



# Geology and Minerals

Geology

# Rock Ages

- 1600 → 1100 million years granites & schists, qtzite, congl, limestone
- 540-250 million year clastics & limestone
- 180-60 my Sedimentary and volcanic
- 27-20 my Volcanic
- 12,000 yrs Alluvial
- Today Alluvial. Colluvial

# Tectonics

- Major events
  - 180-60 my      compressional tectonics - Subduction zone creating granites sedimentary and volcanics.
  - 27-20my      Extensional tectonics, volcanics, mineralization. Major change in igneous rock chemistry.
    - Development of Basin and Range

# Quaternary Geology

- = Past 2 million Years
- What we see today.
- Broad flat valleys with flanking mountains
- Very little downcutting of valleys

# Curiosities

General lack of deep arroyos

Stabilized Sand dune fields

Desert Pavement and Desert Varnish

Ground Cracks east of Sawtooths

# Curiosities

Death Playas

Plant-rock type associations

# Geology and Minerals

## Minerals

# Leasable Minerals

- Oil and Gas
- Geothermal
- CO<sub>2</sub> and Helium
- Coal
- Potash
- Sulfur
- Sodium

# Oil and Gas Potential

- Classified as MODERATE
- Due to location in a basin containing Cretaceous age rocks and oil seeps

# Carbon Dioxide / Helium

- No known Occurrences

# Coal

- No Known Occurrences

# Geothermal

- Not within a KGRA (Known Geothermal Resource Area)
- Possibility in *Avra valley* – indication of elevated geothermal gradients

# Sodium

- Thick salt deposits exist to the northeast in the Picacho Basin. Possibly the thickest known in the world. Depth from 2300' to 8000'.

# Leasable Mineral Summary

- IFNM closed to mineral development except for existing rights. (300 mining claims)
- No current leasable mineral activity occurring in the vicinity of the monument.

# Renewable Energy

- Wind –
  - Considered Class 1 area = no potential
- Solar -
  - Entire Monument considered a solar resource area. No current activity in area of IFNM.

# Locatable Minerals

- 5 Mineral districts within the IFNM
  - Sawtooth Mn
  - Magonigal Cu, Mn
  - Silver Bell Cu, Pb, Zn, Mo, Au, Ag
  - Waterman Cu, Pb, Zn, Au, Ag
  - Ruskruge Cu, Ag

# Current Management

- By proclamation – All lands are withdrawn from all forms of mineral entry subject to valid existing rights.
- This supersedes several RMP decisions.
- Valid existing rights only exist on mining claims in Silver Bell Mts

