ASSESSING THE TOXICITY POTENTIAL OF MINE-WASTE PILES

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and

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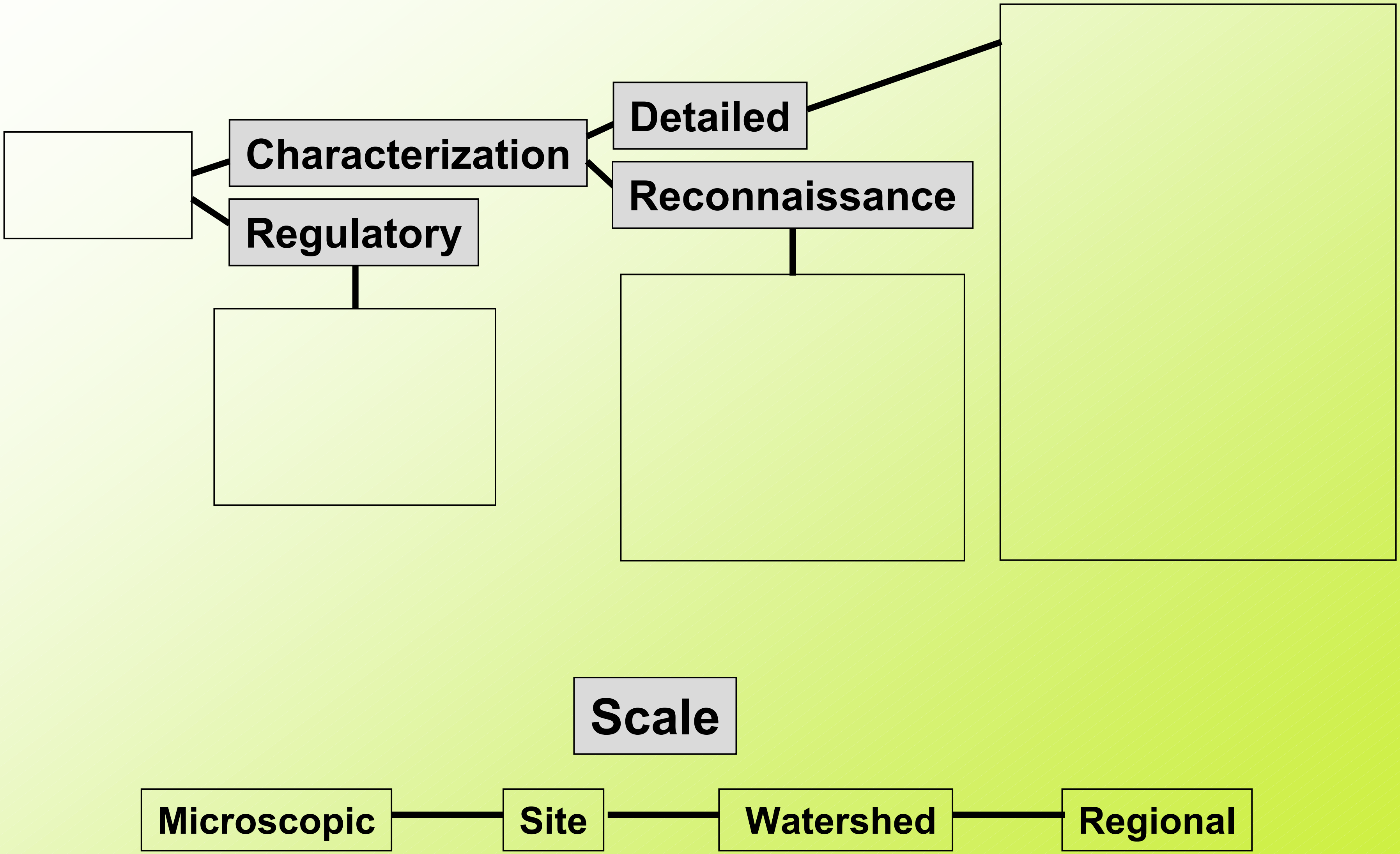
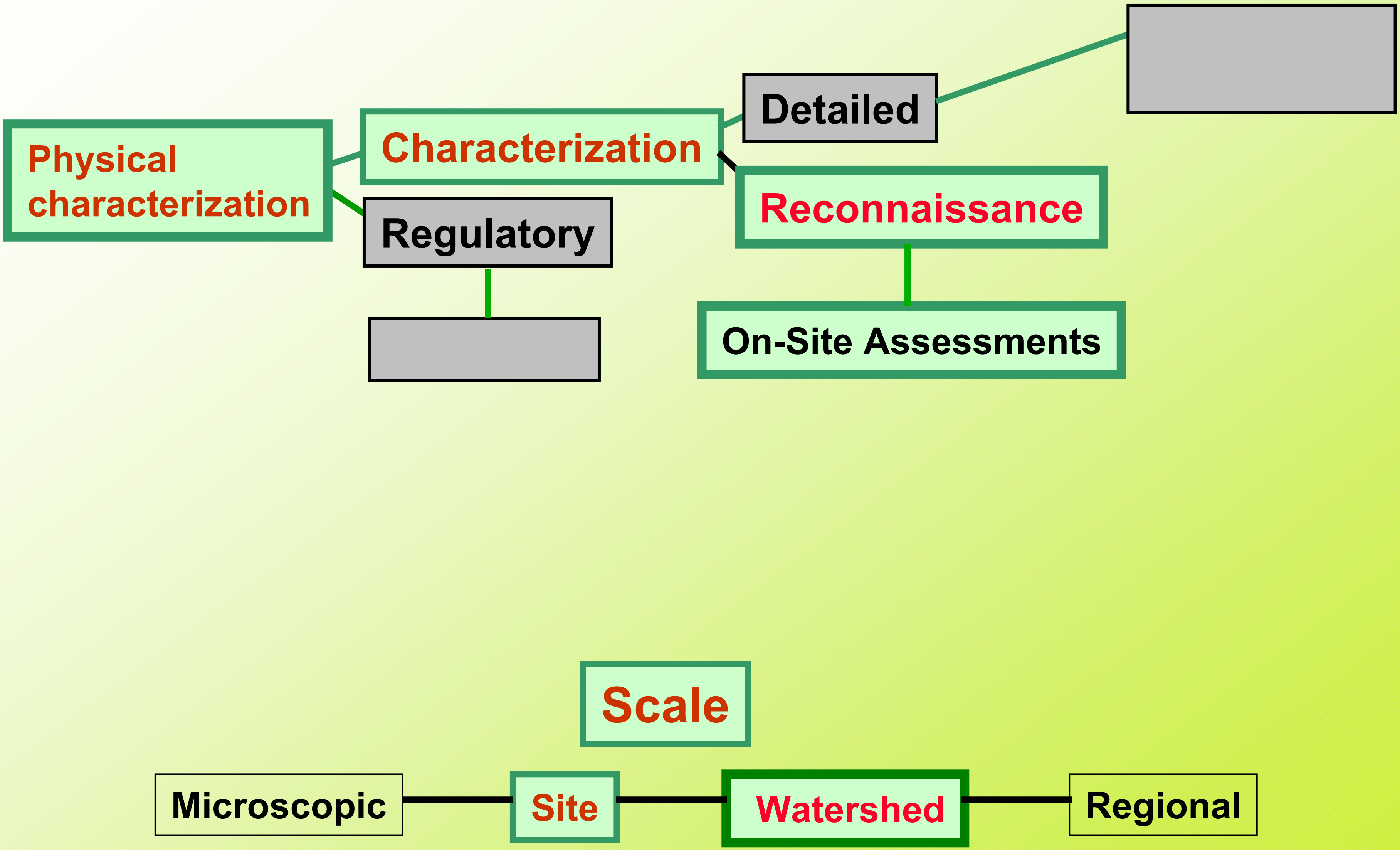
- **I. Introduction**
  - A. Scope of Workshop (*Tom Wildeman*)
  - B. Mine Drainage Chemistry (*Kathy Smith and Tom Wildeman*)
  - C. Mining Wastes Overview (*Sharon Diehl and Kathy Smith*)
- **II. Methods to Determine Bioaccessibility of Metals from Wastes** (*LaDonna Choate and Jim Ranville*)
- **III. Physical Characterization of Waste Piles**
  - A. Physical Characterization of Waste Piles *(Tom Wildeman)*
  - *B.* Fate and Transport of Metals & Sediment in Surface Water *(Rosalia Rojas & Mark Velleux)*
- **IV. The Importance of Geology *(Sharon Diehl)***
- **V. Geophysical Applications *(Bruce Smith)***
- **VI. Waste Pile & Water Sampling *(Kathy Smith)***
- **VII. Chemical Analysis *(Kathy Smith)***
- **VIII. Leaching Tests**
  - A. Leaching Studies *(Phil Hageman)*
  - *B.* Assessing Mine Wastes: Chemical Criteria *(Tom Wildeman)*
- **IX. Acid-base Accounting *(David Fey)***
- **X. Decision Tree (*Tom Wildeman*)**

