

Rethinking Mining and Reclamation

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Themes

Plan with the final product in mind

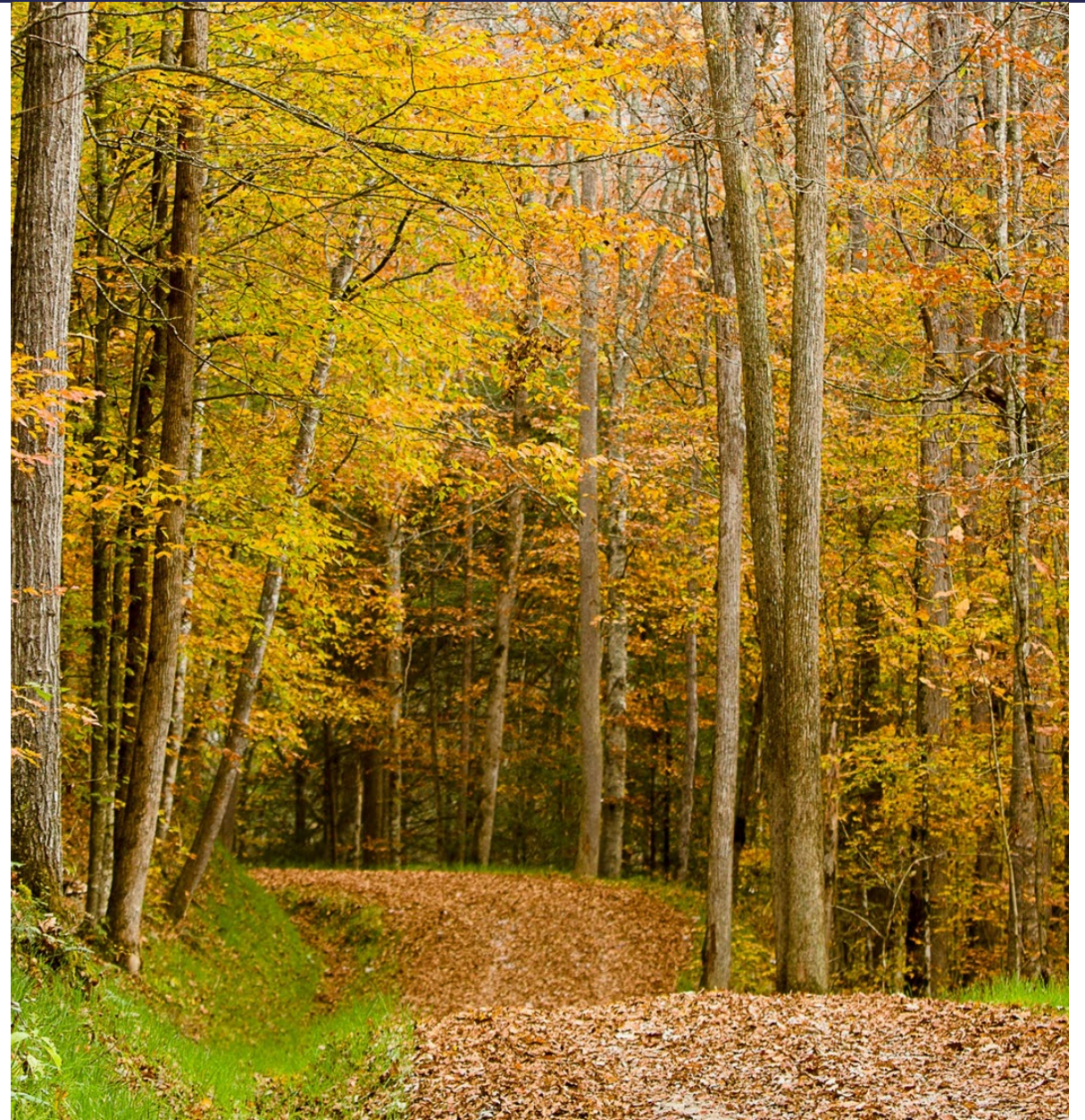
- Design with nature in mind
- Develop management strategies to reduce risk
- View everything as a resource



