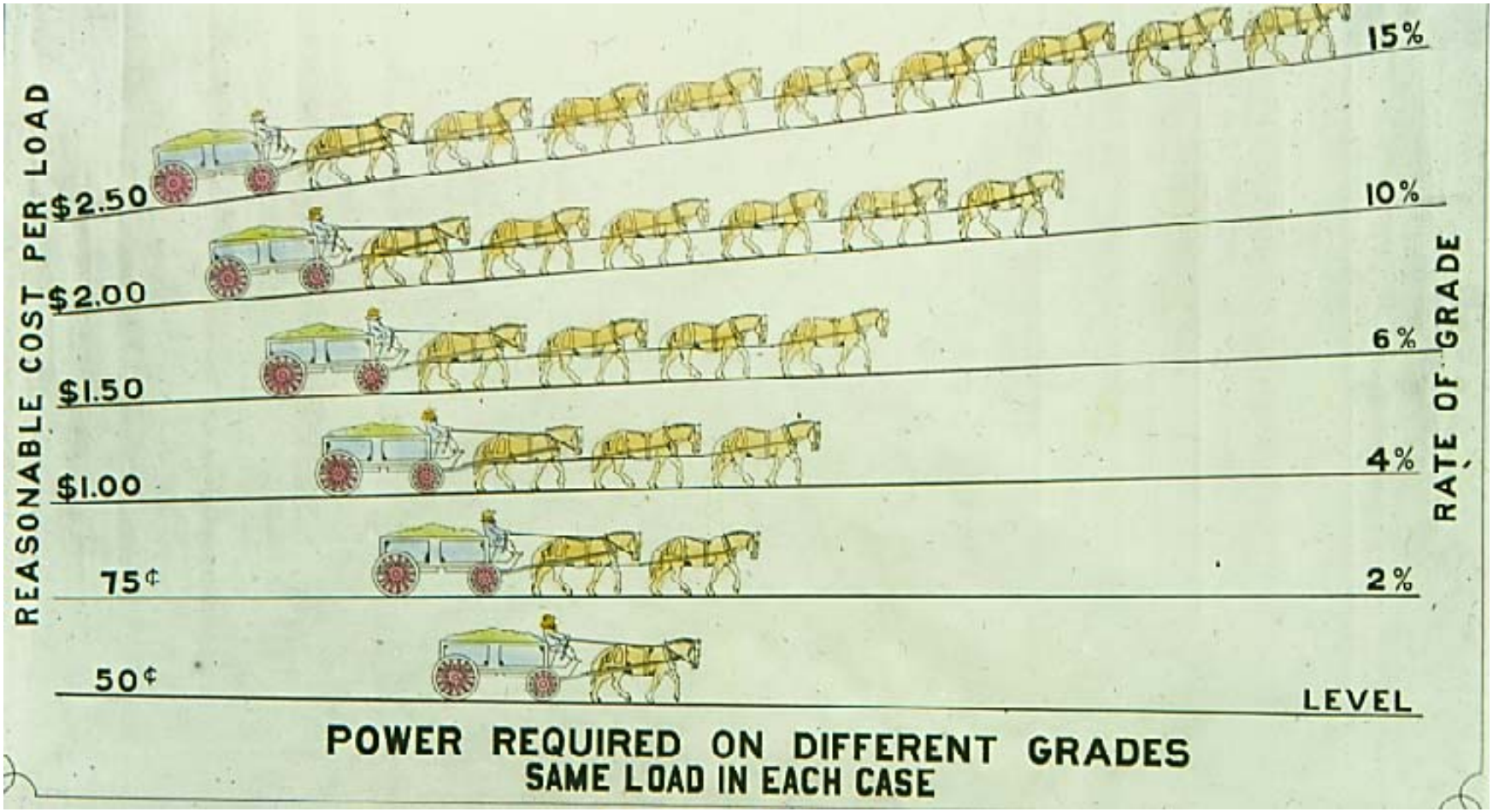

Photo source: Maryhill Museum of Art, Goldendale, Washington

First Avenue (1901)

