Human Impacts

Nutrient cycles

The Carbon Cycle

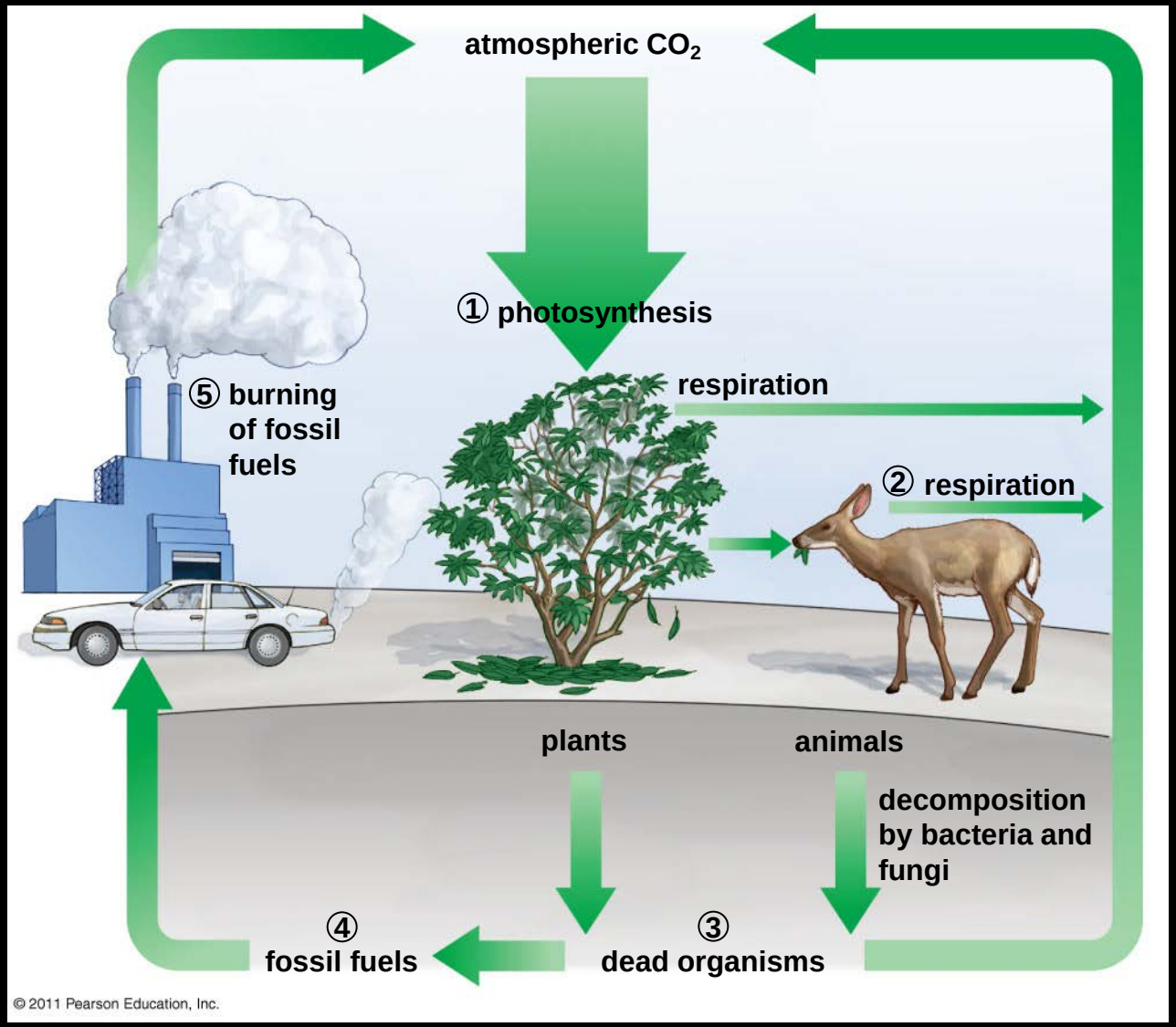


Figure 36.1

Nutrient cycles

The Nitrogen Cycle

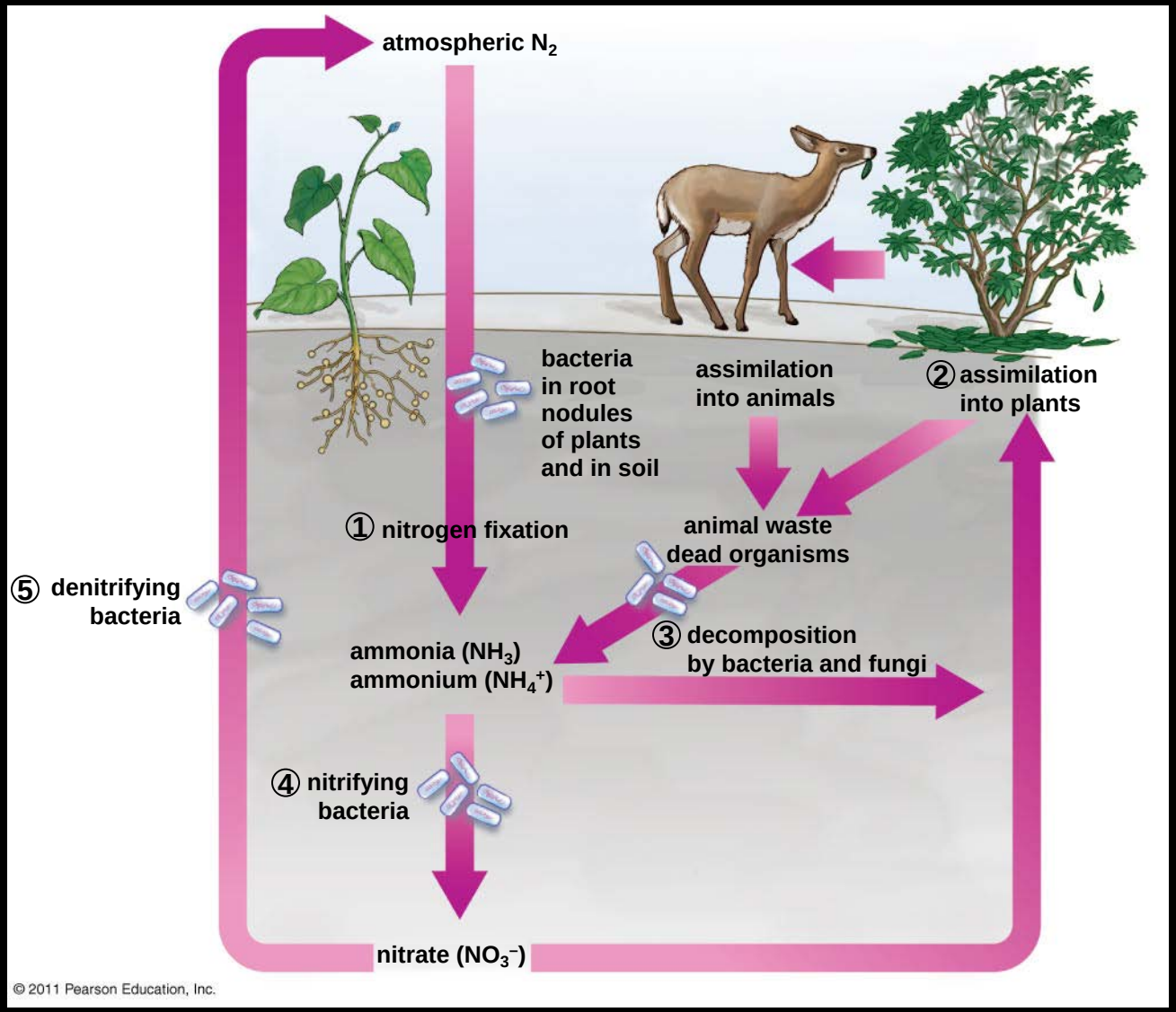


Figure 36.2

Nutrient cycles

Aldo Leopold: *Odyssey*, from Sketches Here and There (1949)

Fertilizer Labels

"All-Purpose" vs a "Special Purpose" plant food. Specialty fertilizers are available for Roses, Vegetables, Flowering, Acid-Loving Plants, etc.

Primary product composition, always written as N-P-K (Nitrogen, Phosphorus, Potassium). This is the percentage of each available to the plants as nutrient.

Details on the N-P-K composition of the fertilizer.

A listing of the other macro- and micro-nutrients contained in the fertilizer and their quantity. Any particular brand may include these or some other combination of nutrients.

A detailed list of the chemical sources from which the actual nutrients were derived. Mainly of interest to chemists.

Too Many Nutrients

Nutrient cycles

Too Many Nutrients

http://microbiology.science.oregonstate.edu/

miseagrant.umich.edu

Too Many Nutrients

Nutrient cycles

Gulf of Mexico "Dead Zone"

