Environmental Assessment of Uranium with Geotechnologies

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Background – Uranium Mines

Photos by Veronica Francisco-Lapahie

OUTLINE

- **Project Overview**
- **Methodology**
  - Tools
  - Data Analysis - Spatial interpolation
- **Results**
- **Discussion**
  - Environmental assessment
  - Recommendations
- Acknowledgements

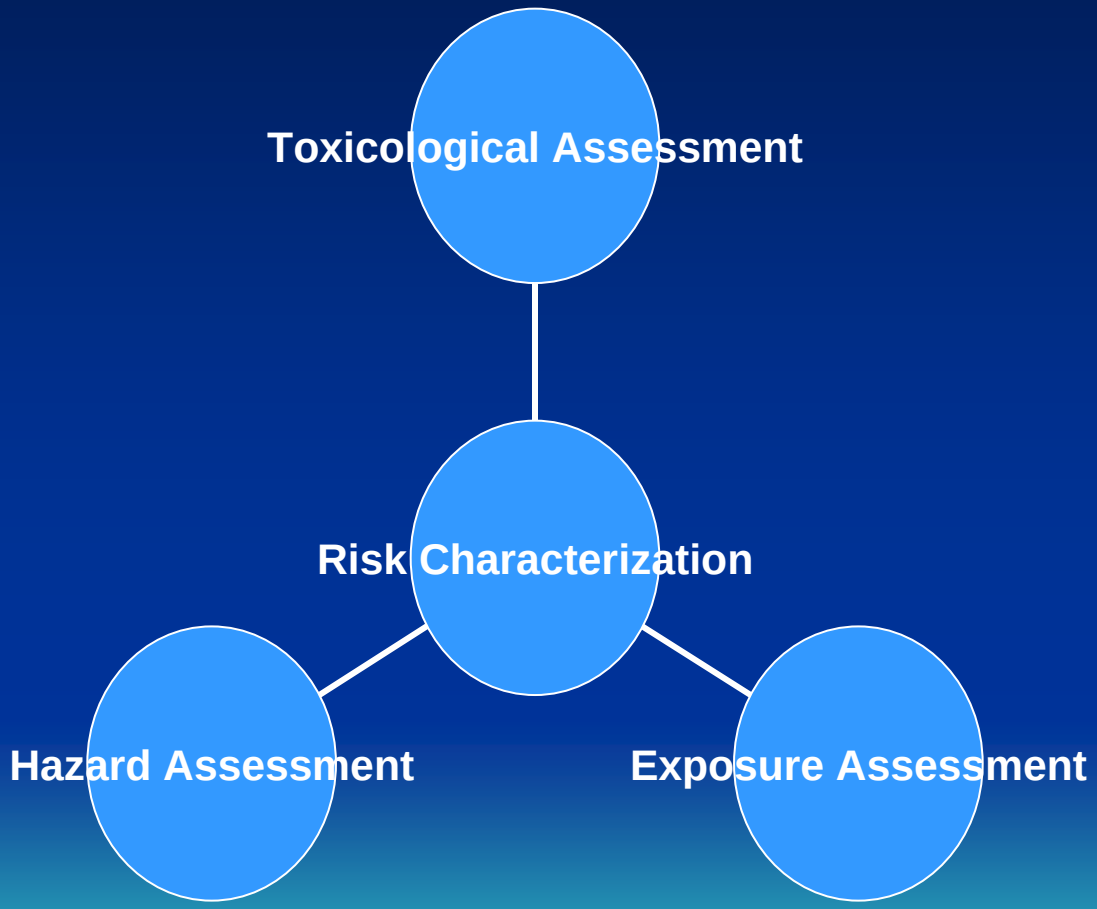
Project Overview

- Problem
- Purpose
  - to assess the potential impact of contamination associated with the abandoned/reclaimed uranium mines on local water sources utilizing geotechnologies.