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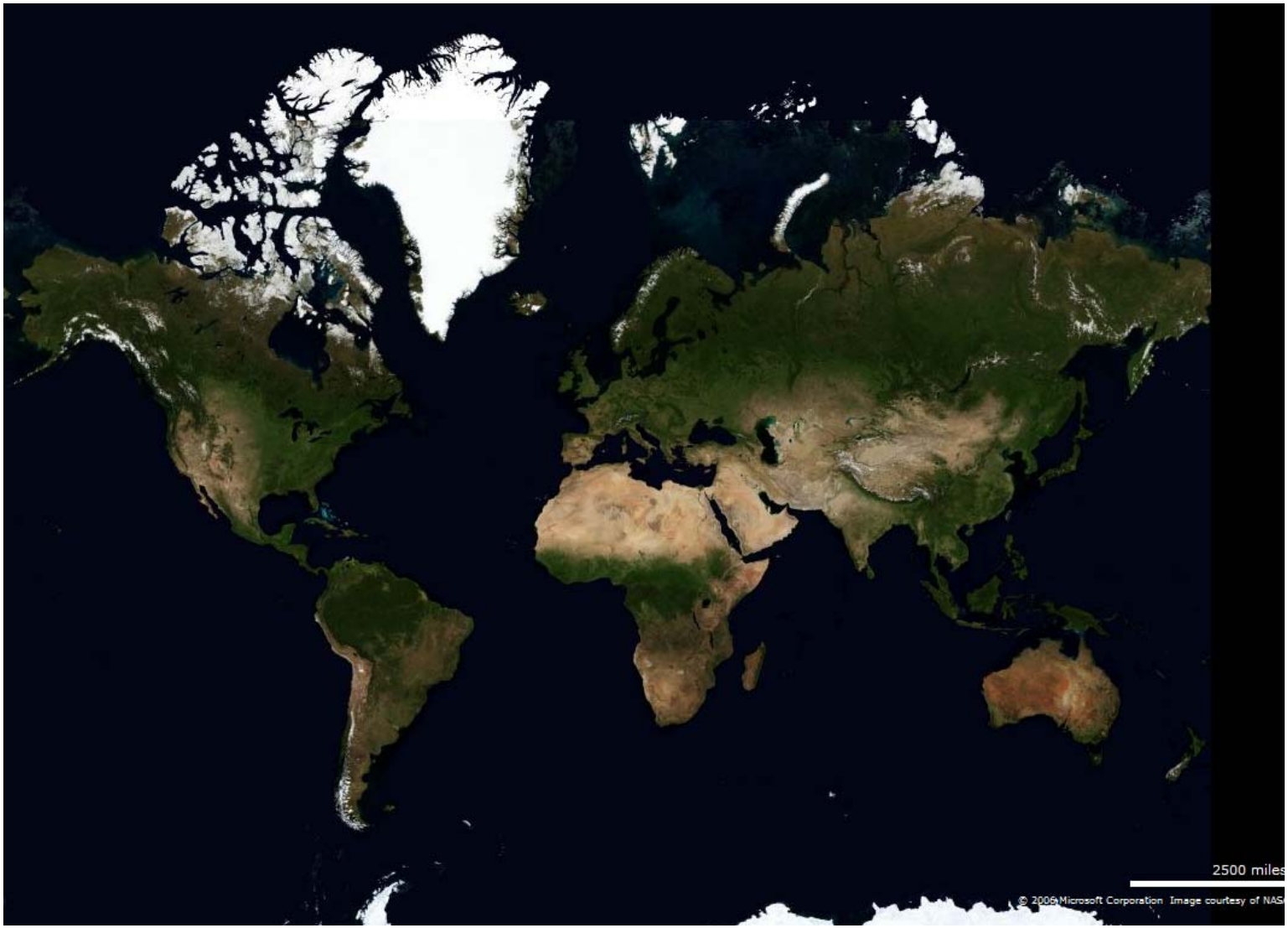
Illustrations of bad…

Global warming



Greenland…a lot of ice to melt…but if you did…

Global warming

Location	Volume (km^3)	Potential Sea Level Rise (m)
East Antarctic ice sheet	26,039,000	64.8
West Antarctic ice sheet	3,262,000	8.1
Antarctic Peninsula	227,100	0.5
Greenland	2,620,000	6.6
All other ice fields, glaciers, etc.	180,000	0.5
Total	32,328,100	80.5 (264 ft.)