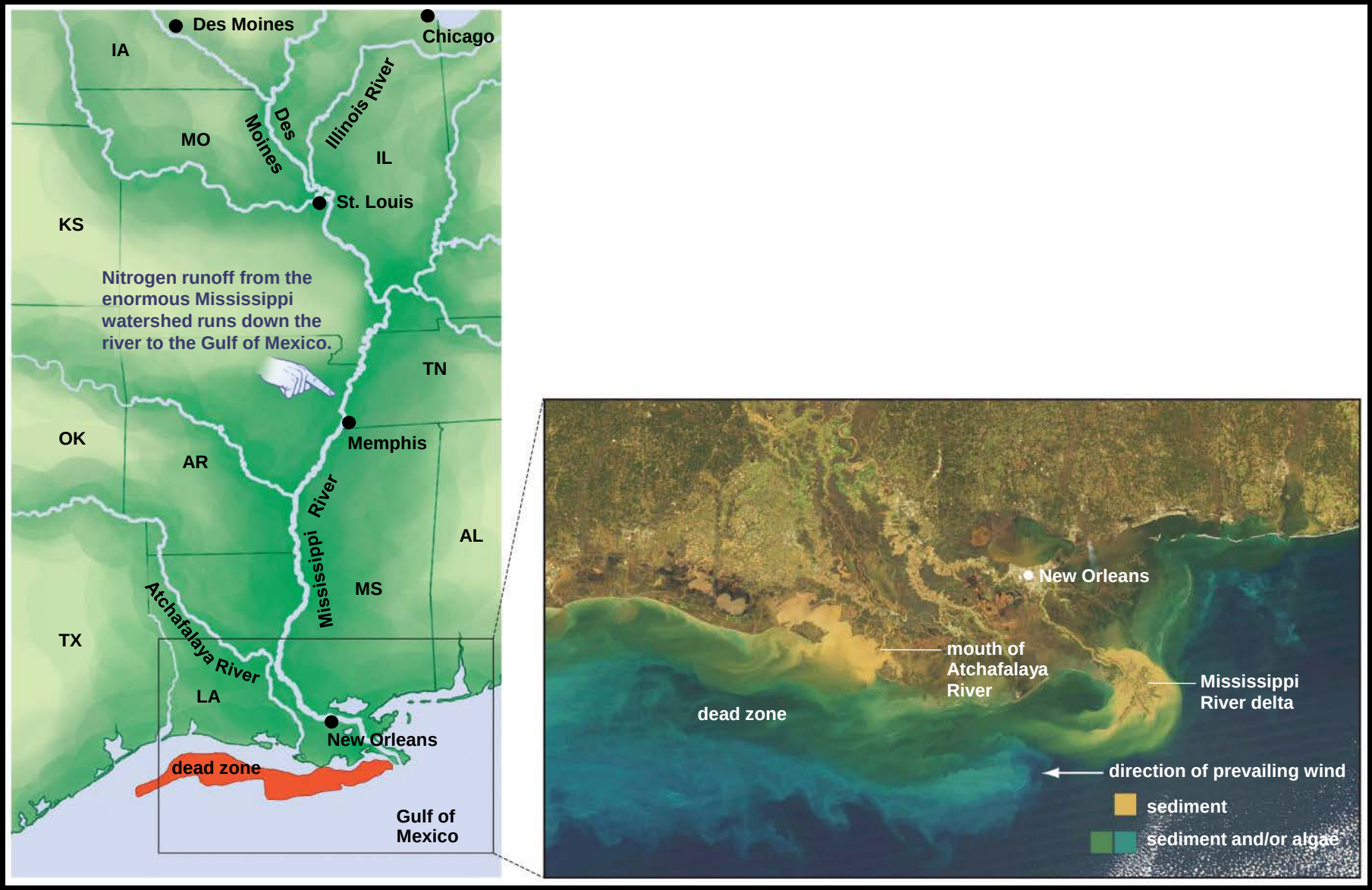
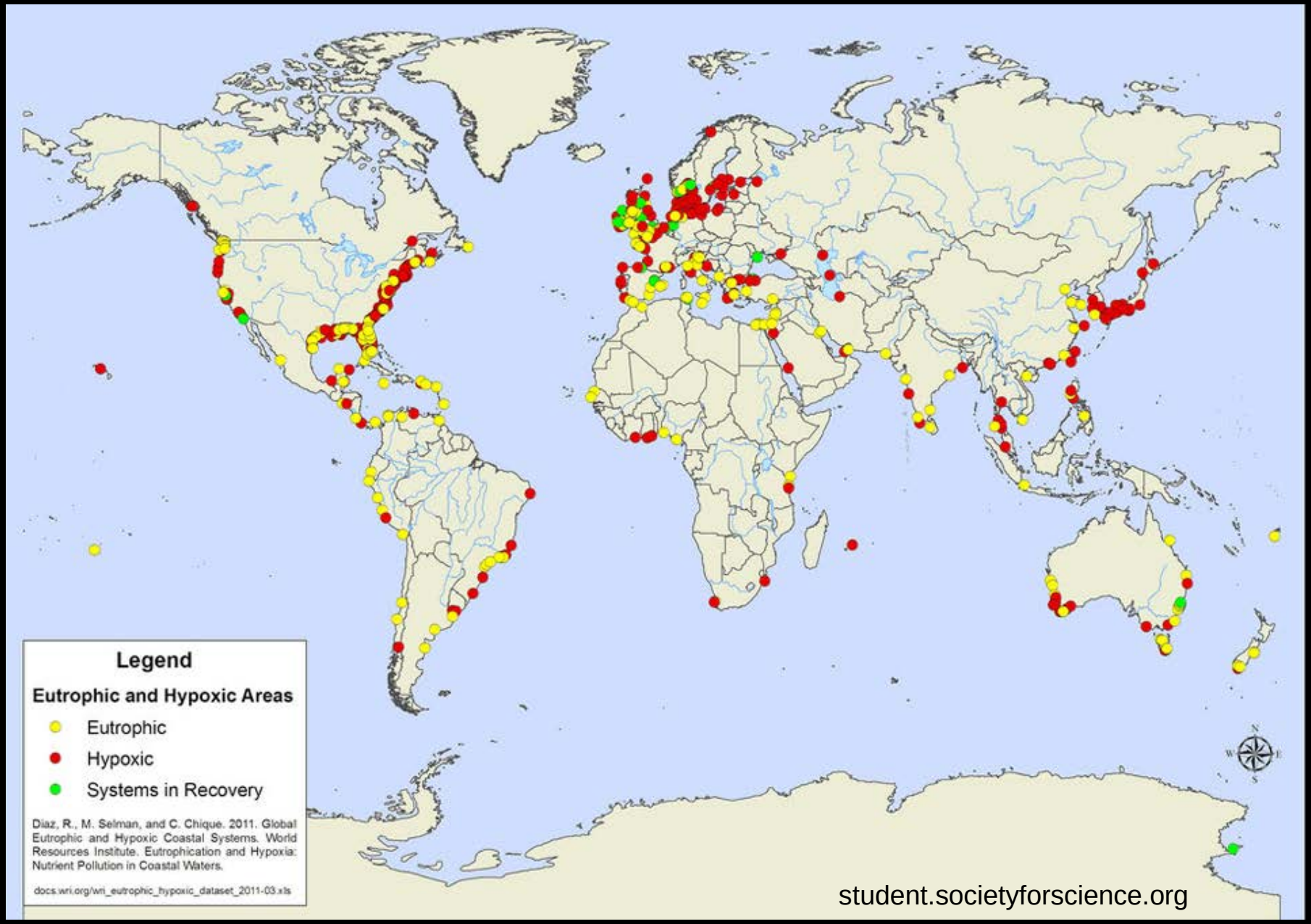
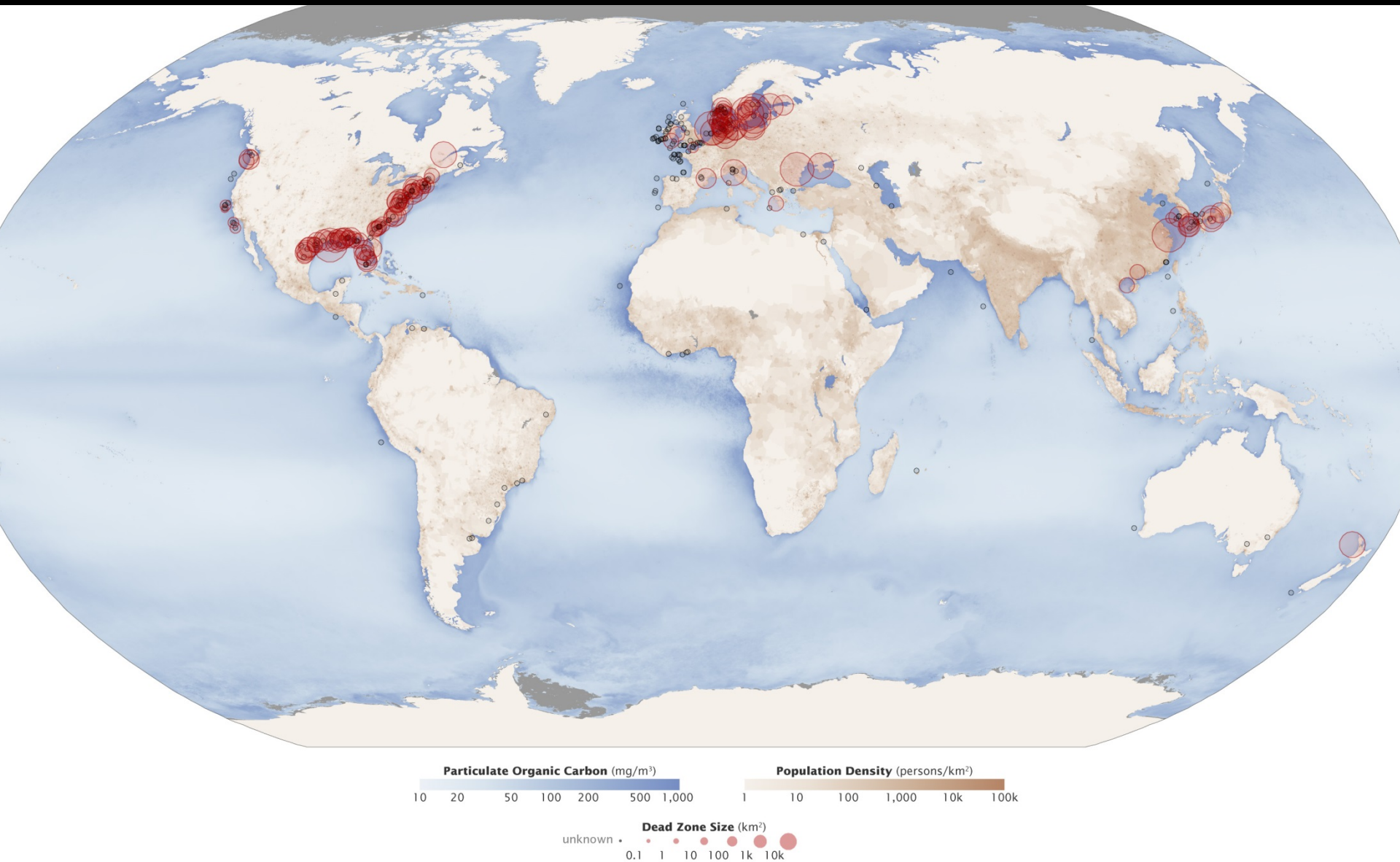


