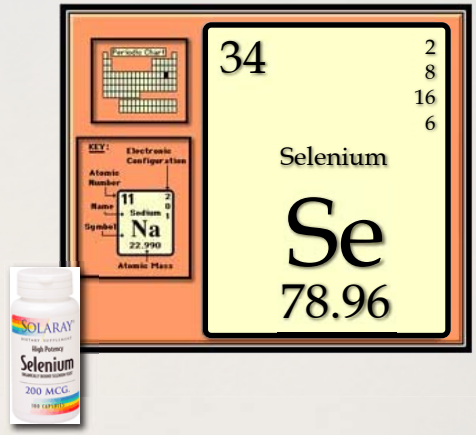
Development of a Selenium Standard for the Open Waters of Great Salt Lake

Great Salt Lake Water Quality Studies

What is Selenium?

The good . . .

- Selenium is a trace mineral that is essential to good health for people and other animals
- Selenium is incorporated into proteins to make selenoproteins, which are important antioxidants, regulate thyroid function, and play a major role in the immune system
- The FDA recommends that adults consume 55 μg/day (micrograms/day)
- Normal diets for most animals contain about 0.5 to 1 or 2 mg Se/kg (milligram/kilogram) parts per million [ppm]) on dry-weight basis



The bad . . .

- At concentrations only a few times higher than the nutritionally adequate level, selenium causes reproductive failure and birth defects in fish, birds, and mammals such as deer and domestic livestock

Where does selenium come from?

- Typical concentrations in the Earth's crust are <0.5 mg Se/kg, but some geologic formations are greatly enriched in selenium. Especially when these formations are modified as a result of human activities, (such as mining and agricultural irrigation), the selenium may be mobilized and become more available to plants and animals, which bioaccumulate selenium and incorporate it into the food chain for other organisms.
- Utah's Mancos Shale Formation is an example of a formation naturally enriched with selenium
- Industrial sources, such as coal and oil combustion, nonferrous metal production (primarily copper and nickel, but also lead, zinc, and cadmium), steel and iron manufacturing, municipal and sewage refuse incineration, and production of phosphate fertilizers, introduce much more selenium into the environment than do natural sources, such as volcanic activity or weathering of seleniferous rocks.
- Plants accumulate selenium from soils.
- Animals accumulate selenium from their food (i.e., consuming plants and other animals).

Mancos Shale Formation