Source: US Geological Survey

Global warming effects…

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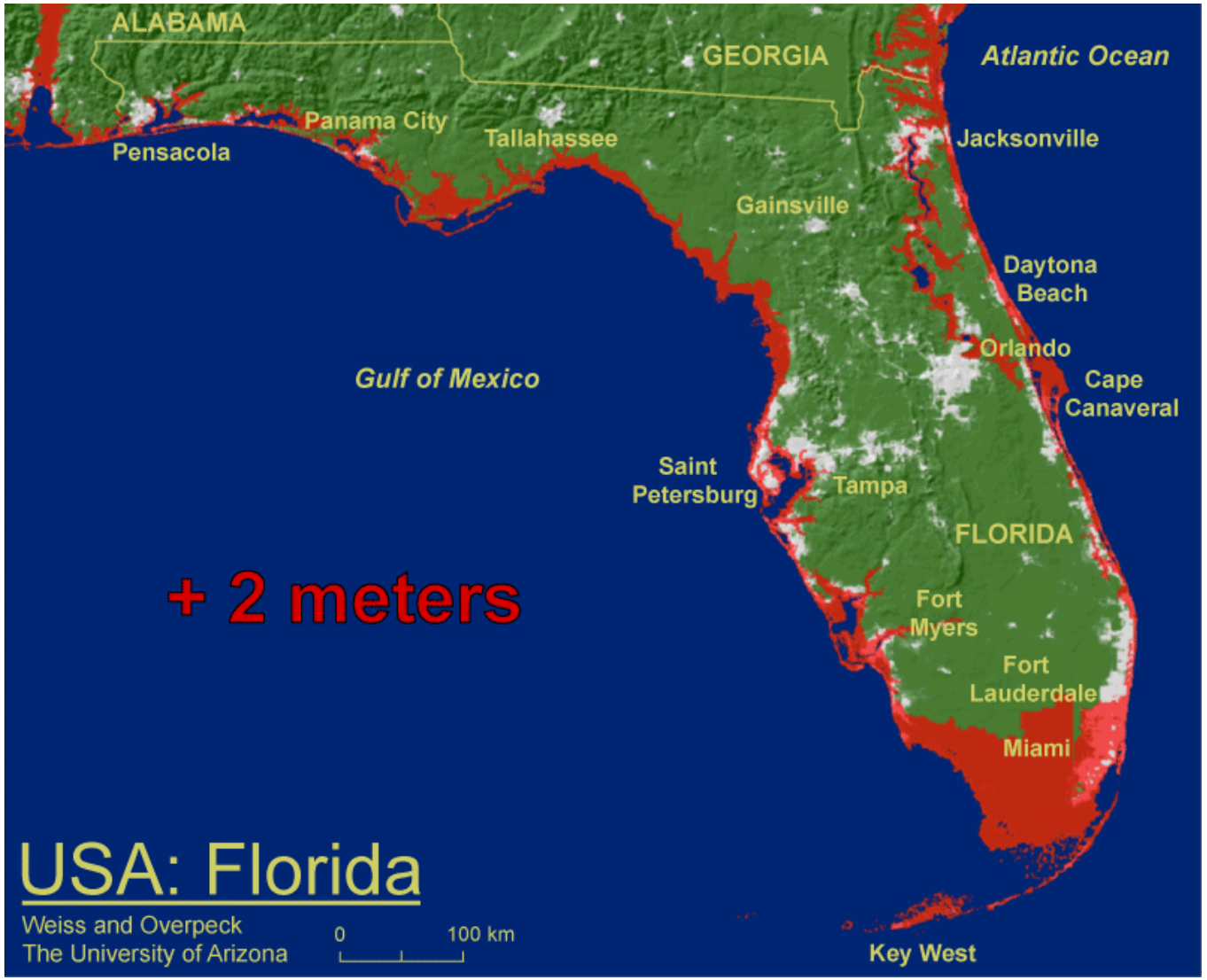