Figure 36.3

Other Dead Zones



Other Dead Zones



The Hydrologic Cycle

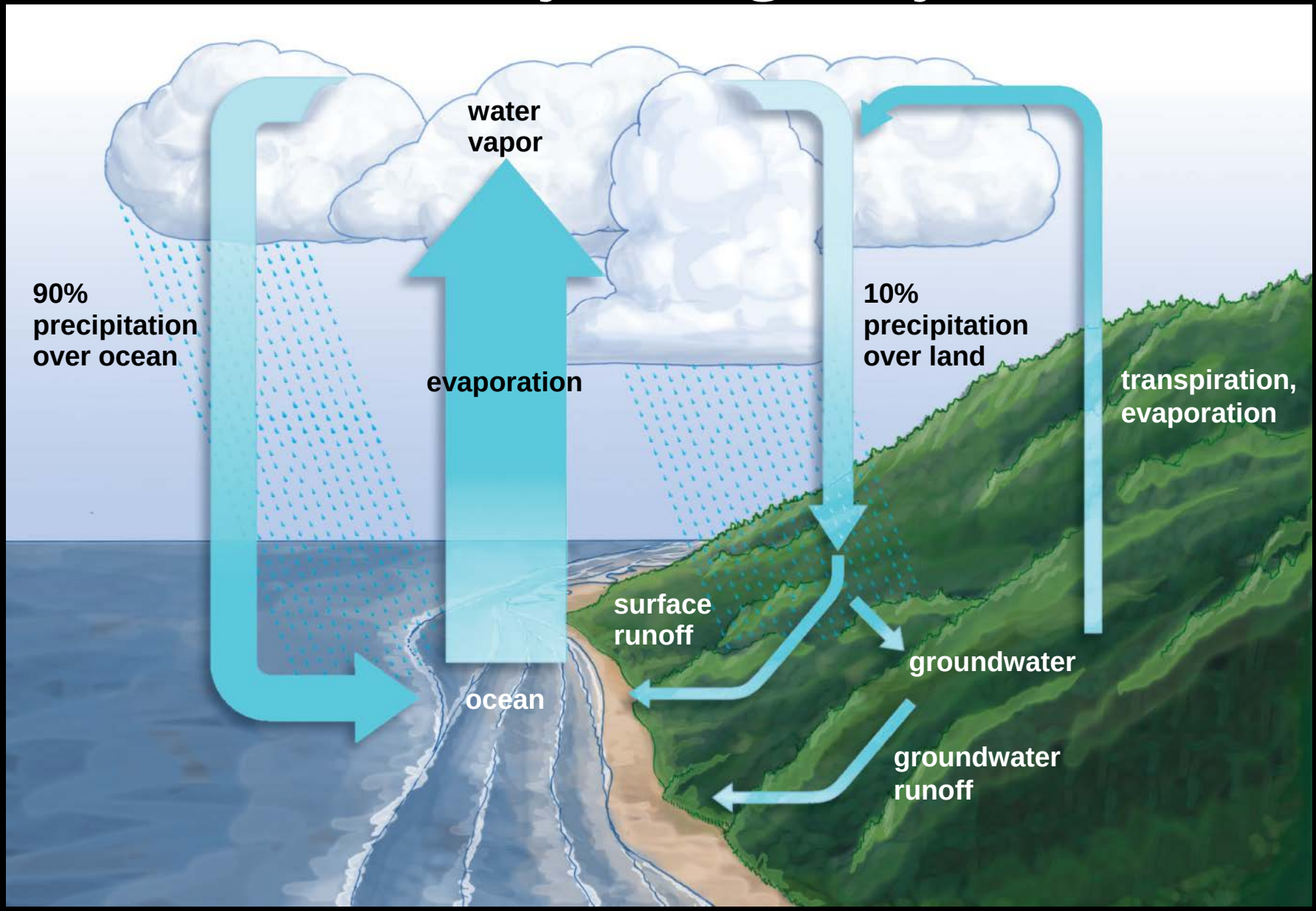


Figure 36.4

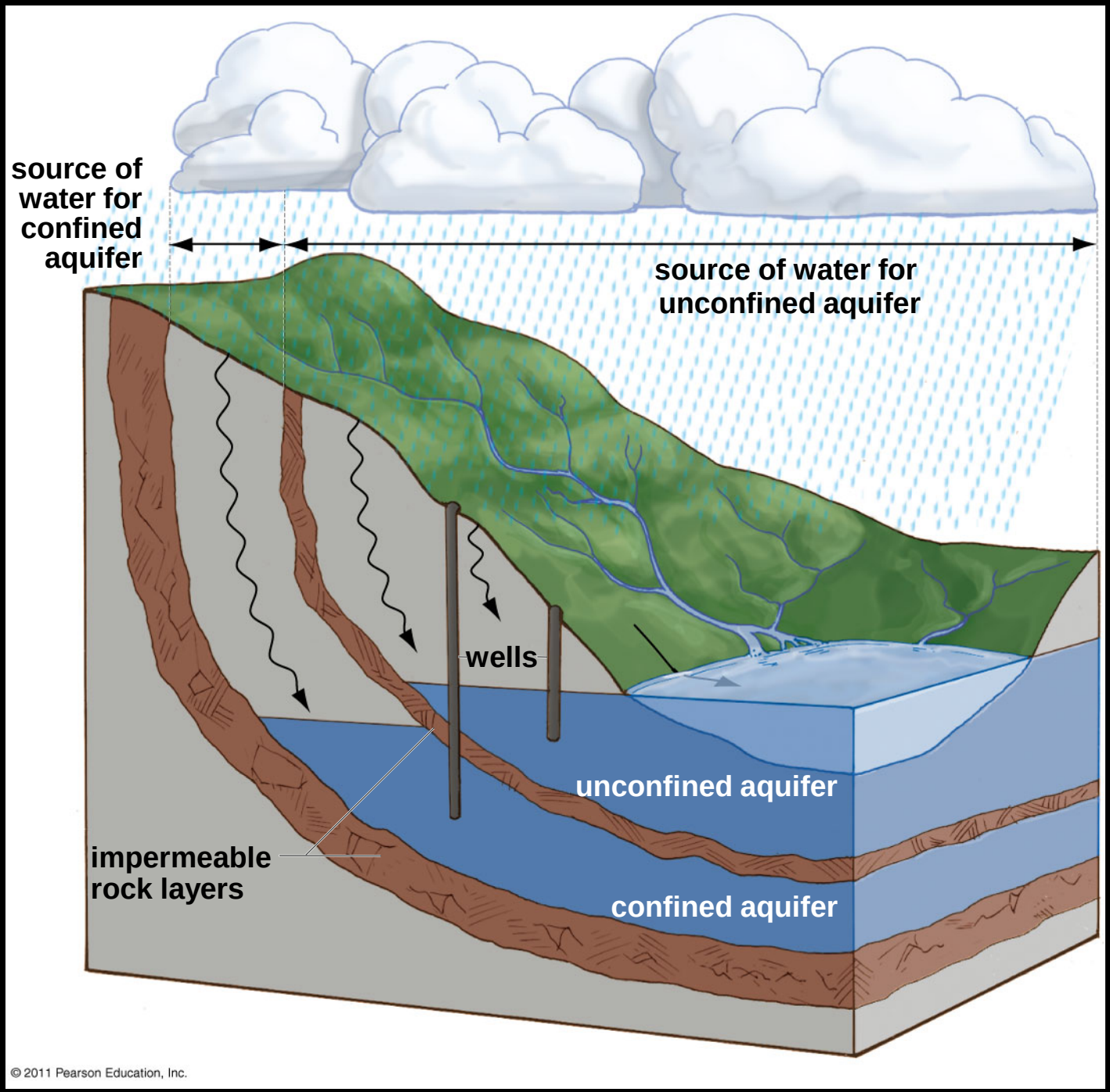


Figure 36.6

Enormous Stores of Underground Water

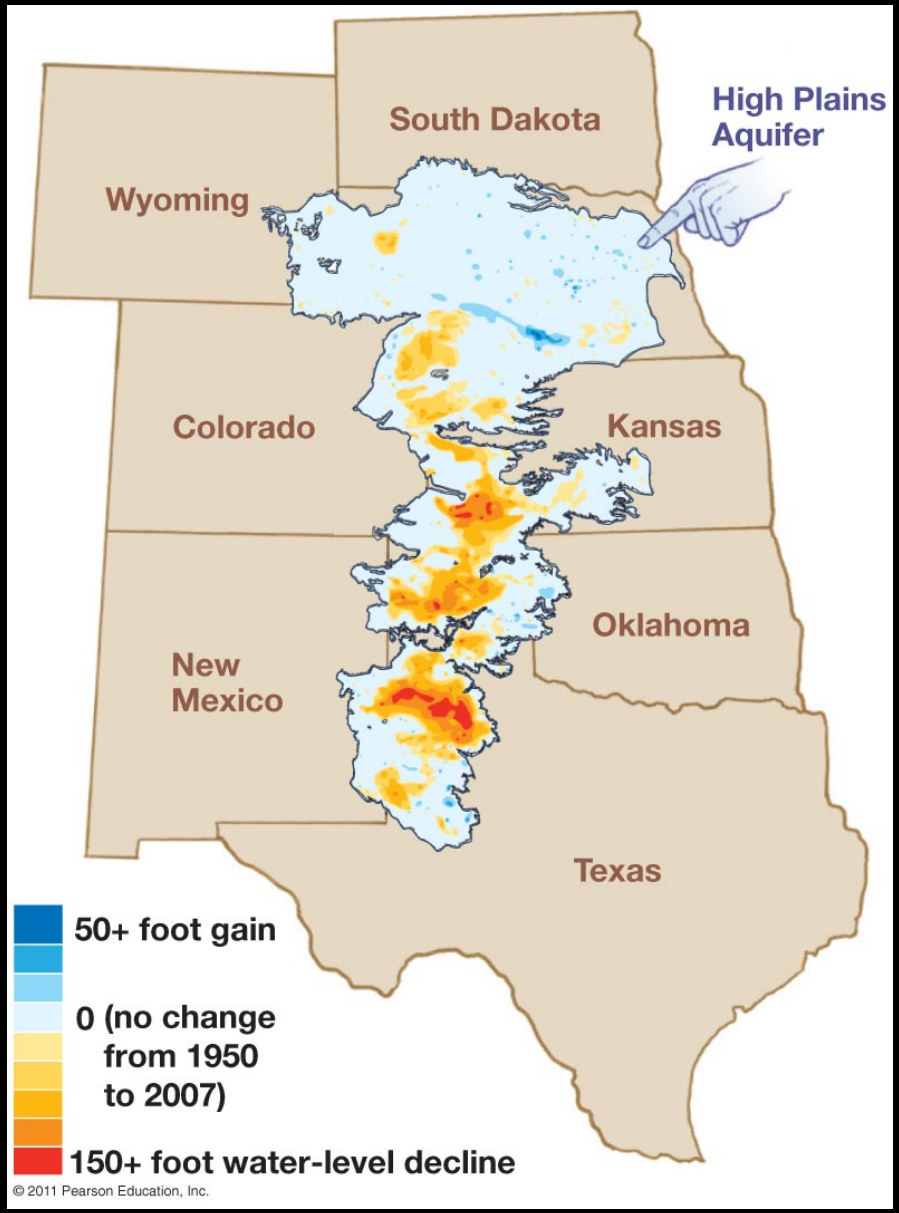


Figure 36.7

Local groundwater sources:

