

GLG 110 – Chapter 14 – Mineral Resources

- ***If it can't be grown, it must be mined!*** – Mineral resources are an integral and valuable part of modern society, worth hundreds of billions of dollars per year to the U.S. economy
- Mineral resources are non-renewable (at least on human timescales), but are recyclable
 - About 25% of the value of newly mined mineral resources in the U.S. each year is recovered through recycling
- **Resource** – a concentration of a naturally occurring material in a form that can now or *potentially* in the future be extracted at a profit
- Mineral **Reserves** are identified and economically recoverable mineral resources
- Mineral resources include:
 - Salt/halite (NaCl)
 - Rock and sand
 - Limestone for cement
 - Gold, Silver, Copper, Platinum
 - Mercury
 - Iron
 - Aluminum
 - Zinc, Nickel, other metals
- **Ore** – useful metallic mineral concentrations that can be mined at a profit
- Ores are often concentrated via igneous and metamorphic processes, wherein water-rich fluids transport and redeposit metallic minerals
- Carbonate and phosphate deposits are commonly formed via biological concentration
- Weathering processes can concentrate minerals – this included *evaporates*
- Mineral extraction and processing can have a very large environmental impact:
 - Strip mining can scar large areas of the landscape
 - Abandoned mines and mining waste piles can lead to surface and groundwater contamination, particularly with metals and acidic drainage
 - Dissolution of gold by cyanide or mercury-bearing solutions used highly toxic substances that can escape and contaminate soil and/or water
 - Smelting can adversely affect air quality, and surface water quality downwind

- Recycling of waste materials from mining, human use (direct recycling or “mining” of landfills) significantly reduces need and can reduce contamination by reclaiming the contaminants as resources
- Commonly recycled metals include iron/steel, copper, aluminum, and lead
- In order for mineral resources to be brought into a measure of *sustainability*, it is necessary for society to:
 - More wisely and efficiently use resources
 - More efficient means of exploring for and mining resources
 - More efficient use of available resources
 - Recycling
 - Finding substitutes that achieve what mineral resources did in the past
- Digital photography removes need for large amounts of silver in photographic films