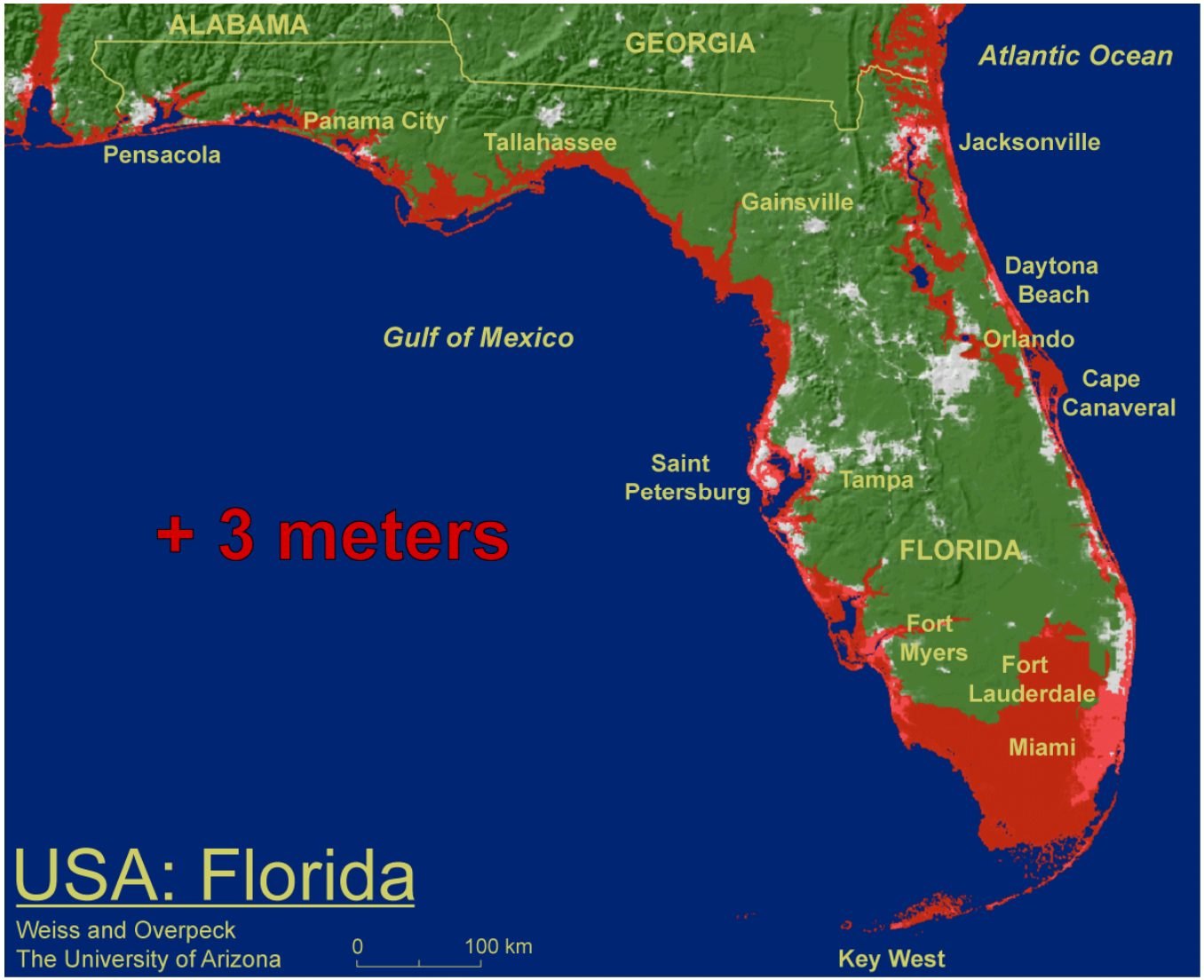
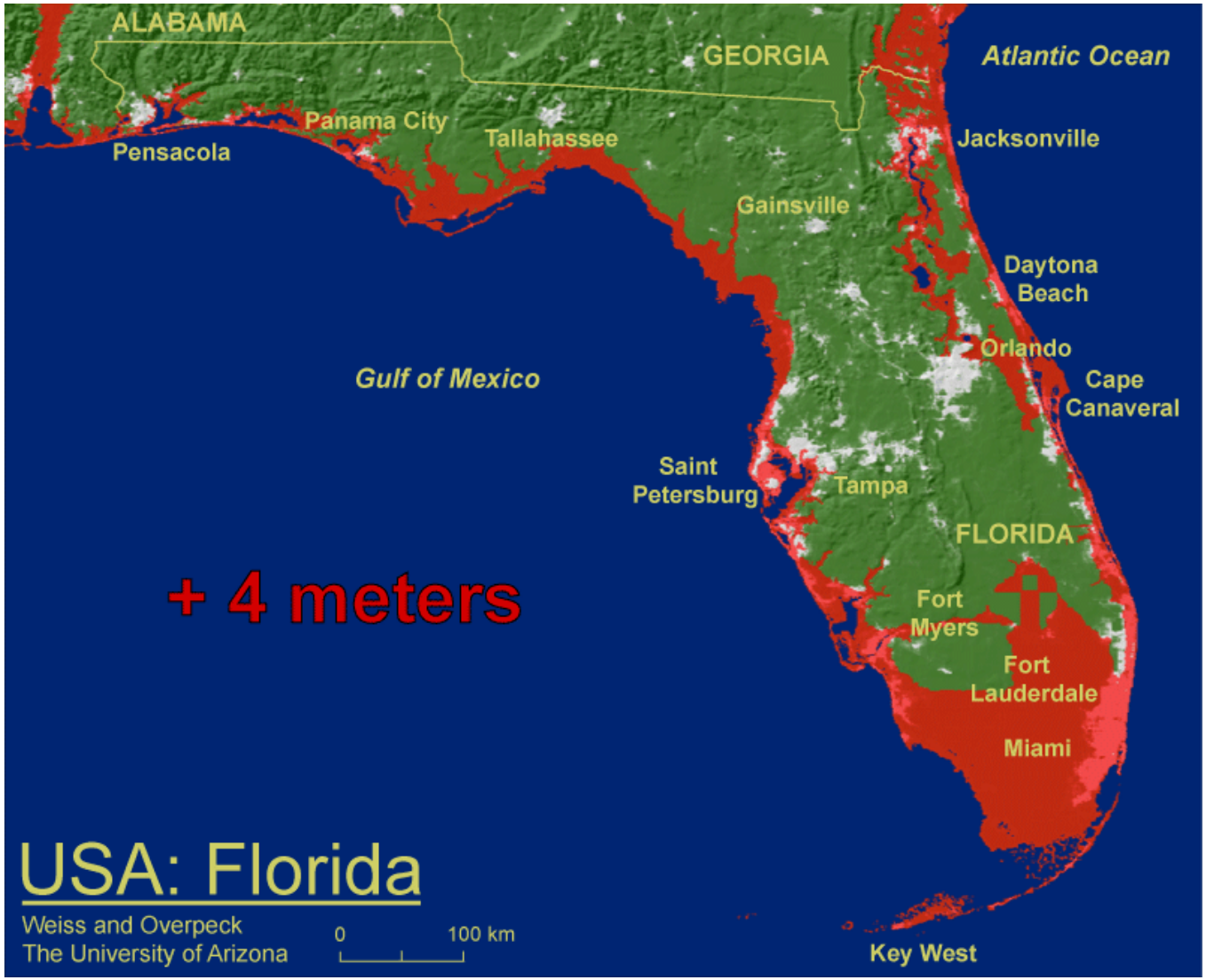