United States Geological Survey (USGS),
Water Replenishment District (WRD) documents

Groundwater: local aquifers

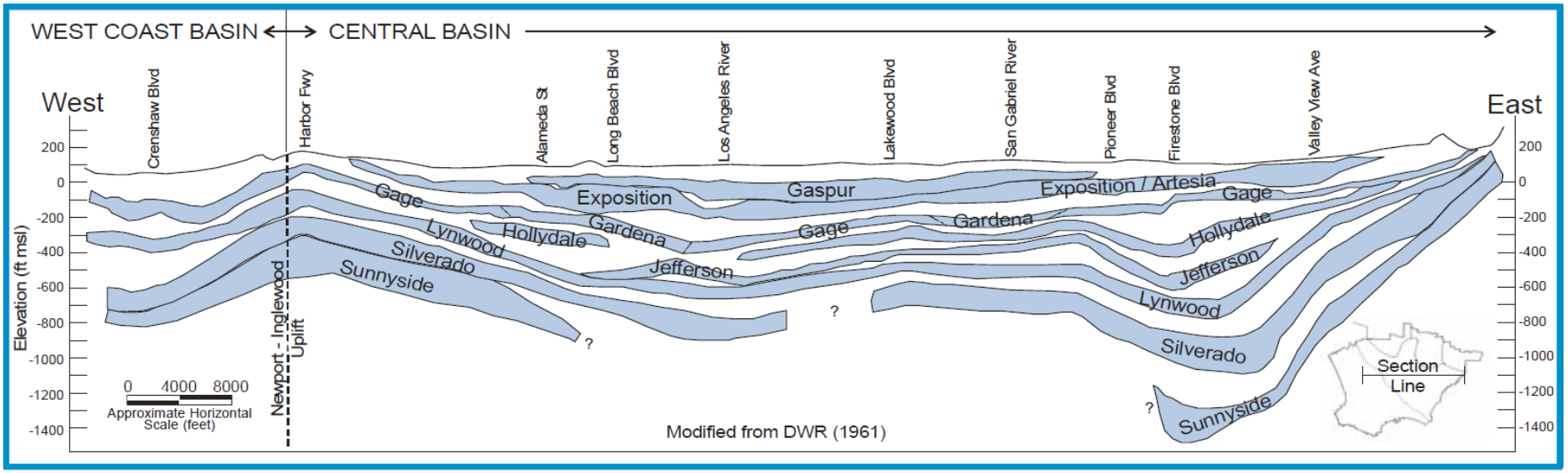
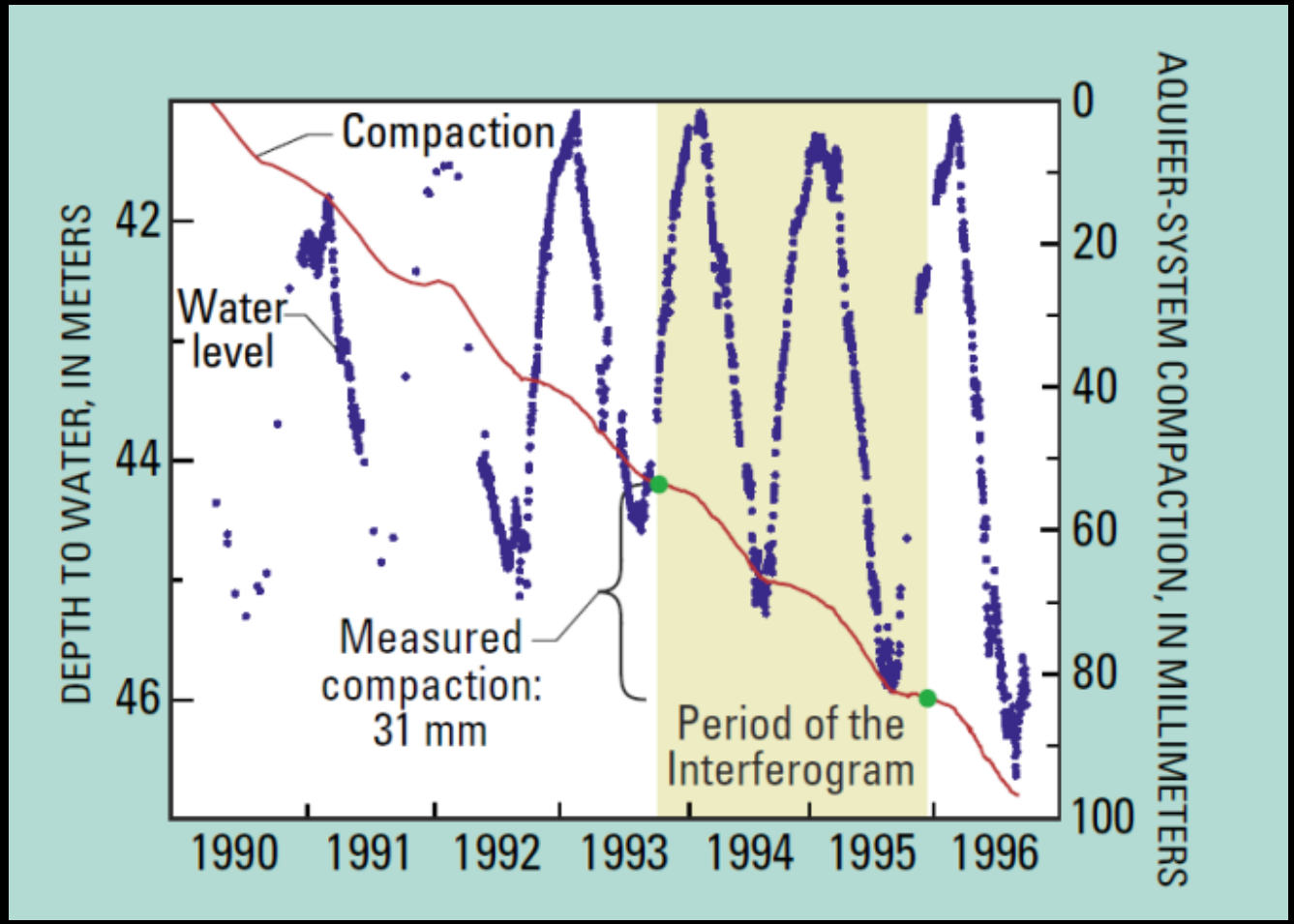


Figure 2—Generalized Cross Section going East / West through Central and West Coast Basins showing Aquifers

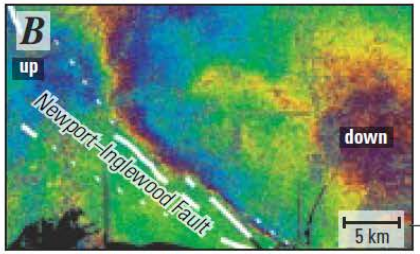
Water Replenishment District of So. Cal., 2004

Groundwater: seasonal changes



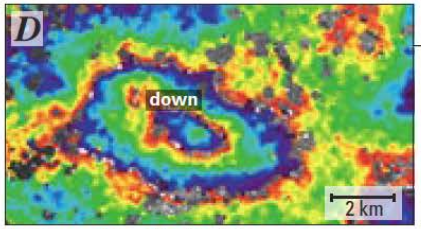
USGS 2003

Groundwater



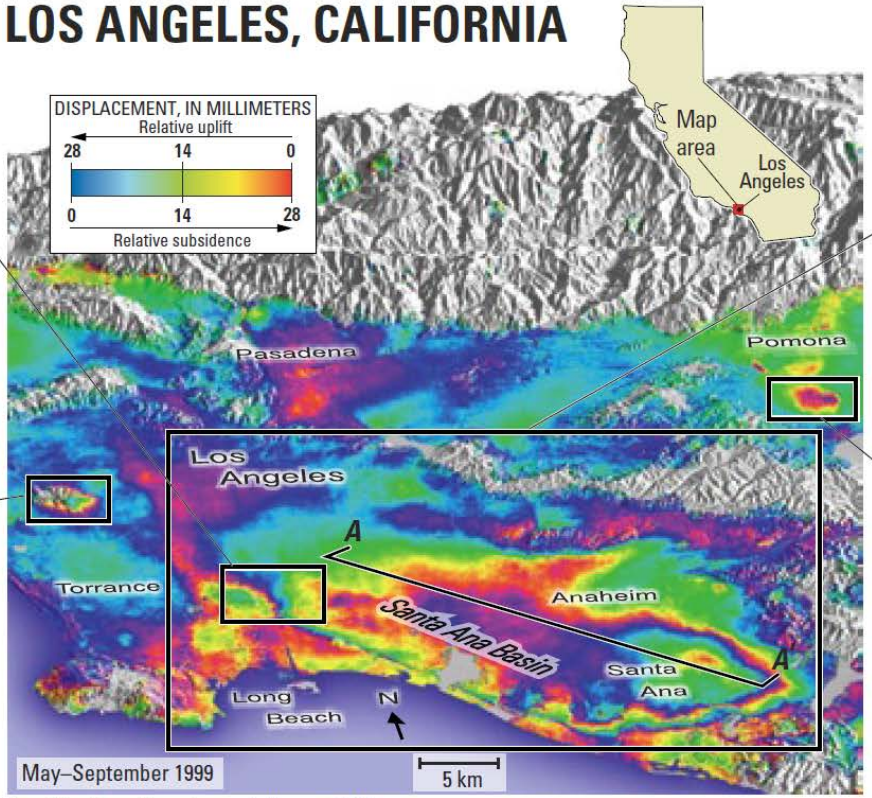
Ground-Water Barriers

Faults and geologic structures often impede the flow of ground water and can be recognized as linear InSAR features where ground-water levels decline on one side of the fault or rise on the other side of the fault

