

Warm-Up

21JAN2016

1. What surprised you about the “Water off a Duck’s Back” lab?
2. What is the living organism that aids in waste-water treatment?

Logistics

- Due today:
 - Water off a Duck's Back

- Due Friday:
 - 10 Vocabulary
 - Multiple Choice Celebration 9/14
 - MONDAY: FRQ for 9/14

Heavy Metals and Other Substances that can threaten human Health and the Environment

- ▣ Lead
- ▣ Arsenic
- ▣ Mercury
- ▣ Acids
- ▣ Synthetic compounds (pesticides, pharmaceuticals, and hormones)

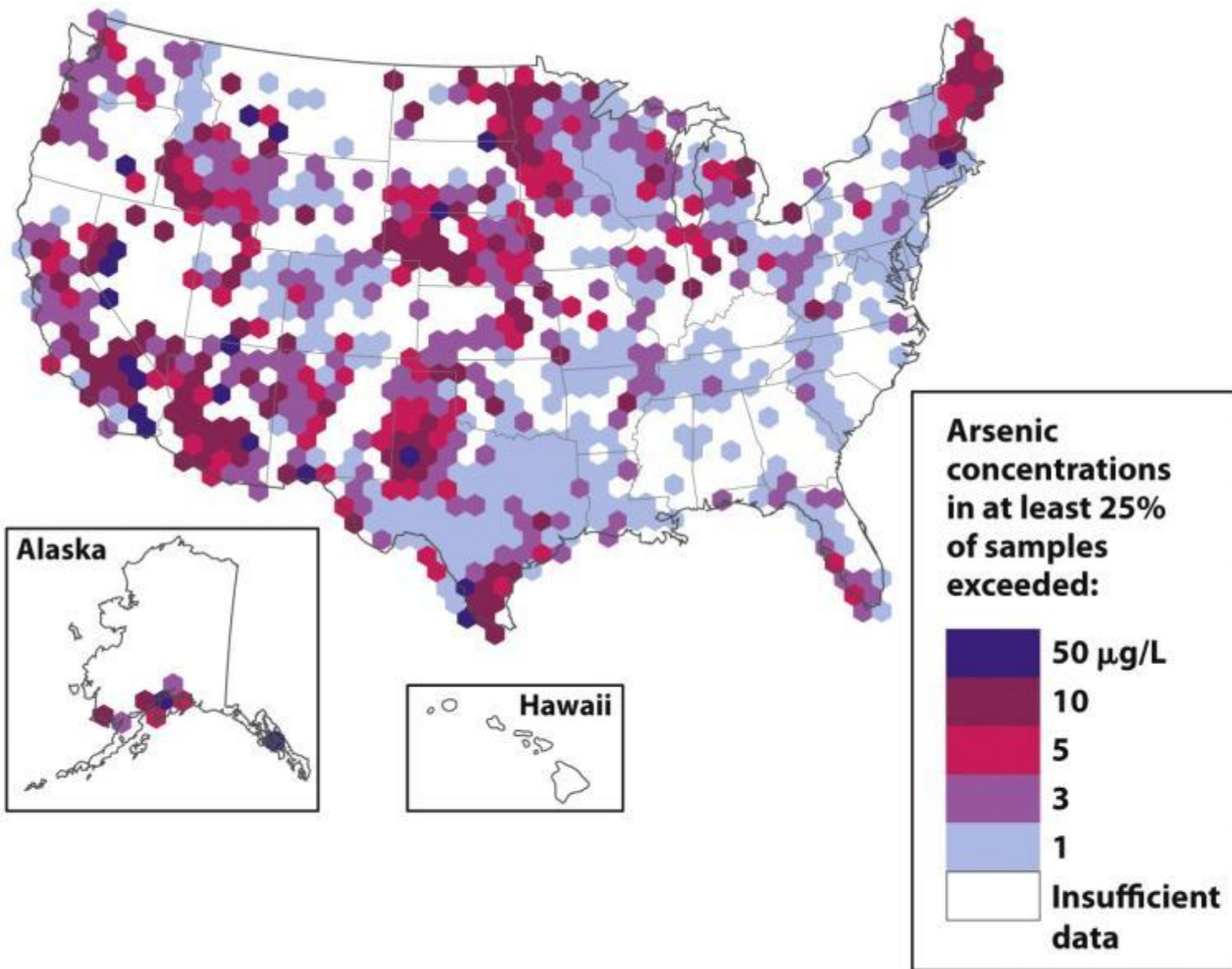


Figure 14.8

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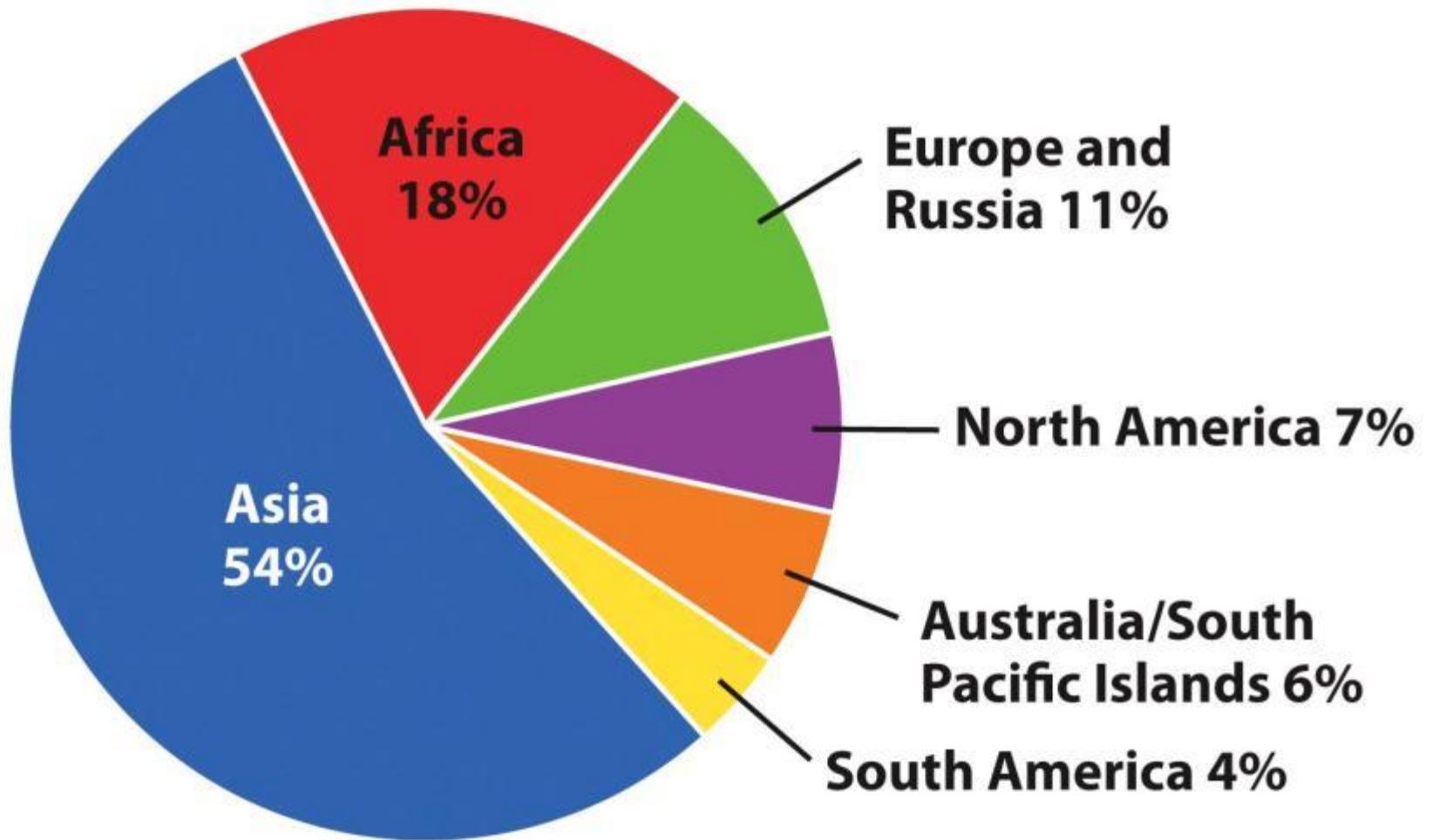
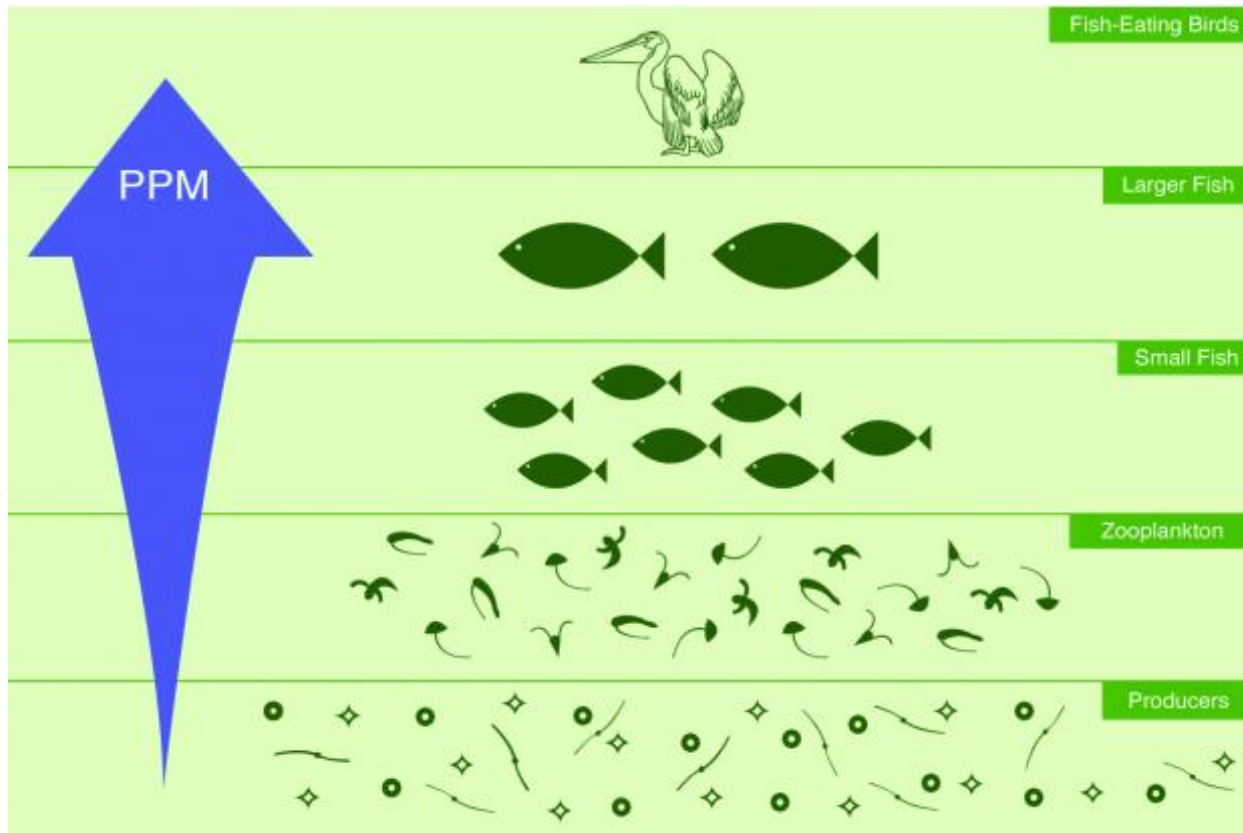


Figure 14.9
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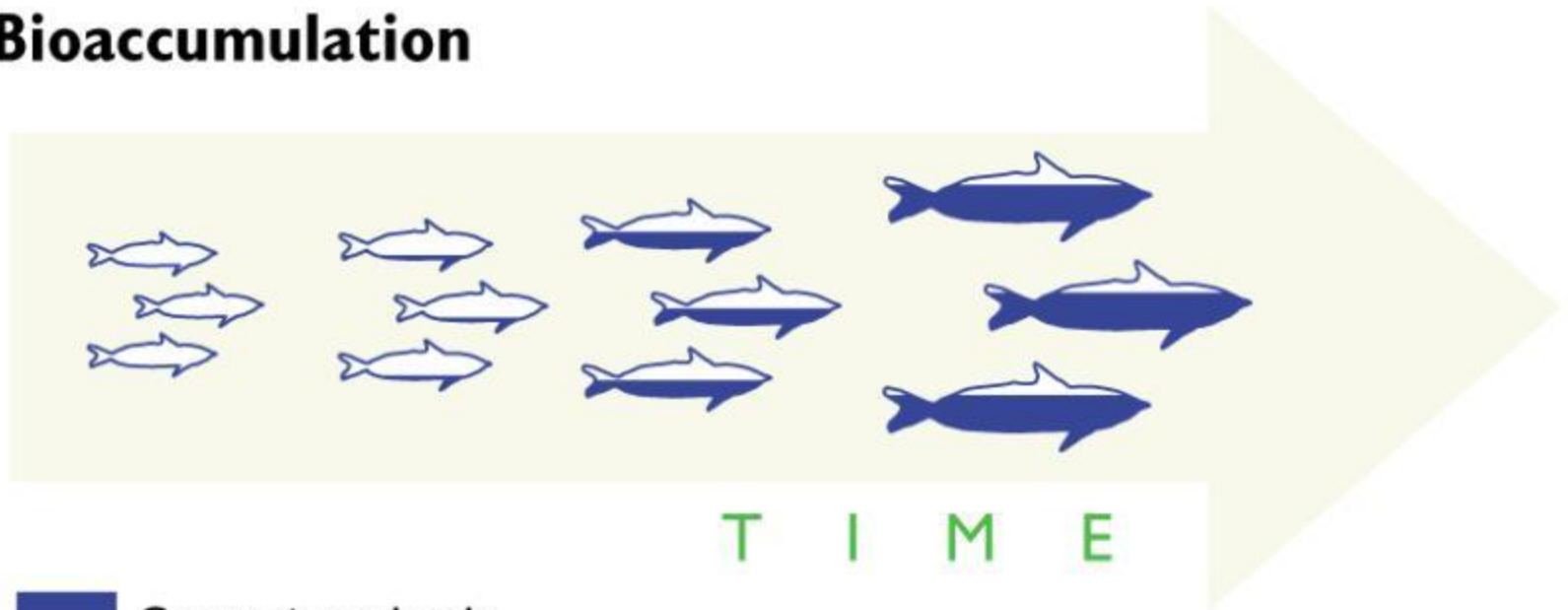
World Mercury Pollution


Bioaccumulation

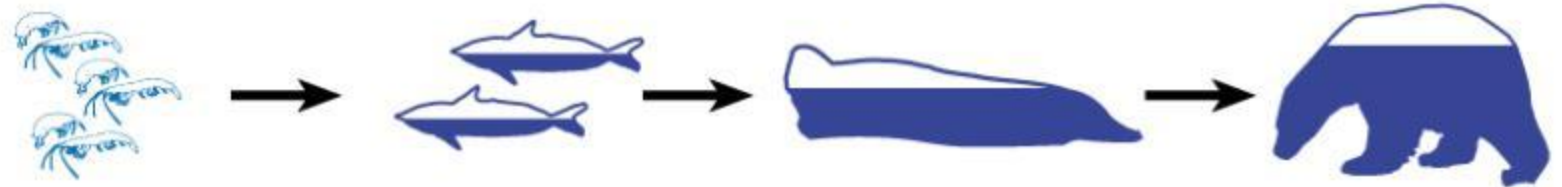
- An increasing of concentration of pollutants as the toxin travels up the food chain