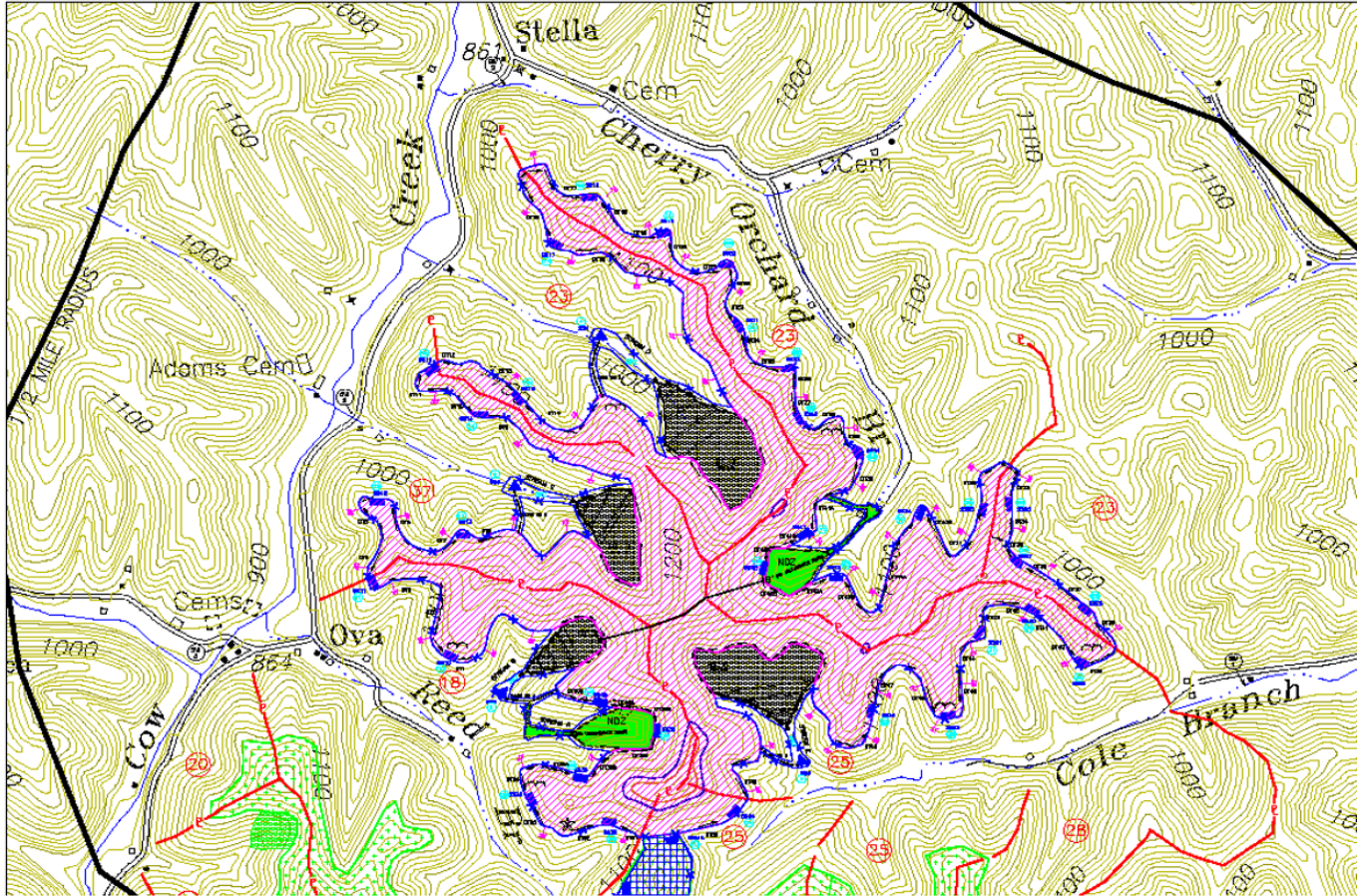
Design with Nature

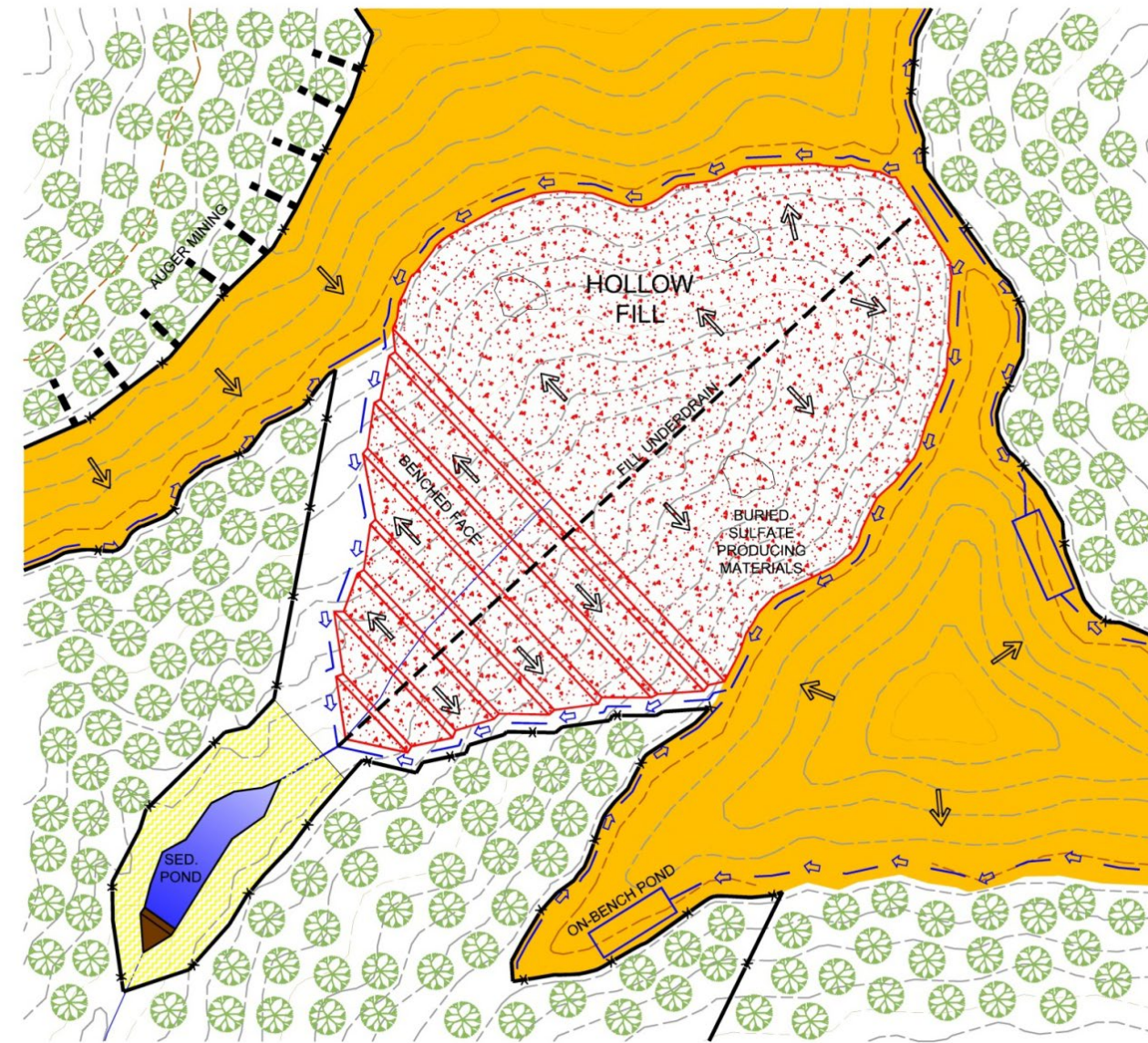
Understanding the interconnectedness of ecosystem components

- Hydrology
- Geology
- Water quality
- Wildlife (aquatic, terrestrial, avian)