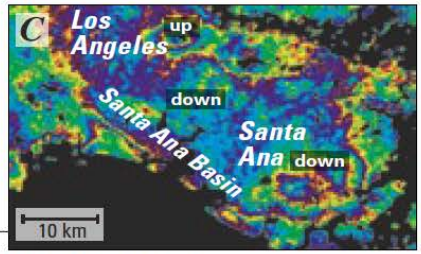


Hydrocarbon Production

The pumping of oil is often imaged as a "bull's-eye" feature, such as the 58 mm of subsidence measured in the Beverly Hills Oil Field (5 years: Oct. 1993–Oct. 1998)

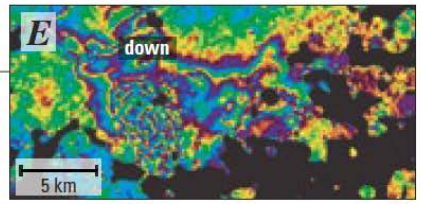


(modified from Bawden and others, 2001)



Multi-Year Subsidence

As water levels decline near Santa Ana, the land surface subsides at a rate of about 20 mm per year (Oct. 1993–Oct. 1998)

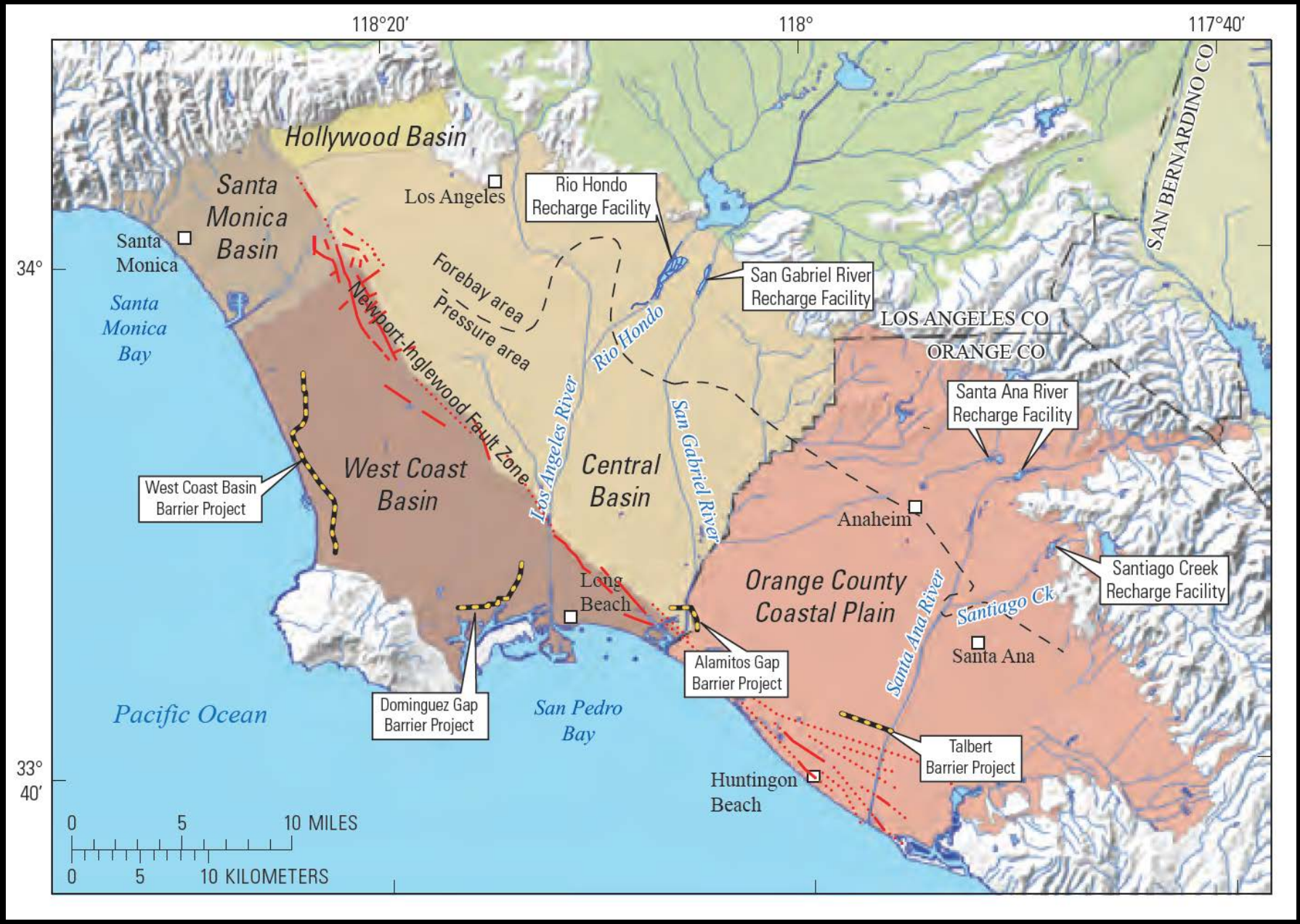


Localized Subsidence

More than 180 mm of ground-water-pumping induced subsidence (1993–95) resulted in cracked building foundations near Pomona