Bioaccumulation



 Contaminant levels



 Contaminant levels

Biomagnification





- Mercury
- Methylmercury
- Tetramethyllead
- DDT
- Strontium-90



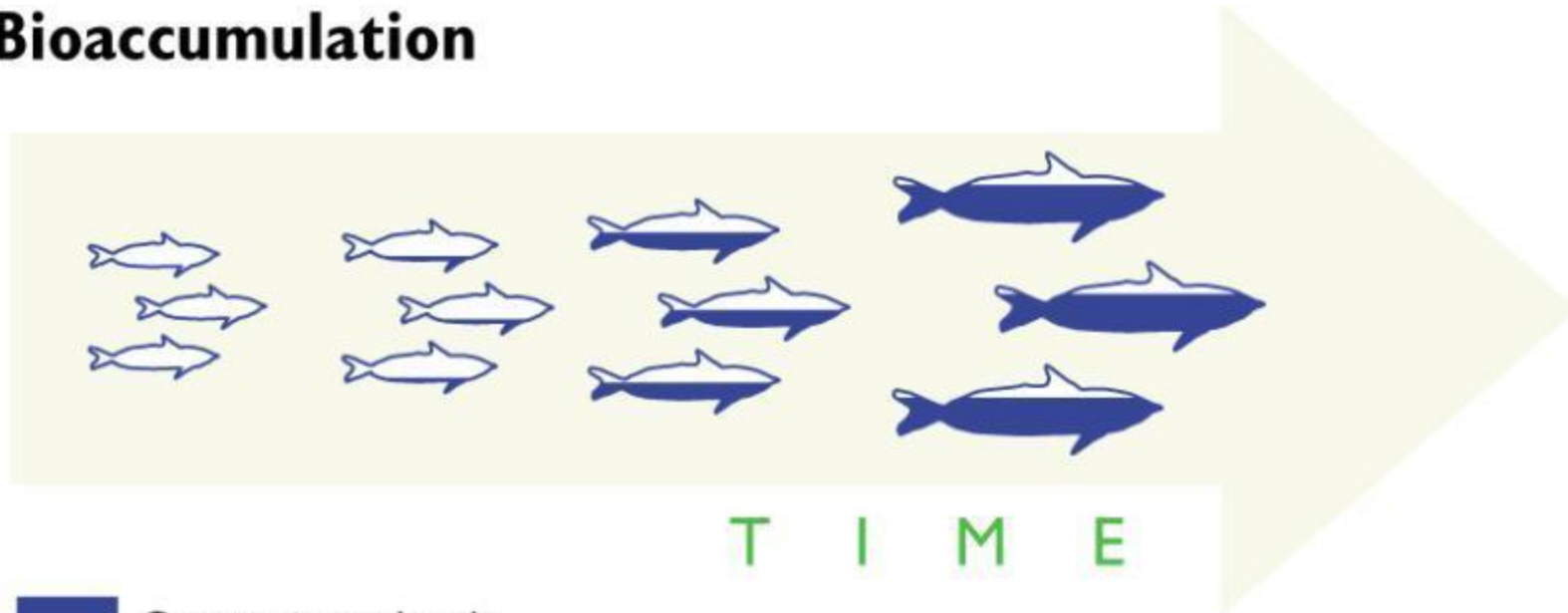
Water Pollutants


- Animal waste
- Oil spills
- Heavy metals
- Mine drainage

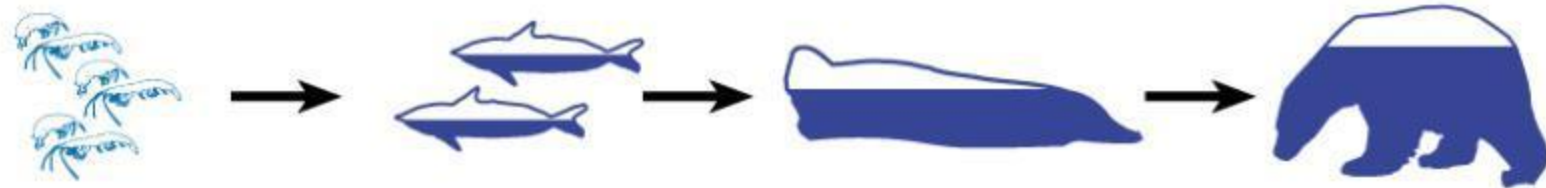
Heavy Metals and Other Substances that can threaten human Health and the Environment