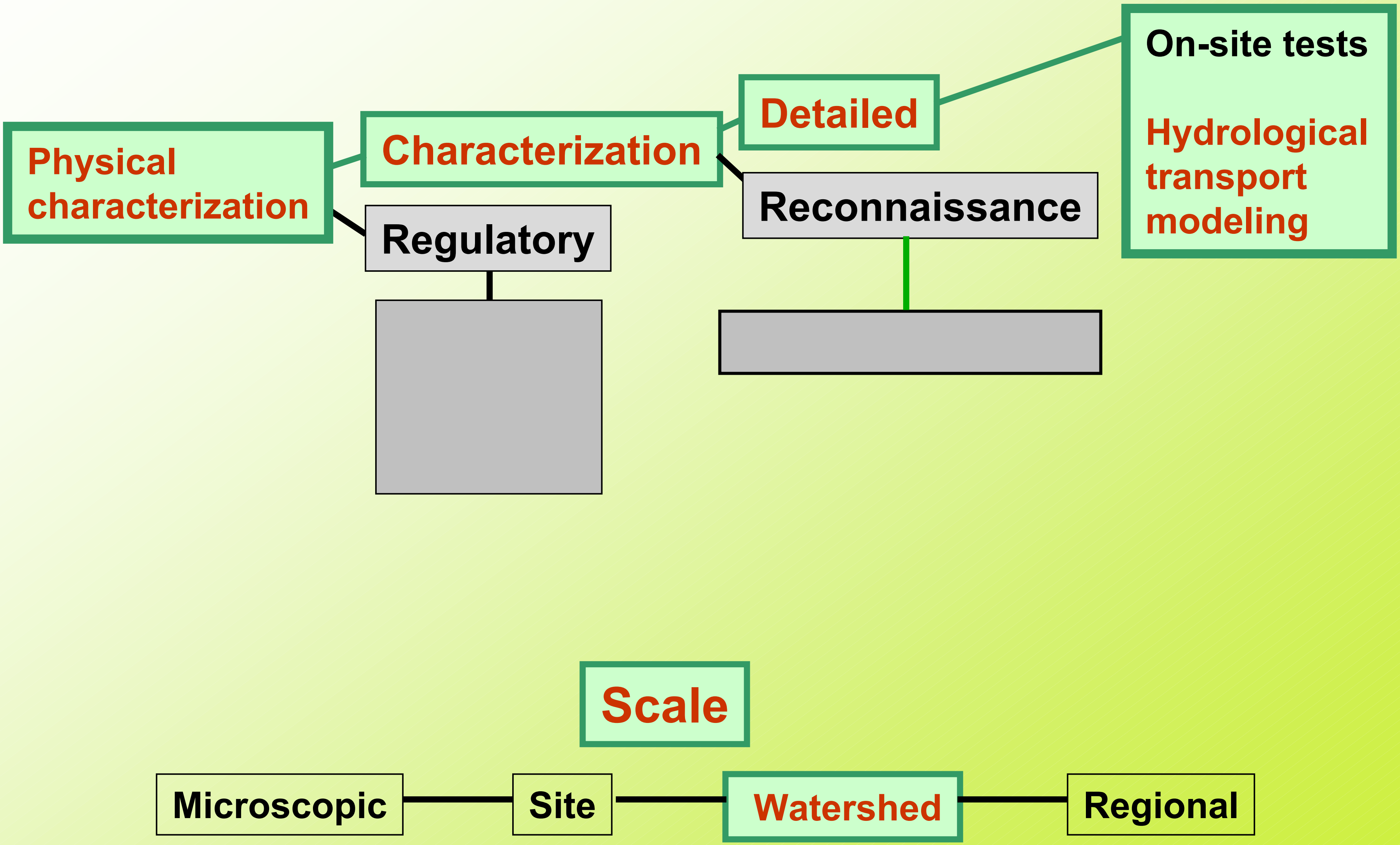
Flow Chart for Ranking and Prioritization