USGS 2003

Groundwater



USGS 2012

Energy flow

Trophic Levels

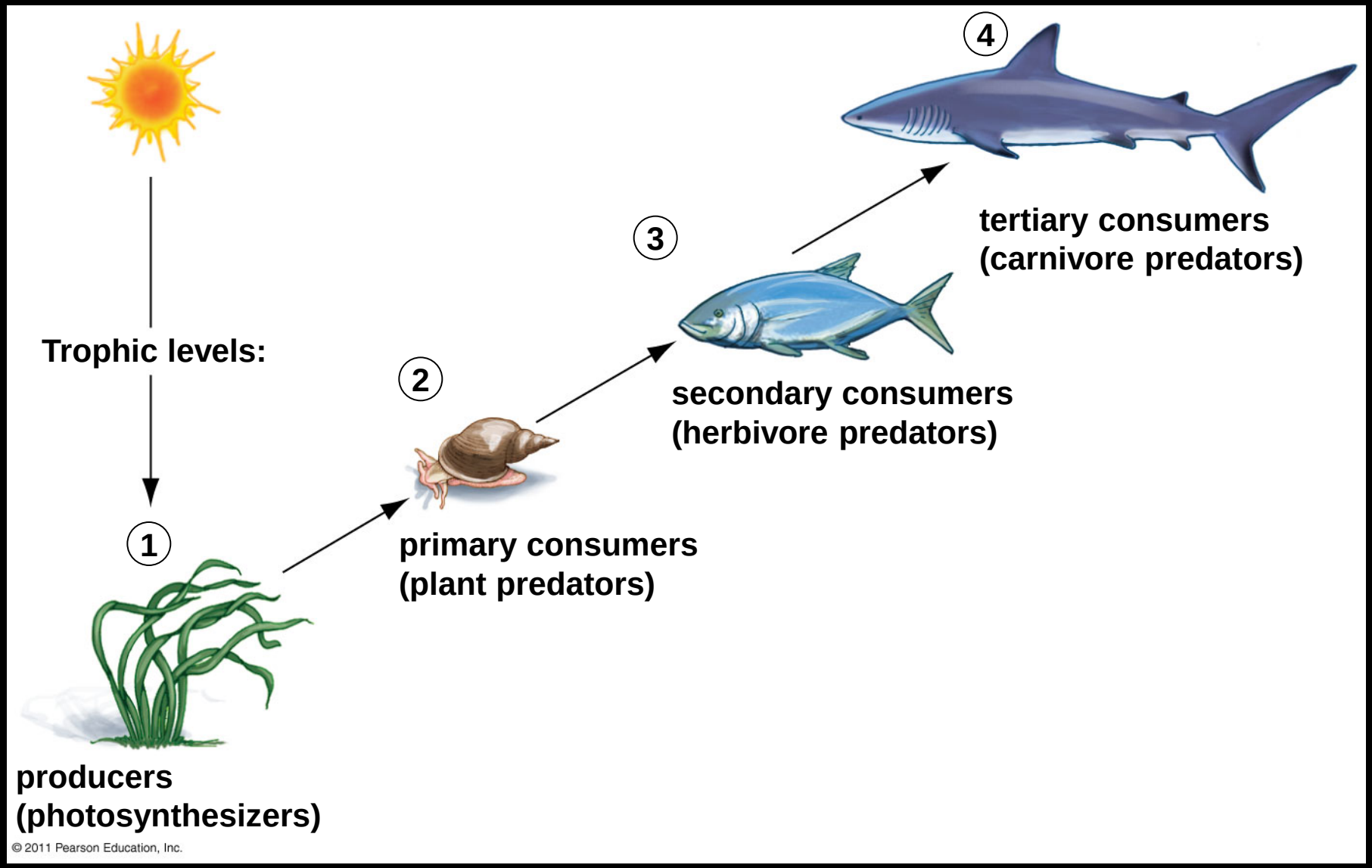


Figure 36.10

Energy flow

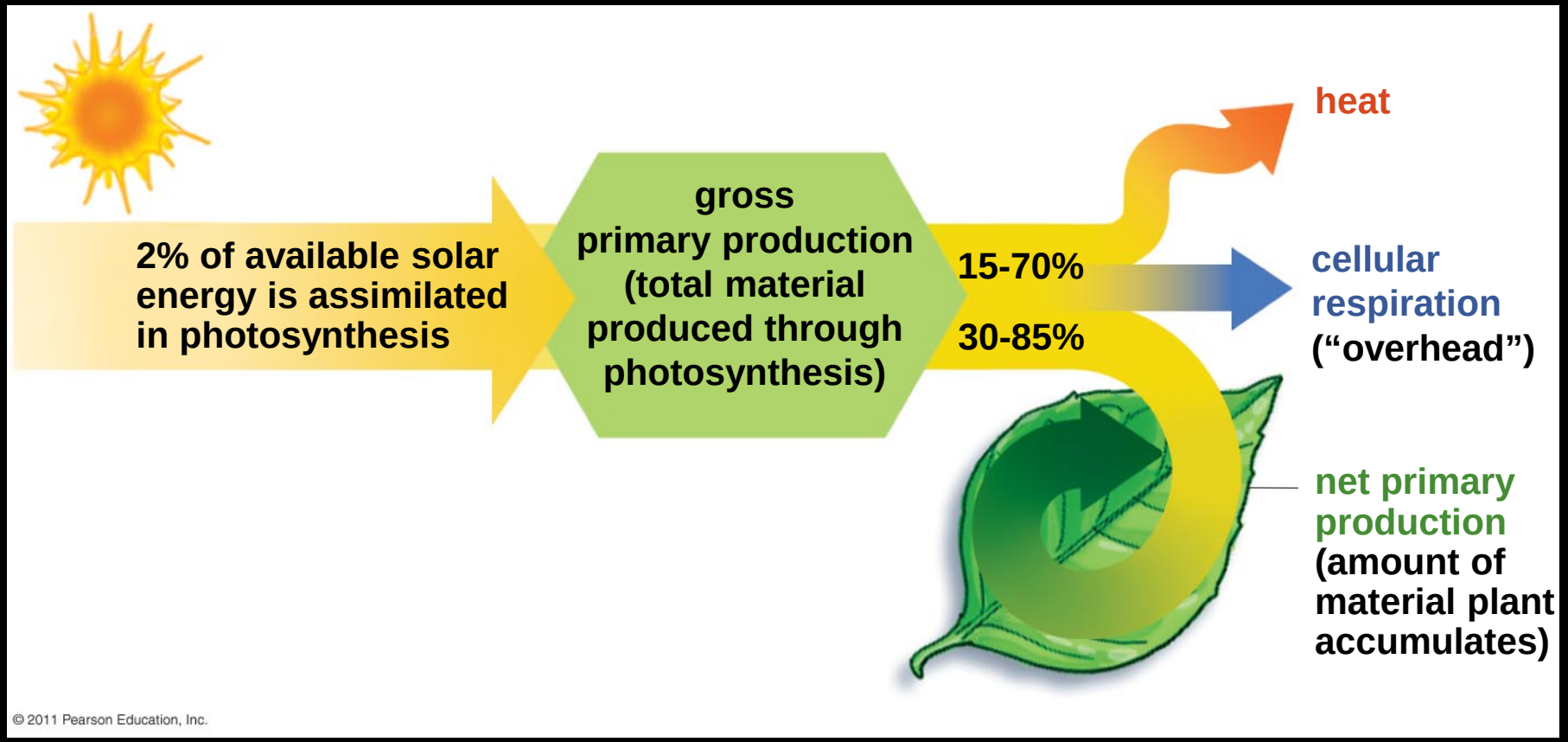


Figure 36.13

Energy Pyramid

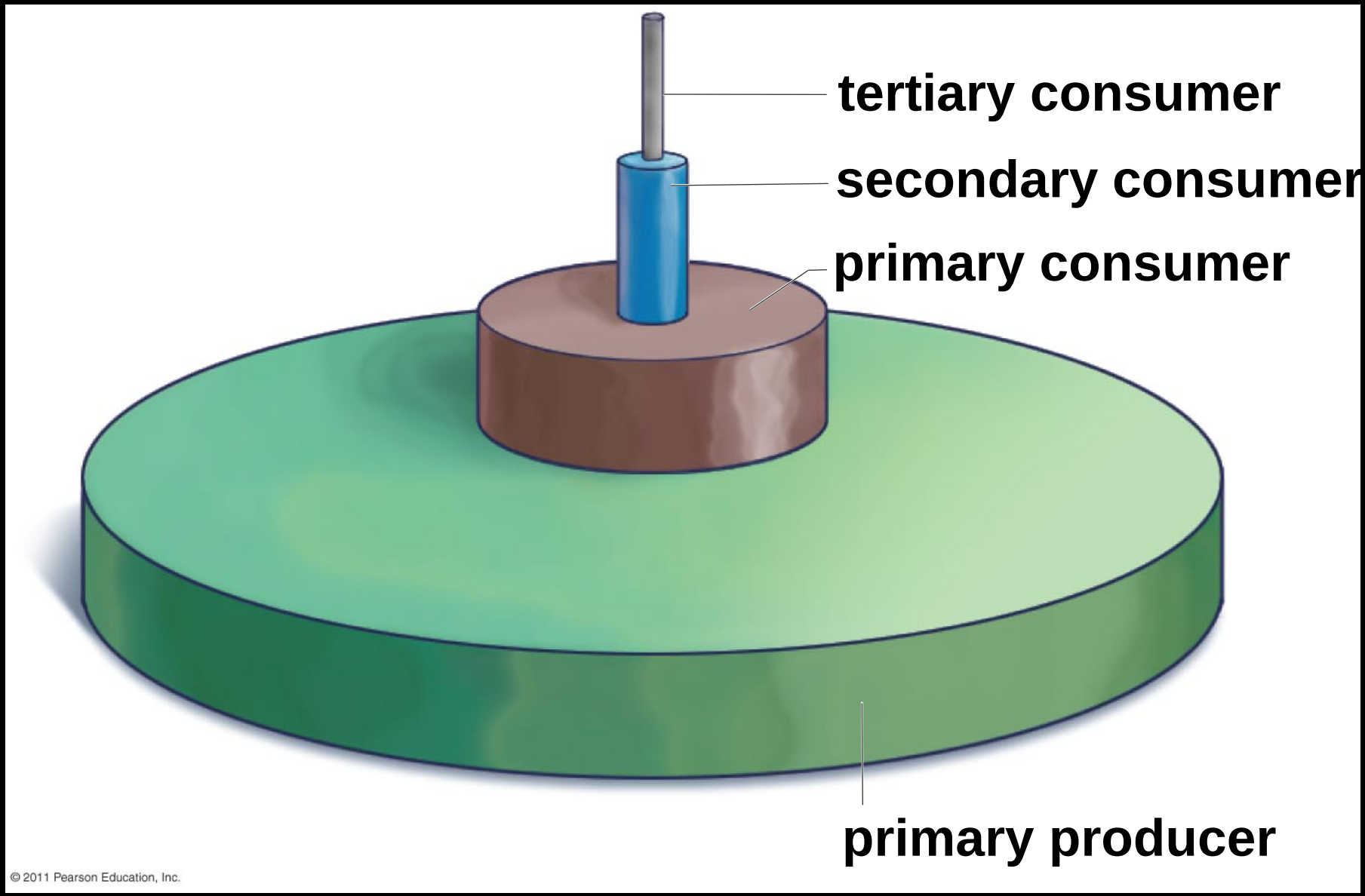
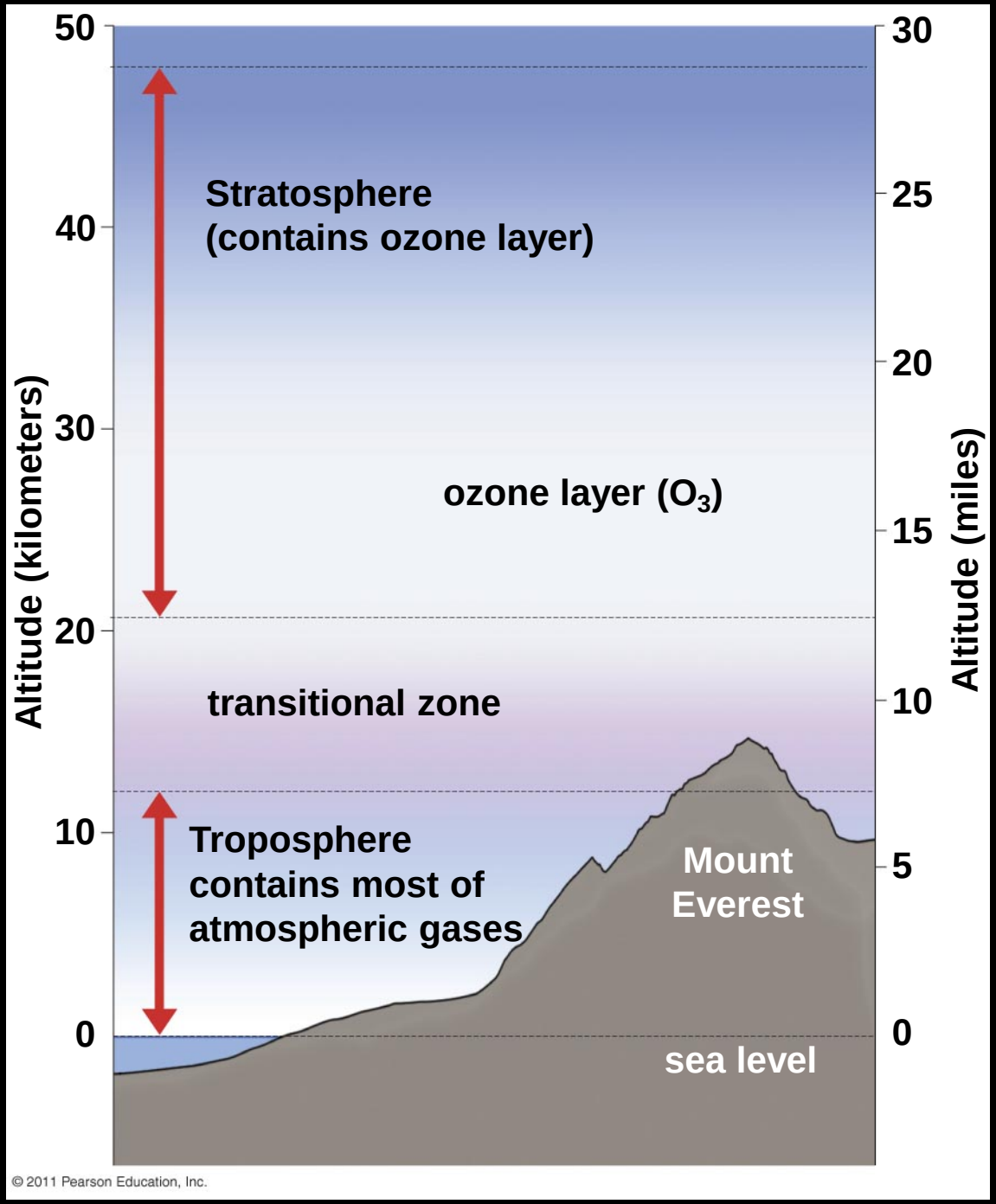