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Bioaccumulation



 Contaminant levels



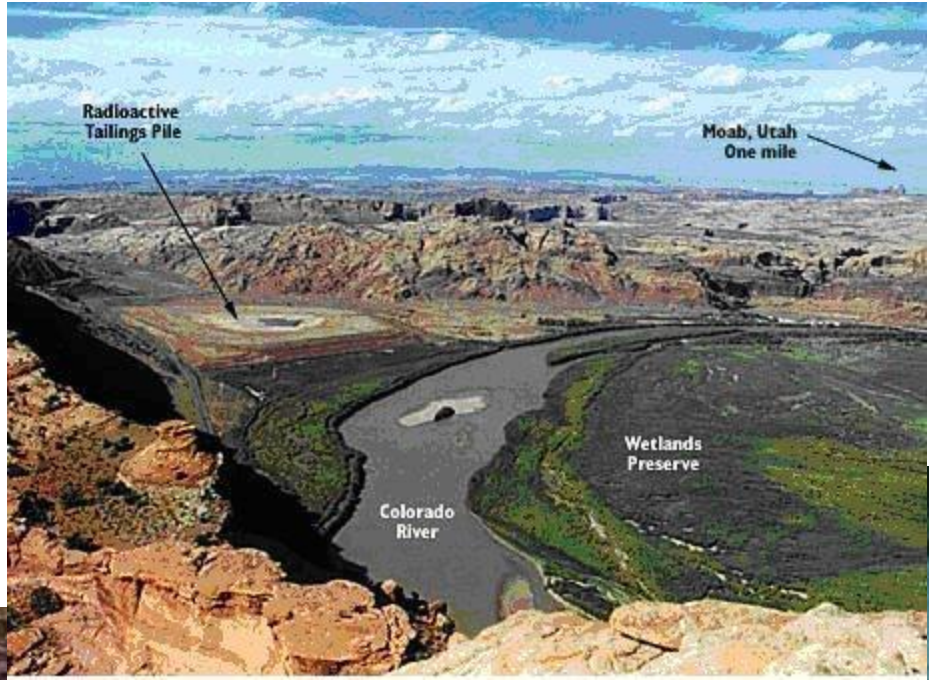
 Contaminant levels

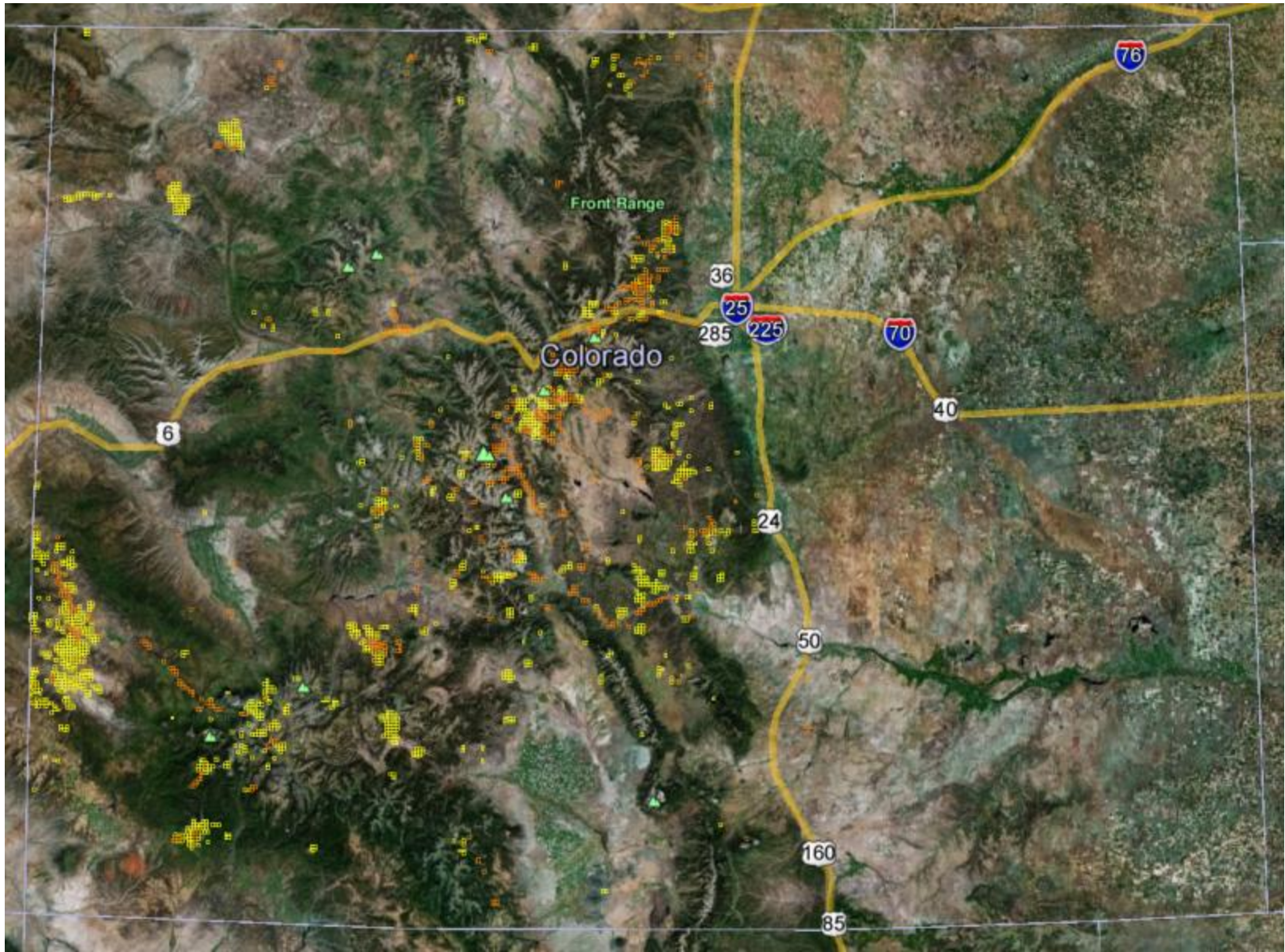
Biomagnification



Figure 14.10
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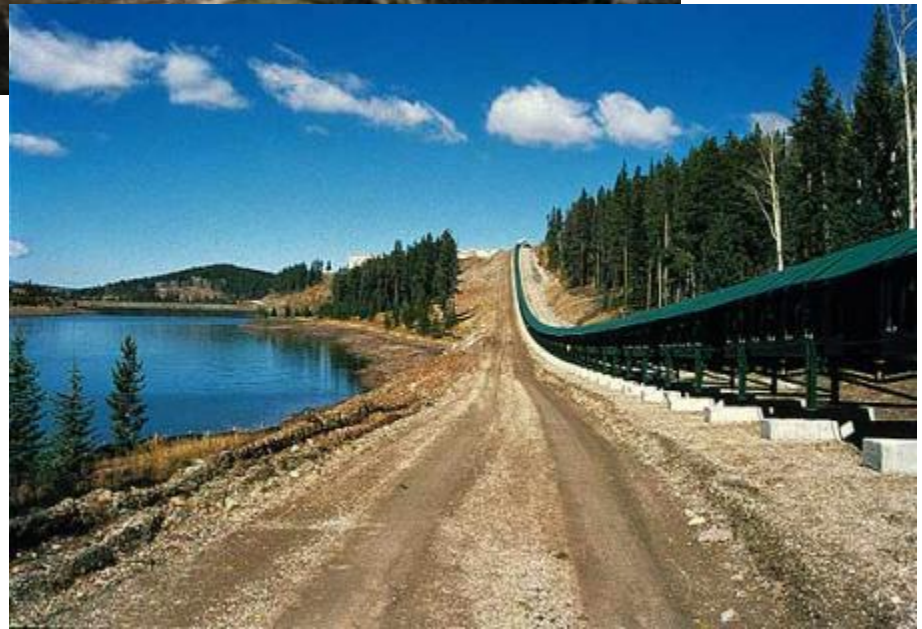
Acid drainage leeches from mines and causes iron to precipitate out of the water







- Henderson Mine





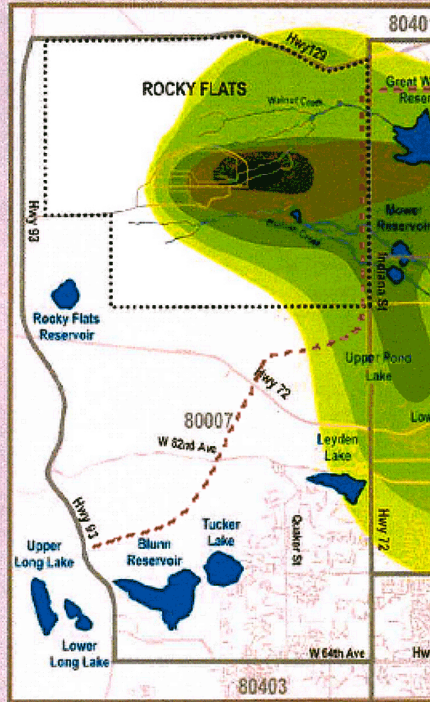
- Other mines in CO:
 - Climax Mine
 - Red Lady