Methodology

- Risk assessment model
  - Hazard assessment
  - Toxicological assessment
  - Exposure assessment
  - Risk characterization
- Geotechnology methodology

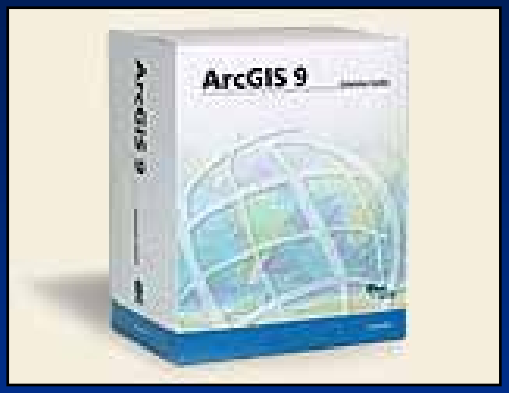
Risk Assessment Model



Geotechnical Methodology

- Use of ArcMap software
- Interpolation of the data for various water sample sites
- Spatial Interpolation method
  - Kriging

Tools



GIS Software

Research Interns

Model 19 Micro R Meter

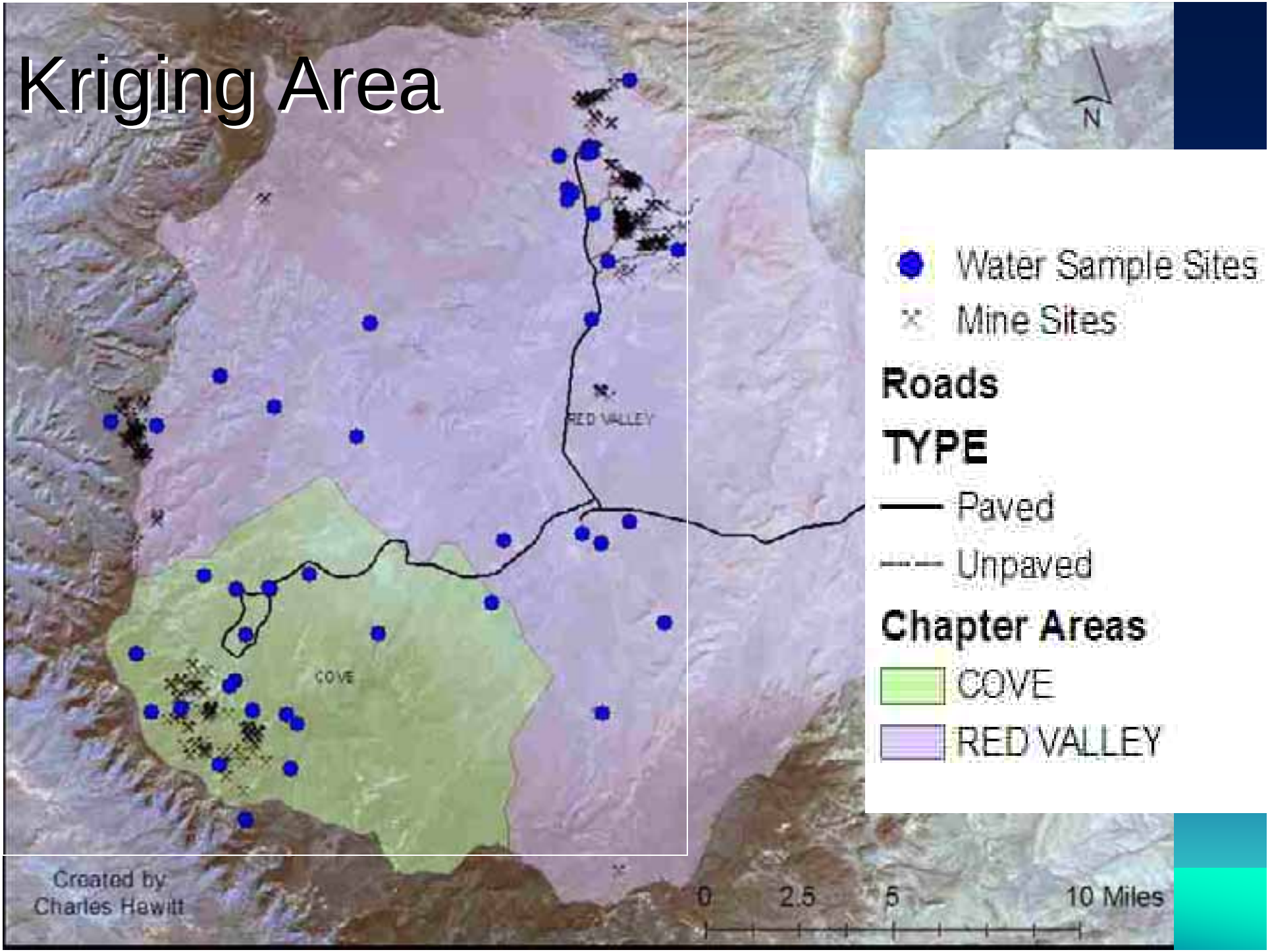
Trimble TSC 1 Unit

Photos by Veronica Francisco-Lapahie

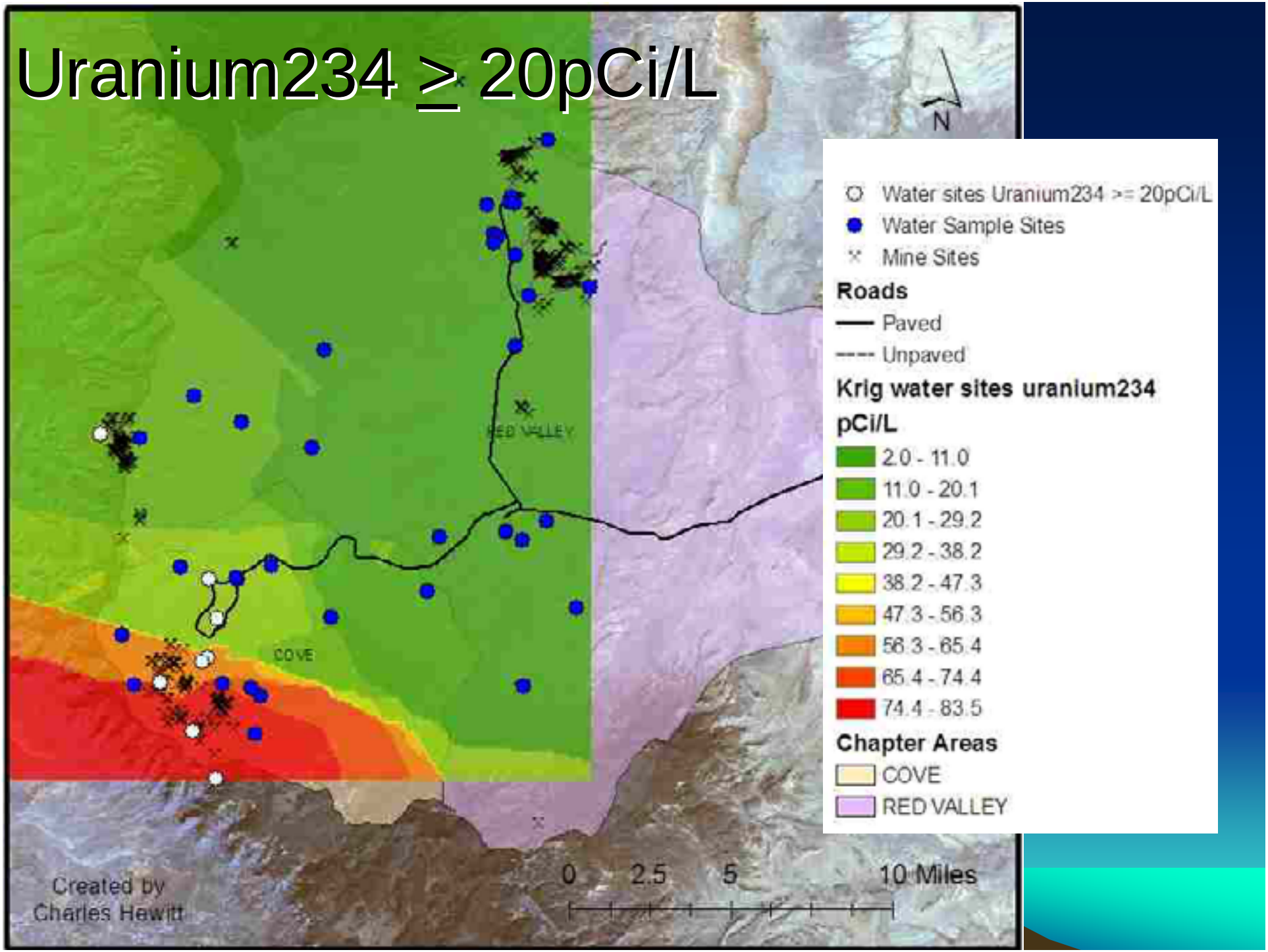
Kriging Results

Uranium 234 and 238

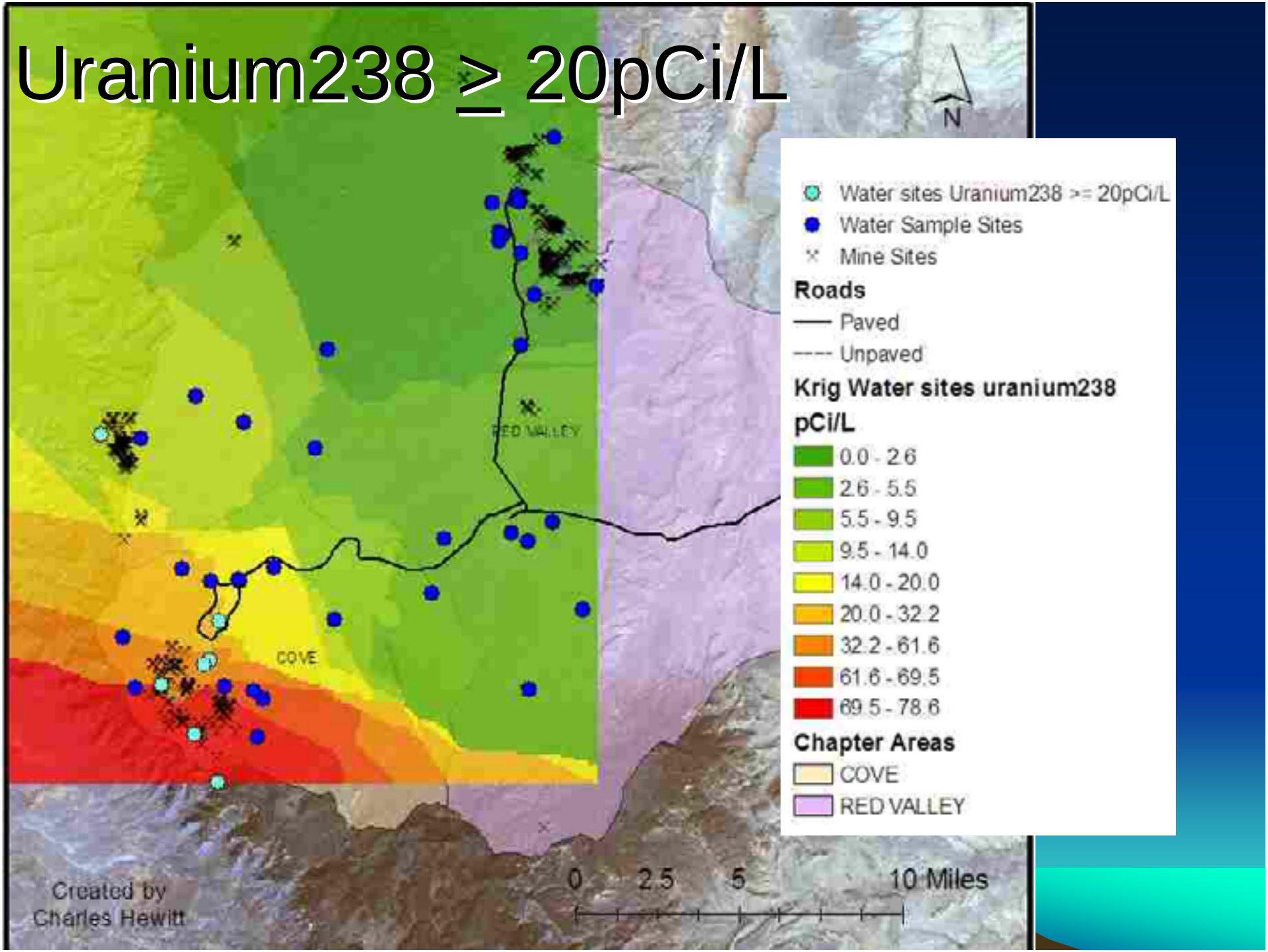
Kriging Area



Uranium234 ≥ 20pCi/L



Uranium238 ≥ 20pCi/L



Discussion

- Environmental Assessment
  - Physical setting description
  - Risk characterization
    - Hazard assessment summary
    - Toxicological assessment summary
    - Exposure assessment summary
- Recommendations

Physical Setting - Exposed Mines

Photos by Charles Hewitt

Physical Setting Cont.

Water Sources

Three ponds help irrigate farm land.

A water tube running from the spring to an irrigation canal and to the fields.

