Resources from the Sea

Ocean Food Resources:

- **Advantages:**
  - Seafood is a nutritionally advantageous source of animal protein.
  - Seafood harvesting can release more land-grown grains for our consumption.
  - Mariculture reduces the demands on land, water and energy.

- **Possible challenges:**
  - Most of oceanic biological production is planktonic (i.e., microscopic to submicroscopic) and dispersed.
  - Continental shelf and estuaries cover tiny fractions of the earth’s surface.
  - The maximum sustainable yield of ~240 million metric tons per year is barely 10% of what is needed.
  - Asia, with ~56% of world population, needs to double its energy and protein intakes to reach the world average at the comparable levels of prosperity, but already consumes ~75% of the world’s seafood harvest.

Ocean’s Mineral Resources:

- **Ocean’s already provide**
  - ~50% of our supply of Mg and Mg compounds, ~70% Br, ~15% Co, ~5% Mn and Ni, and ~0.5% Cu;
  - ~30% of salt, ~10% of sand/gravel; and
  - are an inexhaustible source of water.

- This is good. Mineral resources are crucial because they have defined the human history but are essentially inexhaustible. Now, the basic rule of the market is that prices rise if demand exceeds the supplies, and fall when supplies exceed demand. If the prices stay flat, then we would assume that supplies have somehow stayed abreast of the demand. As the following graph of world price and production data for the four common nonferrous metals (aluminum, copper, tin and zinc) shows, demand for these metals has been rising steadily, but their inflation adjusted prices have remained flat. This is mainly because of the technological advances that have enabled extraction from lower-grade occurrences, so raising the quantity of reserves available. But commercial mining of manganese nodules that extensively litter the seafloor is unlikely anytime soon, because the supply of land based reserves may last for a long time.

World price and production statistics for selected nonferrous metals (aluminum, copper, tin and zinc)

- [http://www.ngdc.noaa.gov/mgg/geology/mmdb.html](http://www.ngdc.noaa.gov/mgg/geology/mmdb.html)