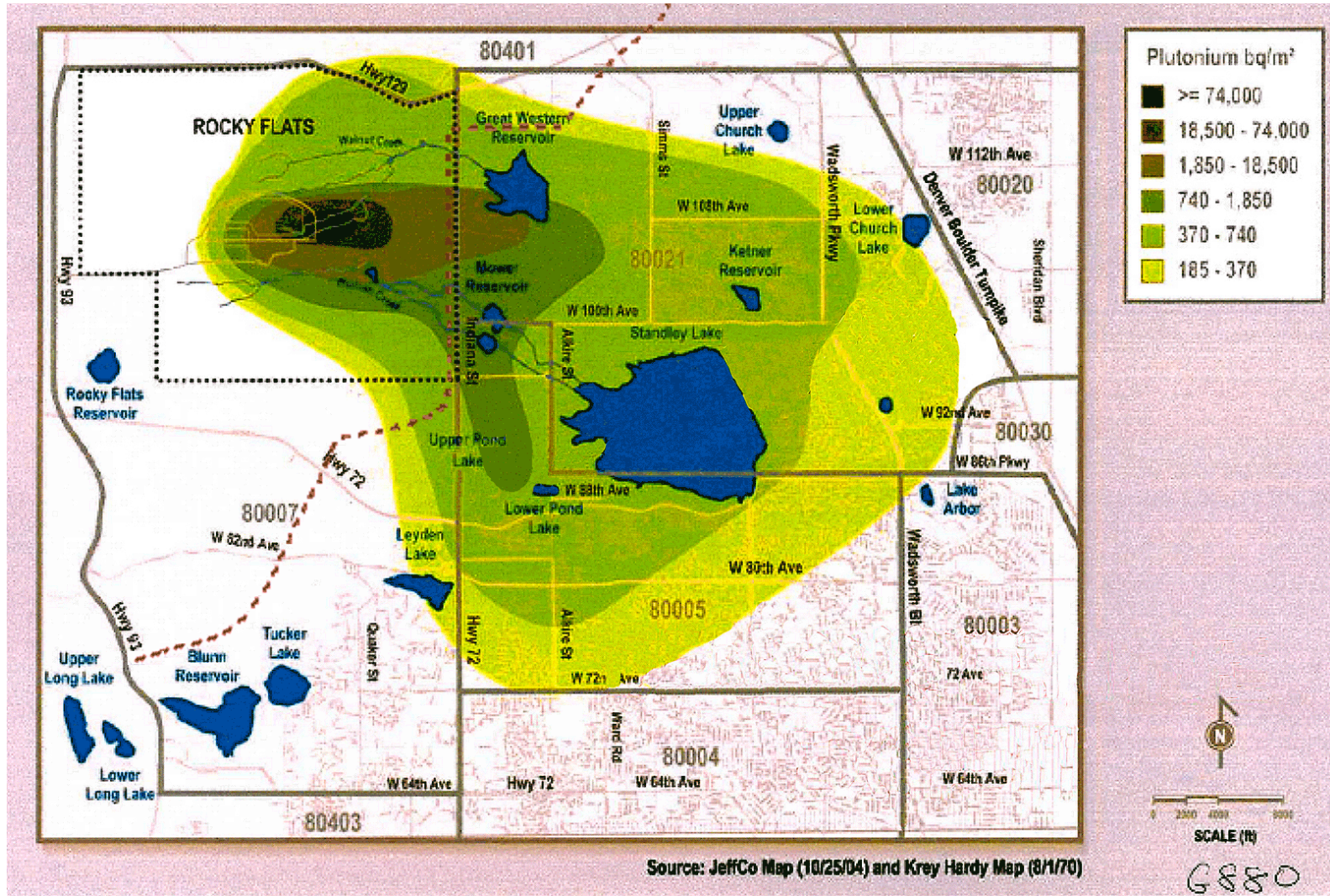
Other water pollutants

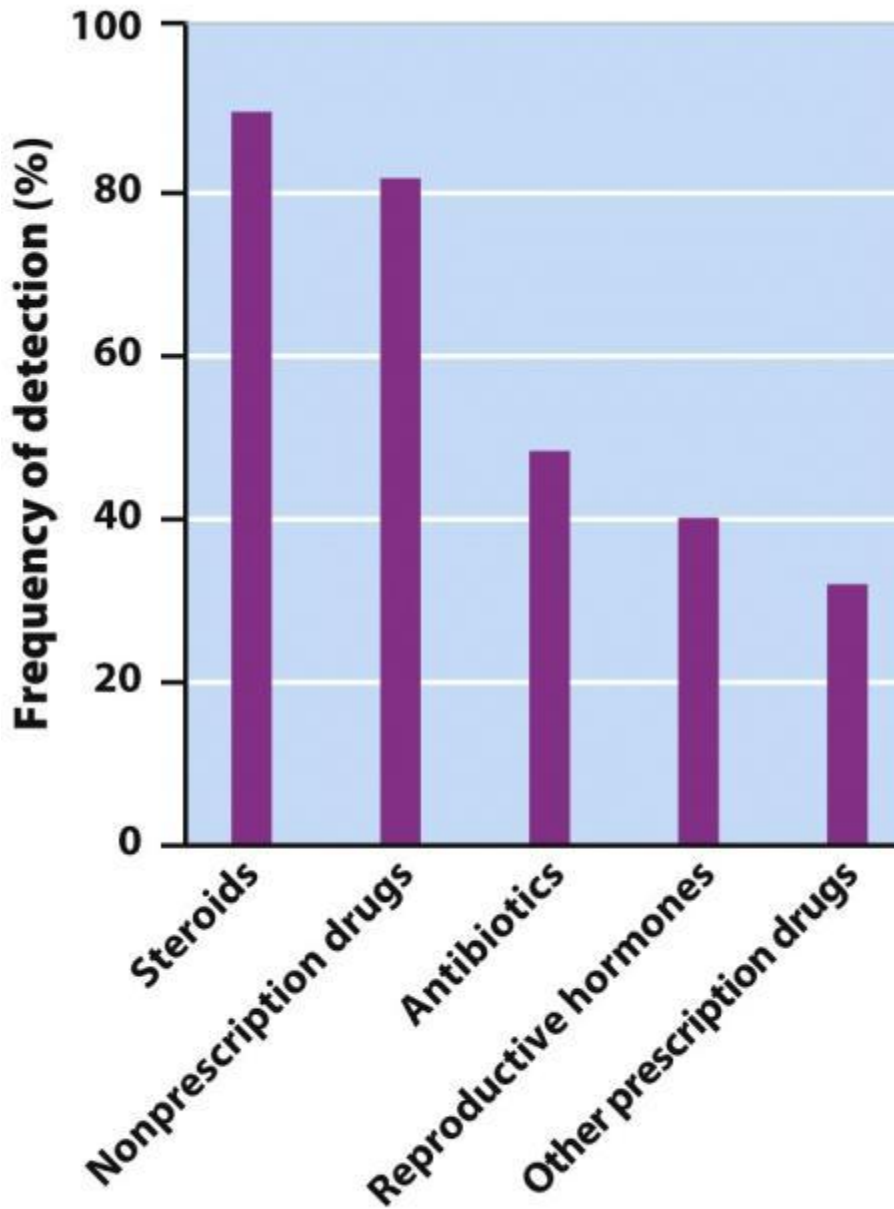
- Pesticides
- Pharmaceuticals and hormones
- Military Compounds (perchlorates)
- Industrial Compounds

Rocky Flats



Rocky Flats





Stream Contaminants

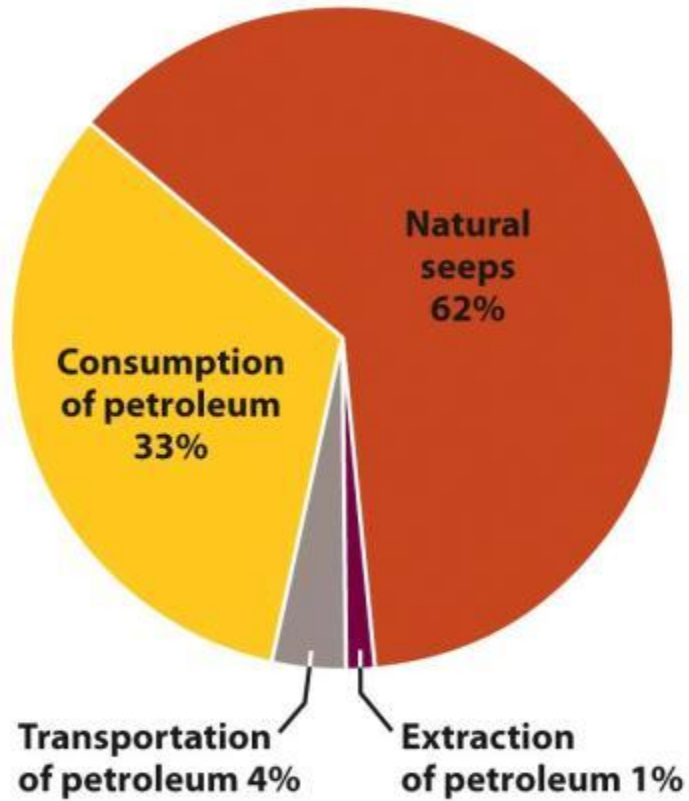
Figure 14.12
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Polychlorinated biphenyls (PCBs)

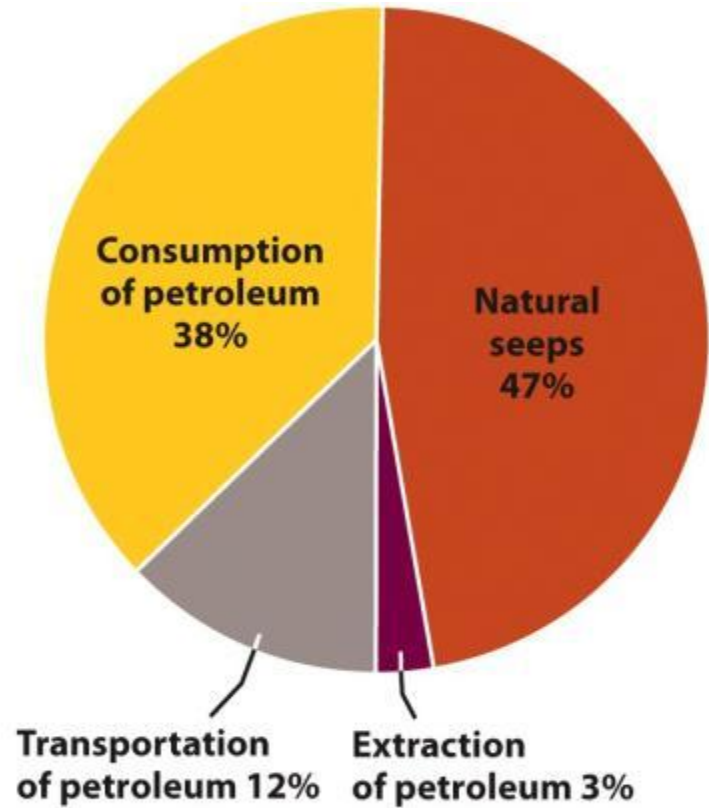


- Describe the primary dangers associated with heavy metals in water.
- Explain the role of acid deposition in water pollution.
- Name examples of synthetic compounds that have been found in our water supply and explain why they are a concern.