Global warming effects…



Global warming effects…



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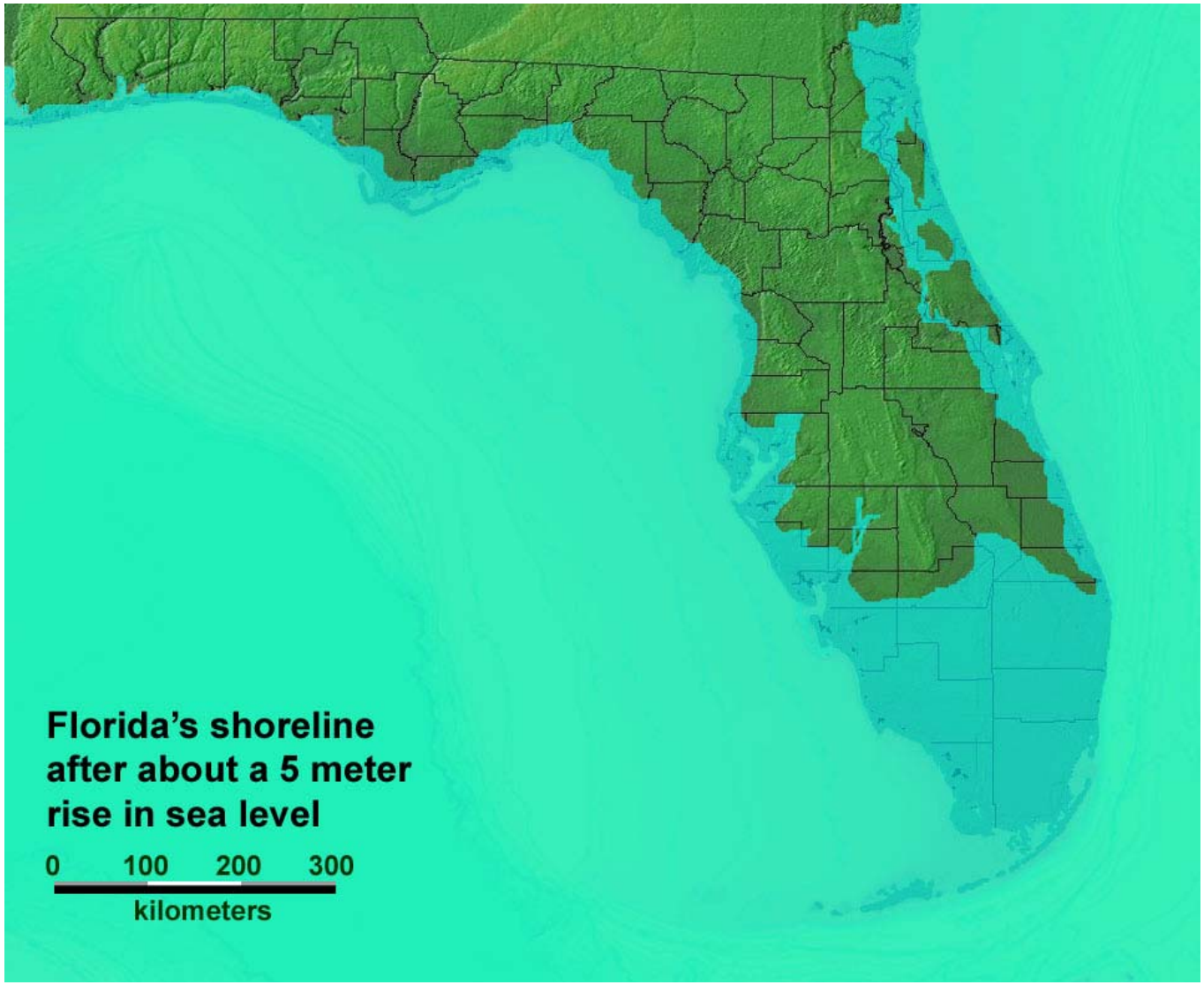
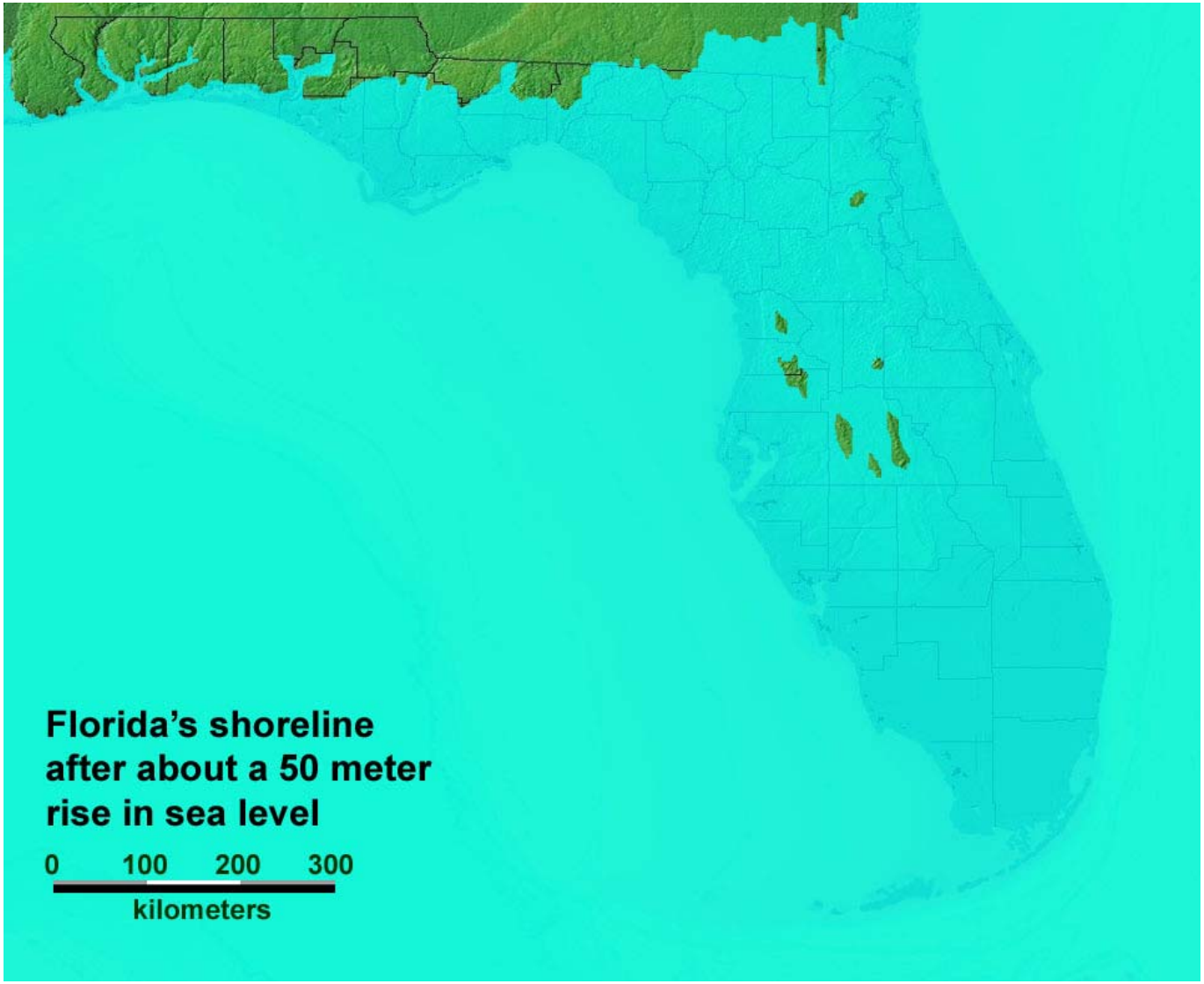


Global warming effects…



Illustrations of ugly…well not all ugly but change…

Big issues are coming….

Special report Transport in Britain

1pm update

Report calls for road pricing to ease congestion

James Sturcke and agencies
Friday December 1, 2006
Guardian Unlimited

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Transport in Britain archived articles

If left unchecked, 13% of traffic would be subject to stop-start travel conditions by 2025. Photograph: Dan Chung

In this section

Transport chief backs road-pricing schemes

Road pricing schemes could reduce congestion on Britain's roads by 50%, a Treasury-backed report said today.

Big problems come quickly….

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Location: Kobe, Japan--1995

Big problems come quickly…

Taiwan--1999

Alaska--2004

Big problems come quickly…

Teton Dam
Teton River, SE Idaho
Failed on June 5, 1976

So do traffic accidents…

Some problems grow slowly…

But enough illustrations about what Civils do and current and future issues they will face….

Bangkok

Finally, a quote from Abraham Lincoln, 1862

"The dogmas of the quiet past are inadequate to the stormy present. We must think anew and act anew..."

Questions?