Flow Chart for Ranking and Prioritization (THOMAS WILDEMAN)



Flow Chart for Ranking and Prioritization (ROSALIA ROJAS)



SCOPE

WATERSHED → SITE → ROCK → MINERAL

EMPHASIS

PHYSICAL ←→ CHEMICAL ←→ BIOLOGICAL

PRIMARY OBJECTIVES

1. PROVIDE A SIMPLE & PRACTICAL METHOD OF ASSESSING THE POTENTIAL TOXICITY OF A WASTE-ROCK PILE
2. PROVIDE SUFFICIENT SCIENTIFIC & TECHNICAL BACKGROUND TO SUPPORT THE SIMPLE ASSESSMENT METHODS

MINE WASTE DECISION TREE

CHEMICAL CRITERIA

PASTE pH, ALKALINITY

< 5

Assume Toxicity.
Check with TCLP & CDMG extraction tests.

> 5

Toxicity Uncertain

TCLP, CDMG, & USGS extraction tests are necessary.

Develop a simple bioavailability test to confirm toxicity.

PHYSICAL CRITERIA

A. ON-SITE ASSESSMENTS

1. Proximity to year-round or ephemeral stream or gulch.
2. Size of waste-rock pile.
3. Extensiveness of erosion features.
4. Presence of cementation crusts.
5. Presence of a kill zone.
6. Presence of vegetation.

B. ON-SITE TESTS

1. Develop a settling test.

Concerning the tests and observations within the criteria, only the paste pH test can be used as an either/or criterion for determining toxicity. For the other tests, ratings will have to be developed for which the aggregate score will determine the degree of hazard of a waste-rock pile.

OTHER FEATURES

- END OF THIS SECTION
  - GLOSSARY
- END OF EACH SECTION
  - KEY PAPERS
- LAST SECTION OF NOTES
  - KEY REFERENCES
  - RELATED LITERATURE
  - RELATED RESOURCES

GROUND RULES

- NONE REALLY – JUST HAVE A GOOD DAY.
- ASK QUESTIONS AT ANY TIME.

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