Oil Pollution



(a) North American marine waters



(b) Worldwide marine waters



Figure 14.14
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Ways to Remediate Oil Pollution

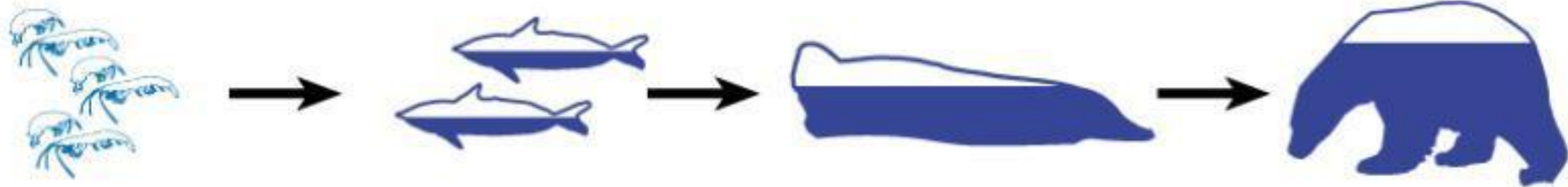
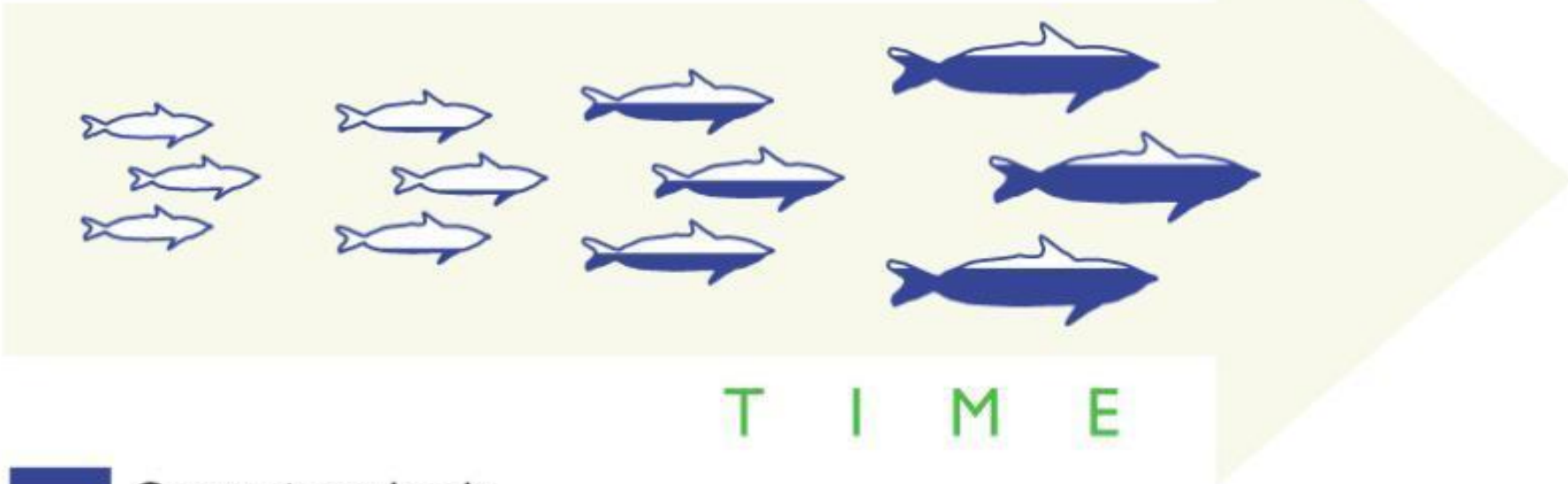
- ▣ Containment using booms to keep the floating oil from spreading.
- ▣ Chemicals that help break up the oil, making it disperse before it hits the shoreline.
- ▣ Bacteria that are genetically engineered to consume oil





- Name several ways in which oil gets into the ocean
- Describe the effects of an oil spill
- What are 3 ways to remediate an oil spill?