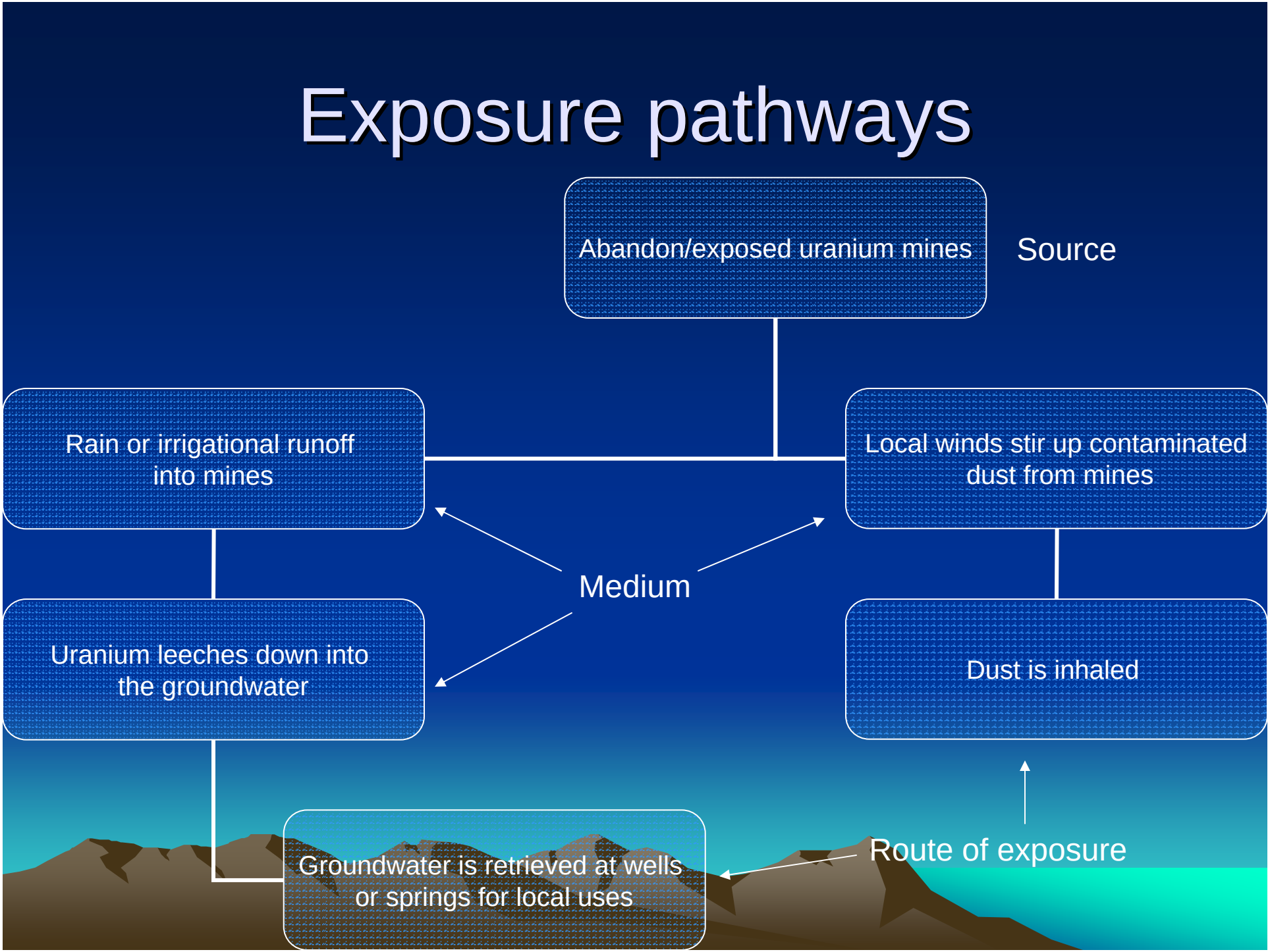
Ashley, Mary & Michelle at an artesian water spring that flows into a canal.

Two water containers for irrigation.

Runoff on hillside may help water the fields but also cause contamination.

Photos by Veronica Francisco-Lapahie

Exposure pathways



Risk characterization

- Summary of
  - Hazard assessment
    - Water sources
    - Abandoned/exposed mines
  - Toxicological assessment
    - Chemical not radiological toxicity
  - Exposure assessment
    - Internal exposures
    - Uranium not readily absorbed

Recommendations

- Exposed mines
  - Reclamation
  - Warning signs
  - Access
- Water sources
  - Routine testing
  - Access
- Education
- Funding

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Photo by Charles Hewitt

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