Figure 36.14

Atmosphere



James May
U2 flight

Atmosphere

Growing Concentration of Atmospheric CO_2

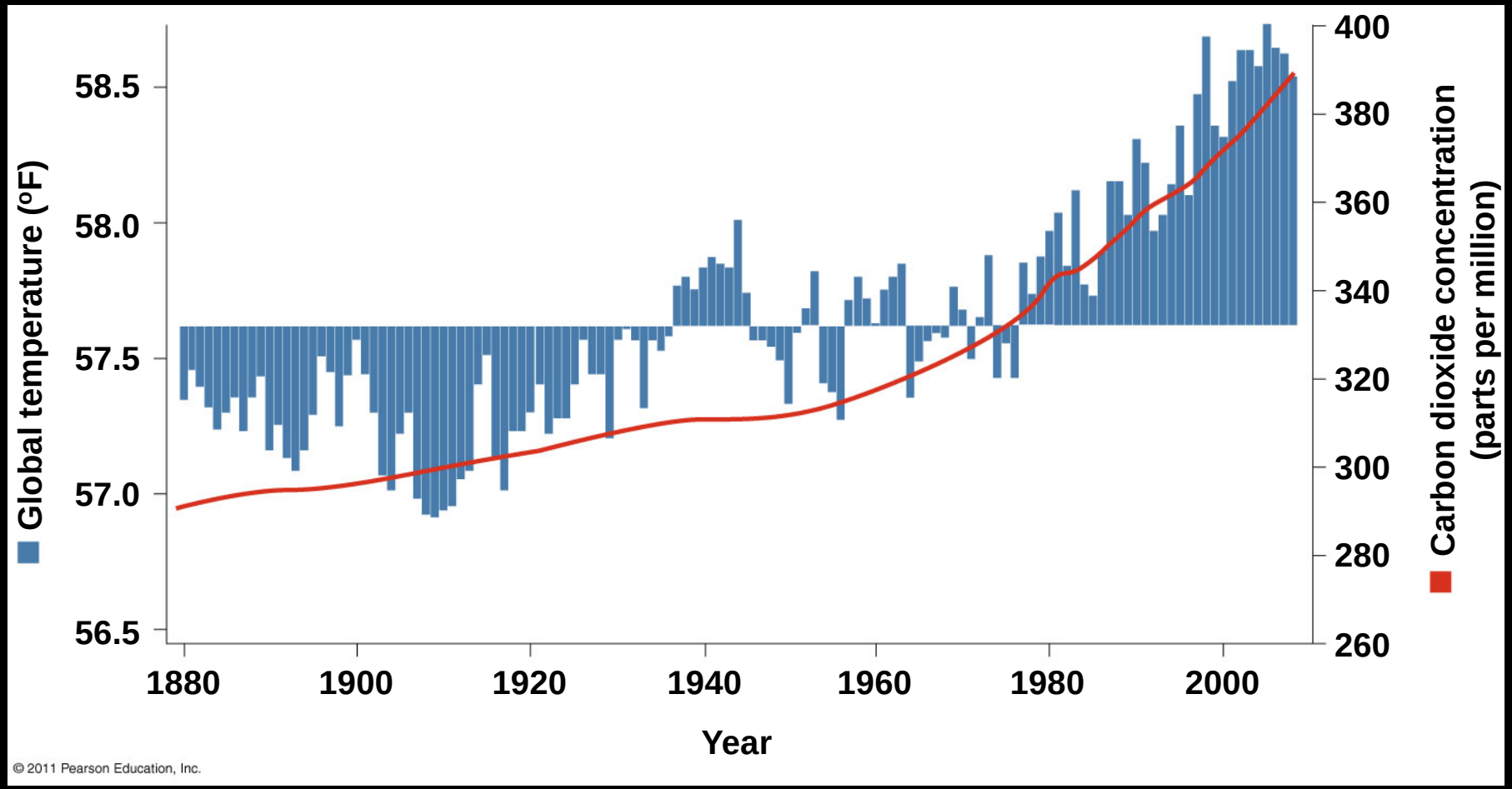


Figure 36.17

Old carbon vs. new carbon, or, coal vs. banana

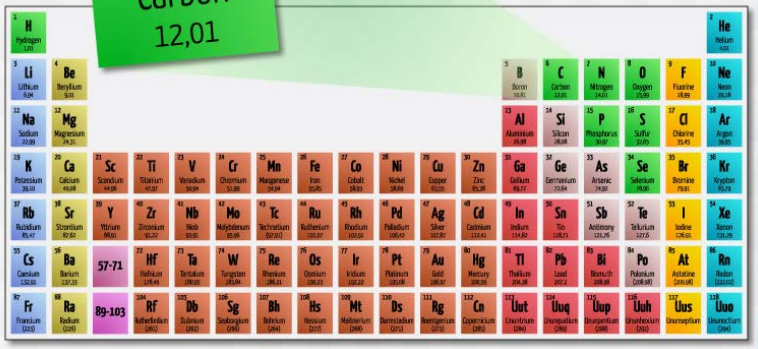
http://www.youtube.com/watch?v=uStoBFtjy8U

Created by BioMass Packaging
Good for business, good for the planet

NEW CARBON VS. OLD CARBON

All of the carbon atoms in our world rotate through a complex set of processes called the Carbon Cycle. It is a closed system with a fixed amount of carbon that must be somewhere in the world at all times.

6
C
Carbon
12,01



NEW CARBON

Recycles from plants and trees to the air and back without increasing atmospheric carbon load.

It is carbon neutral.

Source
Plants

Derivative
Biomass

Method
Growth & Harvest

Supply
Renewable

Products
Pulp & Bioplastics

Disposal
Composting

Carbon Exchange
Closed System – Recyles

OLD CARBON

When released into the air, it does not recycle and adds to the atmospheric carbon load.

It is not carbon neutral.