Bioaccumulation



Biomagnification

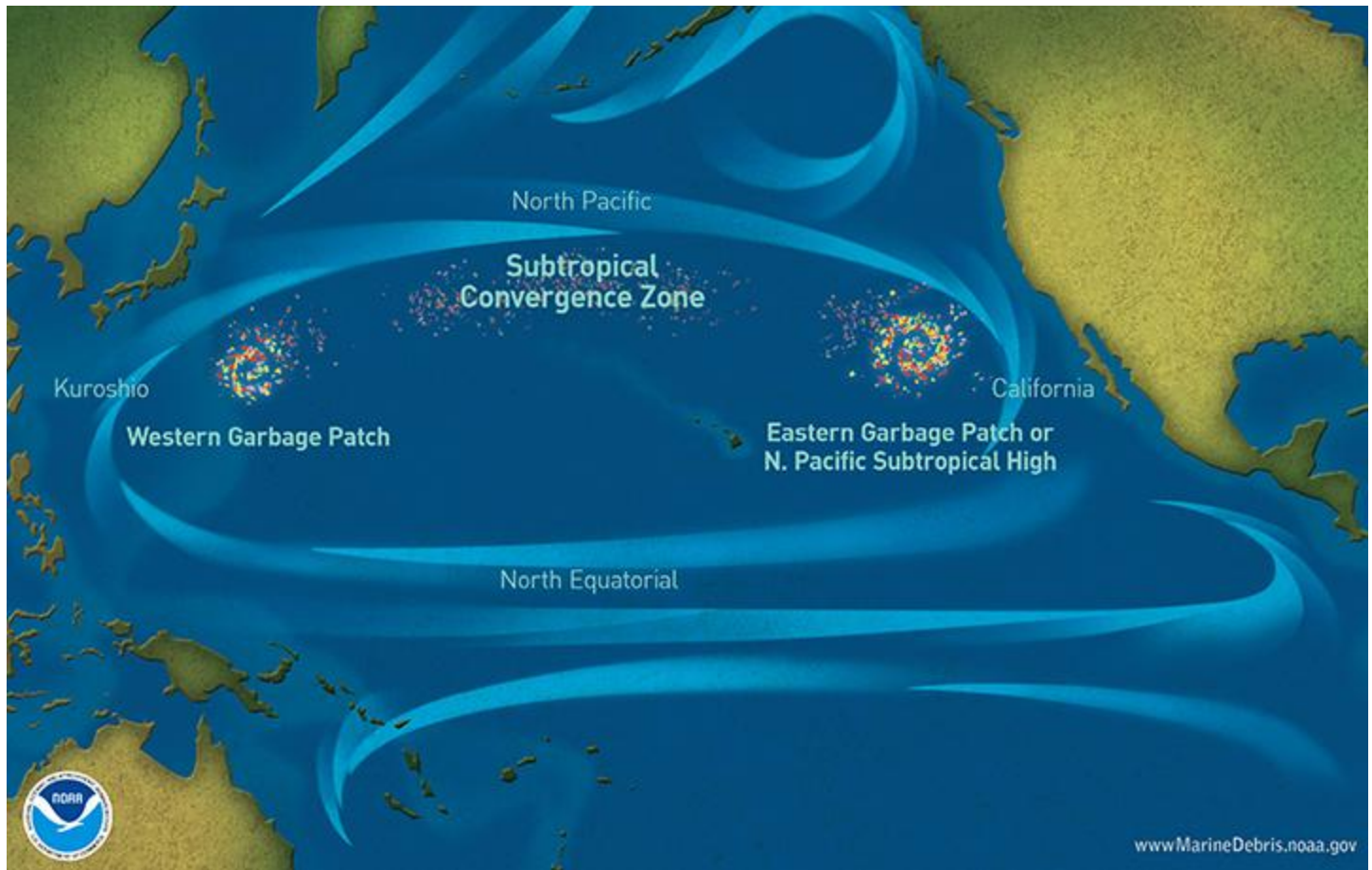
Other Water Pollutants

- ▣ Solid waste pollution (garbage)
- ▣ Sediment pollution (sand, silt and clay)
- ▣ Thermal pollution
- ▣ Noise pollution

▣ Solid waste pollution (garbage)



Figure 14.17
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▣ Sediment pollution (sand, silt and clay)



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▣ Thermal pollution

▣ Common where colder water is removed from a stream/lake and heated water is returned

▣ Thermal shock can result among organisms

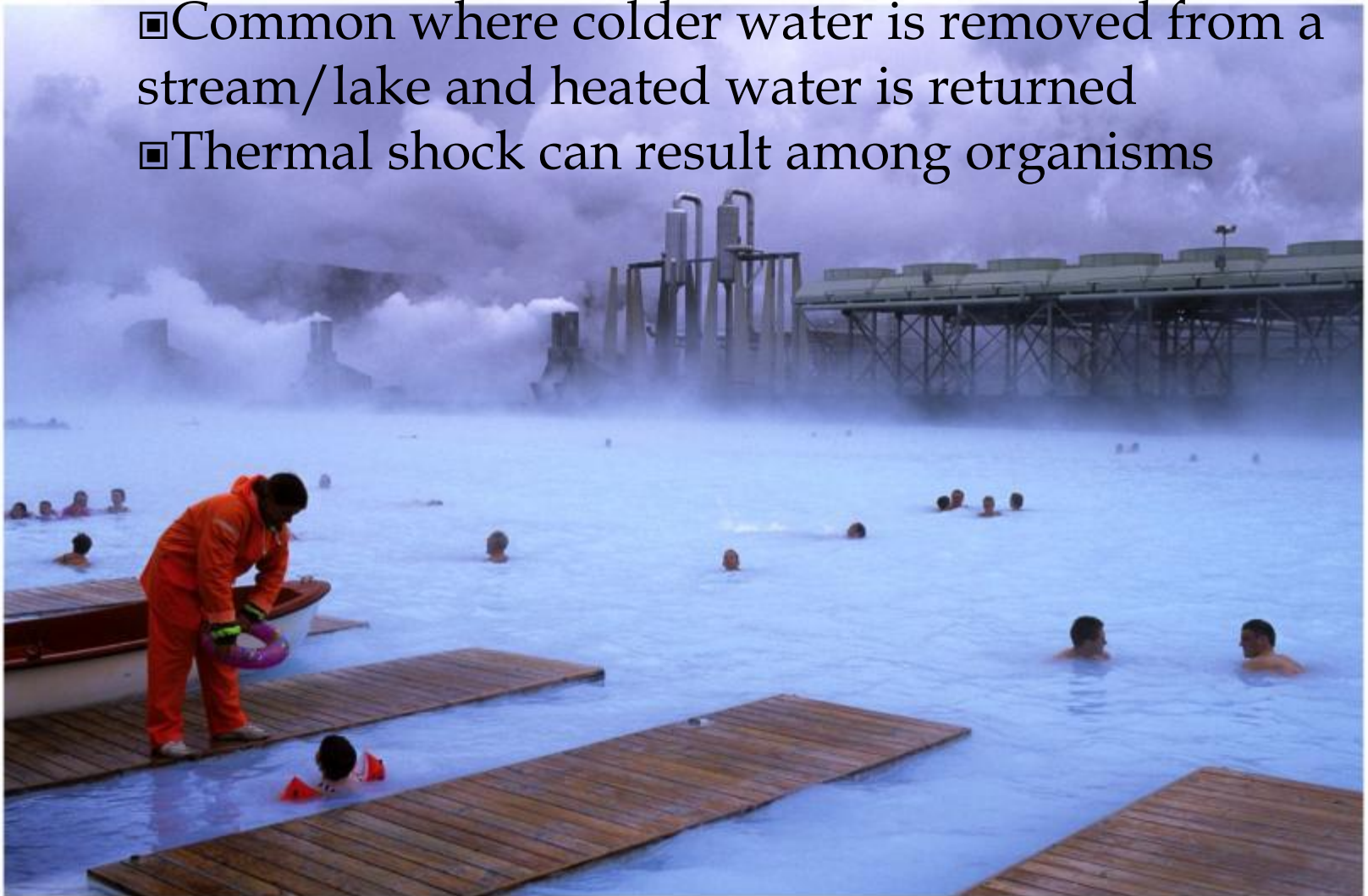


Figure 14.19

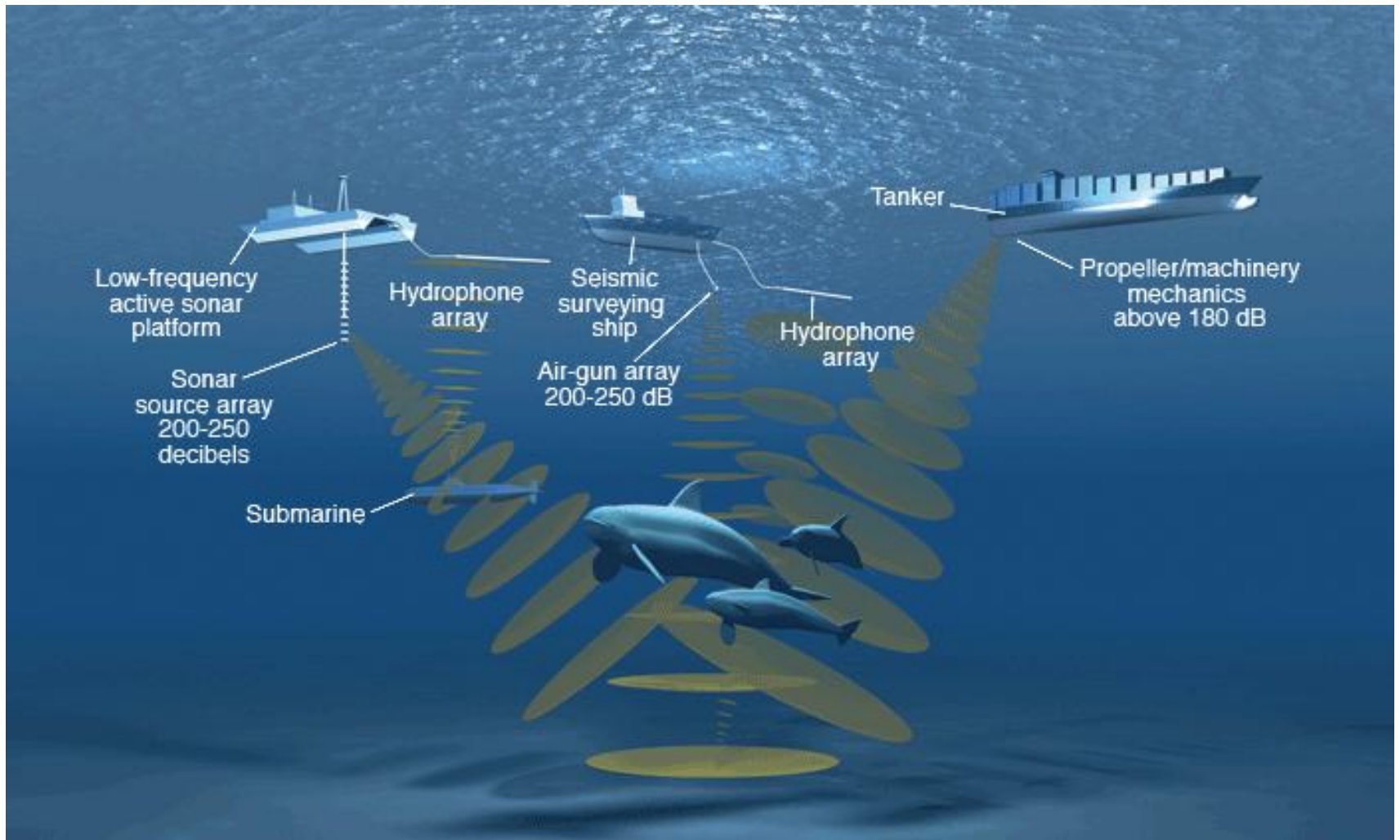
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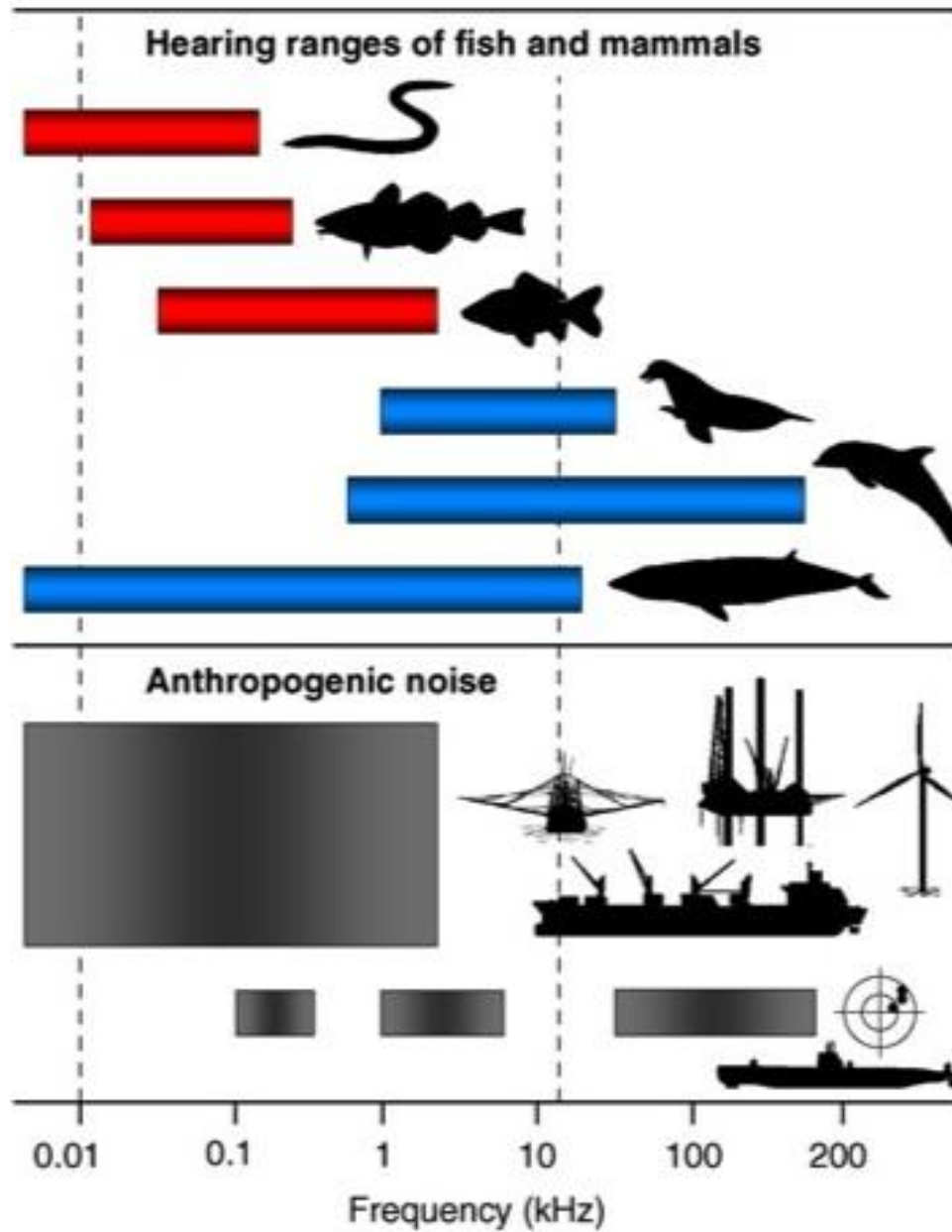
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Noise pollution

What noises affect aquatic animals?

- ▣ Noise pollution from ship engines and sonar systems make it difficult for marine mammals like whales and dolphins, and prevent it from communicating, finding food, and avoiding hazards.
- ▣ If construction sites, freeways, or outdoor concerts are near, it will also interrupt the natural habitat.





- Name 3 kinds of nonchemical water pollution.
- How can nonchemical water pollution be addressed?
- What are some examples of noise pollution as it relates to water?

Warm-Up

22JAN2015

- Do not turn in your warm-ups this week, turn them in next week.
- Explain in brief how plastics from your clothes can end up in your fish

Water Laws

- ▣ Clean Water Act- (1972) supports the “protection and propagation of fish, shellfish, and wildlife and recreation in and on the water”. (surface waters)
- ▣ Issued water quality standards that defined acceptable limits of various pollutants in U.S. waterways.
- ▣ Does NOT apply to ground water
- ▣ There are efforts to include biodiversity as a measurement of water quality



Water Laws

- ▣ Safe Drinking Water Act- (1974, 1986, 1996) sets the national standards for safe drinking water.
- ▣ It is responsible for establishing maximum contaminant levels (MCL) for 77 different elements or substances in both surface water and groundwater.
- ▣ Arsenic as an example MCL is 50 ppb

TABLE 14.1

The maximum contaminant levels (MCL) for a variety of contaminants in drinking water as determined by the U.S. Environmental Protection Agency, in parts per billion (ppb)

Contaminant category	Contaminant	Maximum contaminant level (ppb)
Microorganism	Giardia	0
Microorganism	Fecal coliform	0
Inorganic chemical	Arsenic	10
Inorganic chemical	Mercury	2
Organic chemical	Benzene	5
Organic chemical	Atrazine	3

Source: U.S. Environmental Protection Agency, <http://www.epa.gov/safewater/contaminants/index.html>.

Table 14.1

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TABLE 14.2**The current leading causes and sources of impaired waterways in the United States**

	Causes of impairment	Sources of impairment
Streams and rivers	Bacterial pathogens, habitat alteration, oxygen depletion	Agriculture, water diversions, dam construction
Lakes, ponds, and reservoirs	Mercury, PCBs, nutrients	Atmospheric deposition, agriculture
Bays and estuaries	Bacterial pathogens, oxygen depletion, mercury	Atmospheric deposition, municipal discharges including sewage

Source: Data from U.S. Environmental Protection Agency. 2004. *National Water Quality Inventory: Report to Congress.*

Table 14.2

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Developing countries and Water

- While a country is in the process of industrializing, often there are no environmental regulations to control water and air pollution
- Africa, Asia, South America, China, India, and eastern Europe all have prevalent water pollution problems due to rapid industrialization

São Paulo



- What is an MCL?
- What is the relationship between economic development and clean water?
- Describe some of the legislative actions taken to protect clean water and why they are significant.

- You have time to study, work on missing work, complete your case study, or examine your Eco-Column
- PLEASE use it productively

Warm-up

23JAN2015

- Please turn in your 10 vocabulary
- Use these final moments to look over your notes.