Source
Fossil Fuels

Derivative
Petroleum

Method
Extraction

Supply
Finite

Products
Plastics

Disposal
Landfill or Incineration

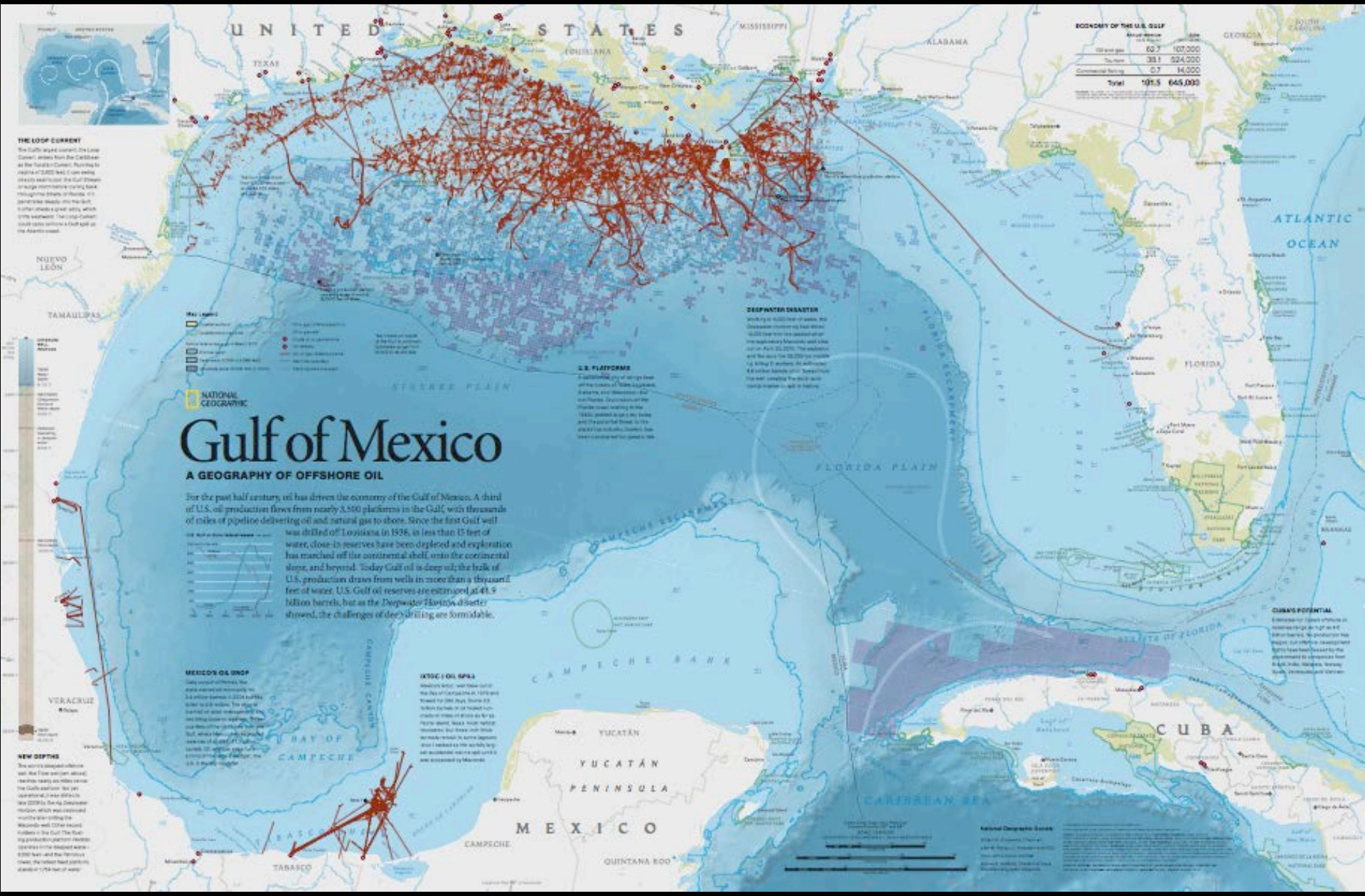
Carbon Exchange
None – Increased Levels

biomasspackaging.com

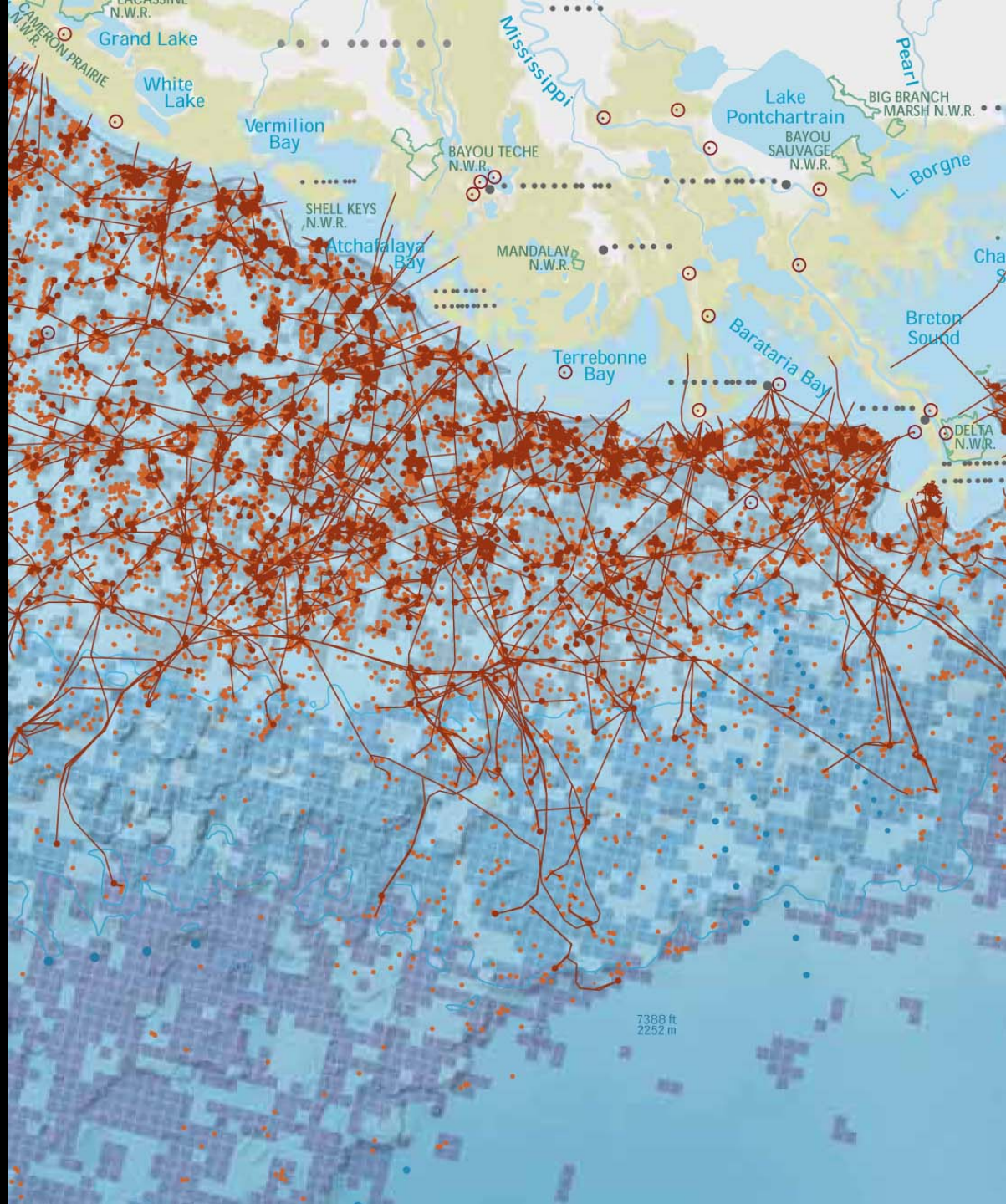
Geography of Offshore Oil

http://ngm.nationalgeographic.com/2010/10/gulf-oil-spill/gulf-map-interactive?rptregcta=reg_free_np&rptregcampaign=20131016_rw_membership_n1p_us_ot_w#finished

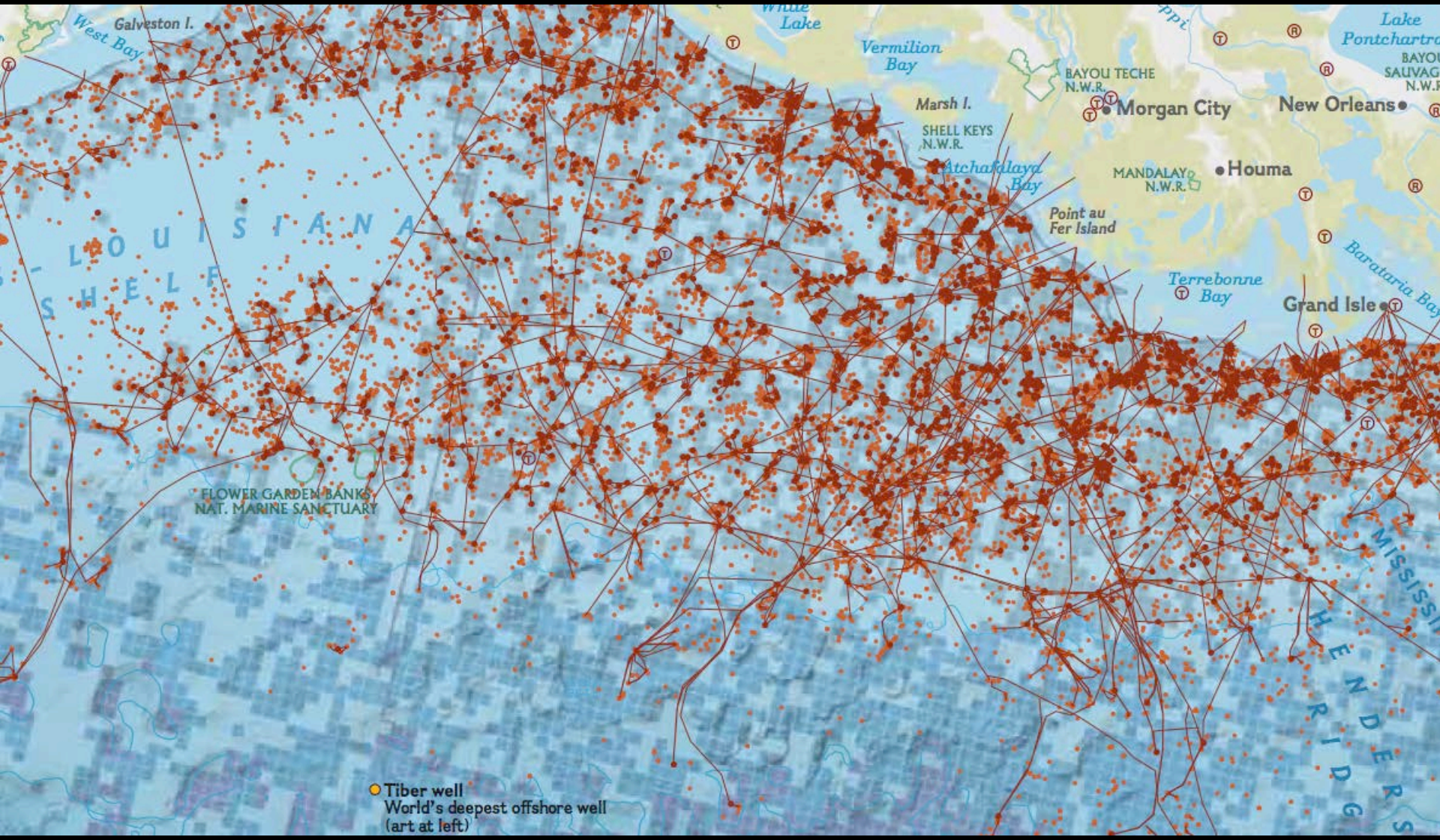
Atmosphere


UNITED STATES
TEXAS
LOUISIANA
MISSISSIPPI
ALABAMA
GEORGIA
SOUTH CAROLINA
ATLANTIC OCEAN
NUEVO LEÓN
TAMAULIPAS
FLORIDA
NATIONAL GEOGRAPHIC
Gulf of Mexico
A GEOGRAPHY OF OFFSHORE OIL
For the past half century, oil has driven the economy of the Gulf of Mexico. A third of U.S. oil production flows from nearly 3,500 platforms in the Gulf, with thousands of miles of pipeline delivering oil and natural gas to shore. Since the first Gulf well was drilled off Louisiana in 1938, in less than 15 feet of water, close-in reserves have been depleted and exploration has marched off the continental shelf, onto the continental slope, and beyond. Today Gulf oil is deep oil; the bulk of U.S. production draws from wells in more than a thousand feet of water. U.S. Gulf oil reserves are estimated at 48.9 billion barrels, but as the Deepwater Horizon disaster showed, the challenges of deep drilling are formidable.
THE LOOP CURRENT
DEEPWATER DISASTER
U.S. PLATFORMS
MEXICO'S OIL DROP
NEW DEPTHS
CUBA'S POTENTIAL
ECONOMY OF THE U.S. GULF
Oil and gas 62.7 107,000
Tourism 38.1 524,000
Commercial fishing 0.7 14,000
Total 101.5 645,000
FLORIDA PLAIN
CAMPECHE BANK
BAY OF CAMPECHE
YUCATÁN
YUCATÁN PENINSULA
MEXICO
CAMPECHE
TABASCO
QUINTANA ROO
CUBA
CARIBBEAN SEA
VERACRUZ

Atmosphere


Grand Lake
White Lake
Vermilion Bay
Mississippi
Lake Pontchartrain
BIG BRANCH MARSH N.W.R.
BAYOU SAUVAGE N.W.R.
BAYOU TECHE N.W.R.
SHELL KEYS N.W.R.
Atchafalaya Bay
MANDALAY N.W.R.
Terrebonne Bay
Barataria Bay
Breton Sound
DELTA N.W.R.
7388 ft
2252 m

Atmosphere


Galveston I.
West Bay
White Lake
Vermilion Bay
BAYOU TECHE N.W.R.
Morgan City
New Orleans
Marsh I.
SHELL KEYS N.W.R.
Atchafalaya Bay
MANDALAY N.W.R.
Houma
Point au Fer Island
LOUISIANA
SHELF
Terrebonne Bay
Grand Isle
Barataria Bay
FLOWER GARDEN BANKS NAT. MARINE SANCTUARY
HENDERSON RIDGE
Tiber well
World's deepest offshore well
(art at left)

Hope and action

Hope and action

conbio.org

Hope and action

theSCA.org

Hope and action