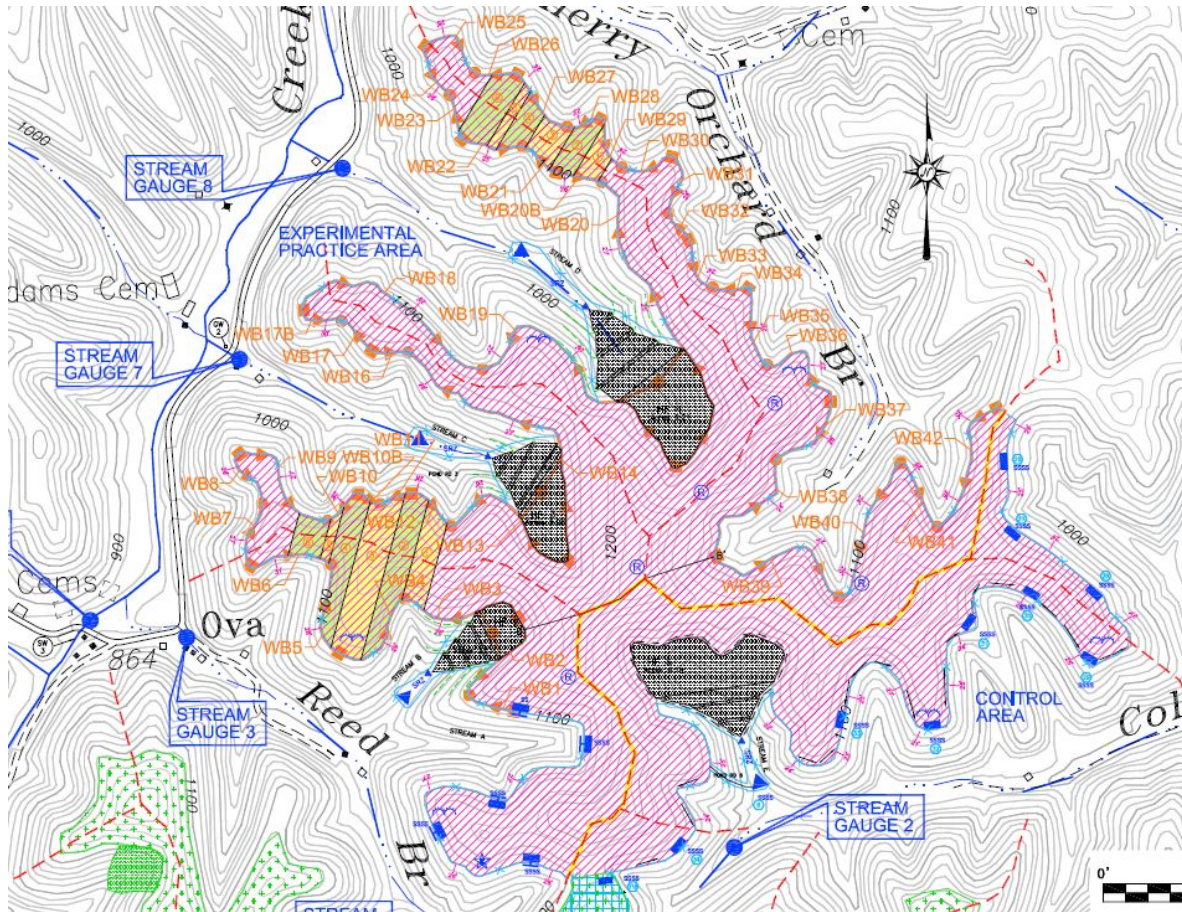


Current Mining Methods in Appalachia



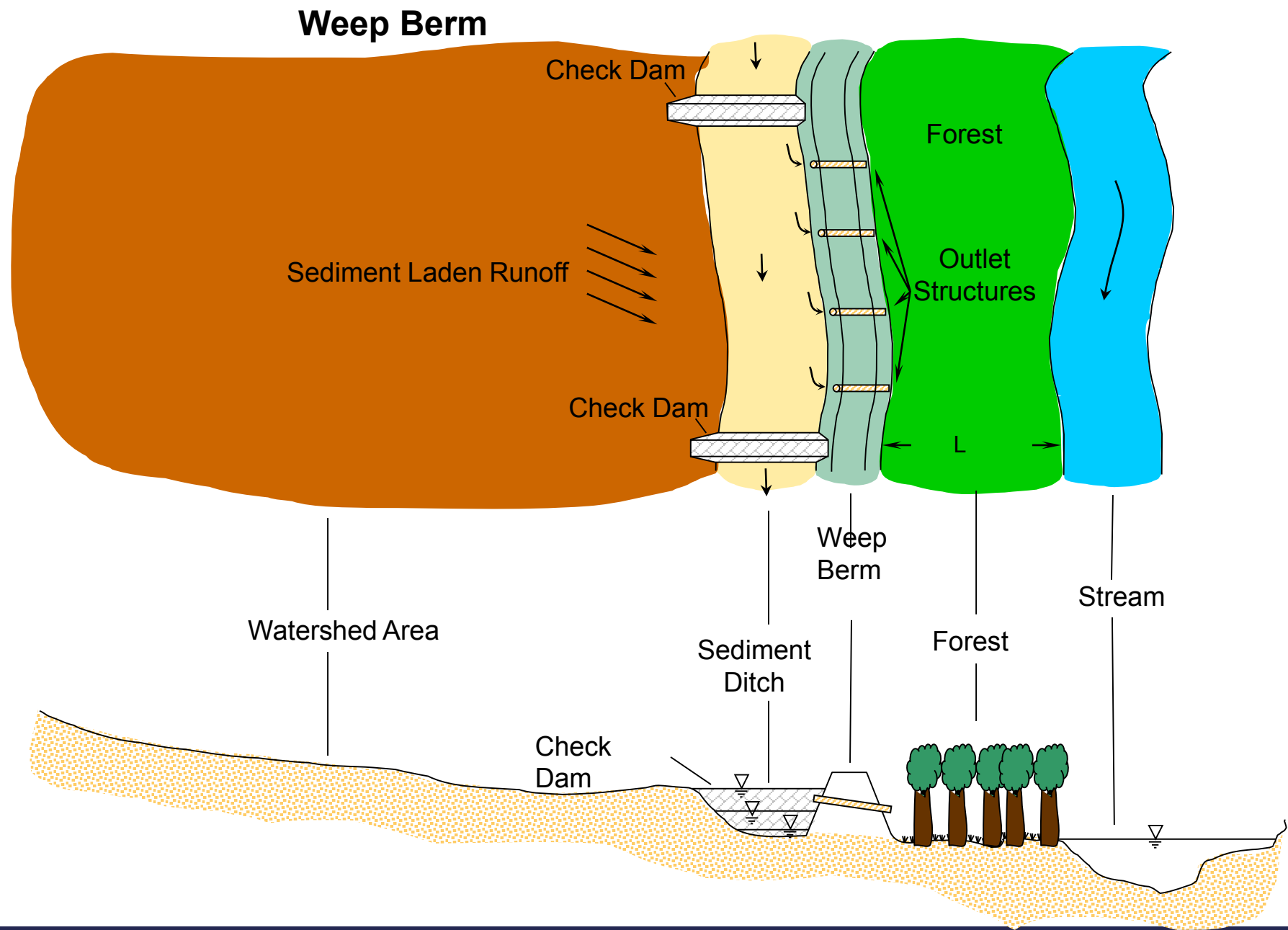


Disruptive Technologies



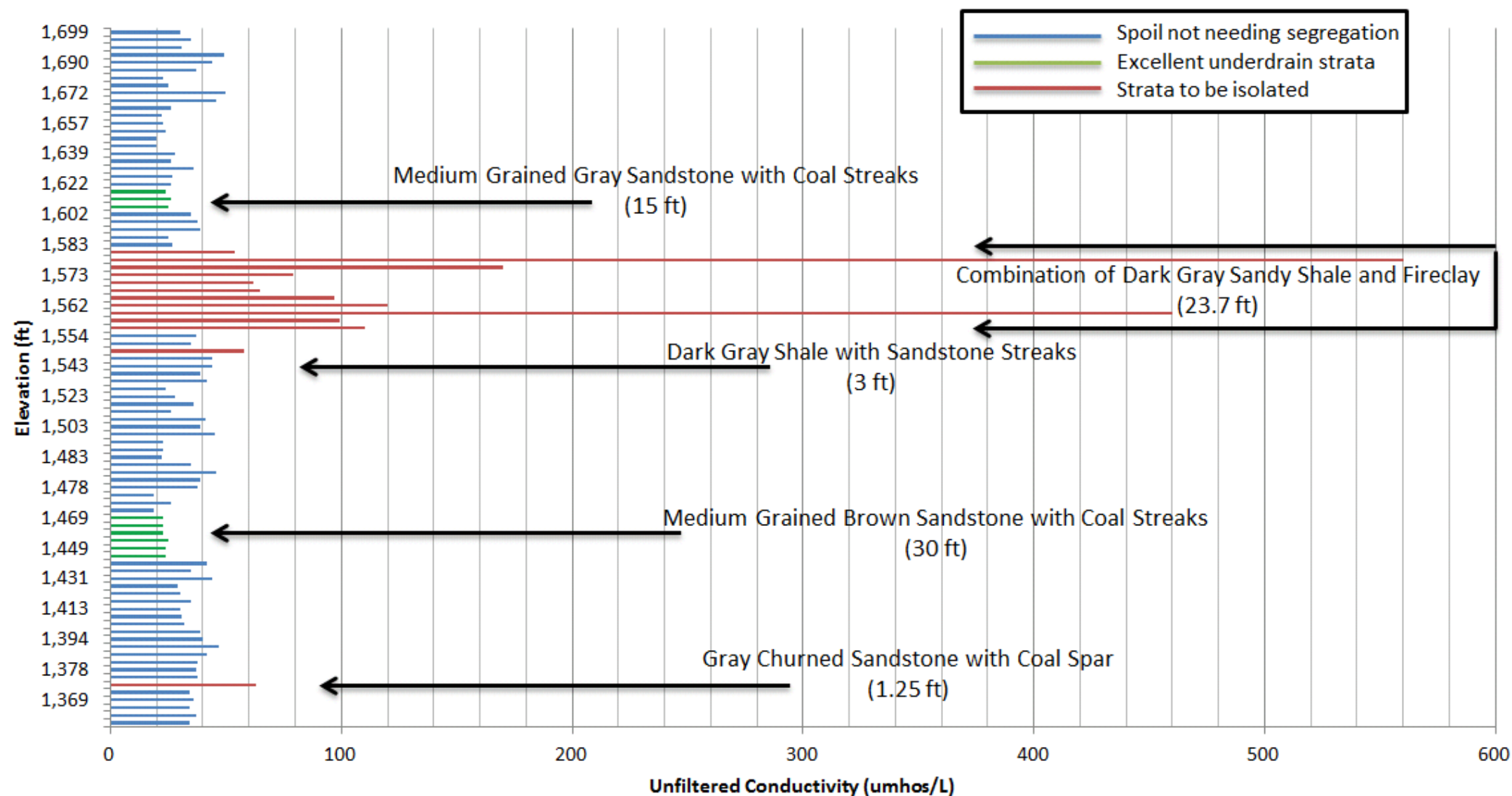
Accomplishments

- 100% valley fills eliminated
- 100% sediment and bench ponds eliminated
- Stream loss reduced from 13,000 ft to 0 ft
- Substantially improved water quality
- Eliminated flooding potential
- Largely reduces reclamation costs
- Increases profitability



Weep Berms







Holistic Solution

Re-envision the process of mining and reclamation

- Select mining sites located adjacent to AML
- Incorporate disruptive technologies into the design
- Need to overcome regulatory and industry impediments





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Potential Enhancements

Case Study: Advanced Restoration Technologies

- Isolate shoot-and-shove spoil areas
- Geomorphic design of watersheds
- Springs, streams and wetlands
- Forest
- Highwalls as a resource for endangered bats



Re-established High-value Forest Initial and 10 Years Later



Stream Creation & Forest Reestablishment



Impediments

Challenges on the regulatory and industry fronts

- Inherited onsite water quality
- Restrictions on use of geologic materials
- Limitations associated with mine perimeter
- Need for management adaptation
- Perceptions vs reality in permitting
- Restrictions associated with transport
- Acceptance by external stakeholders

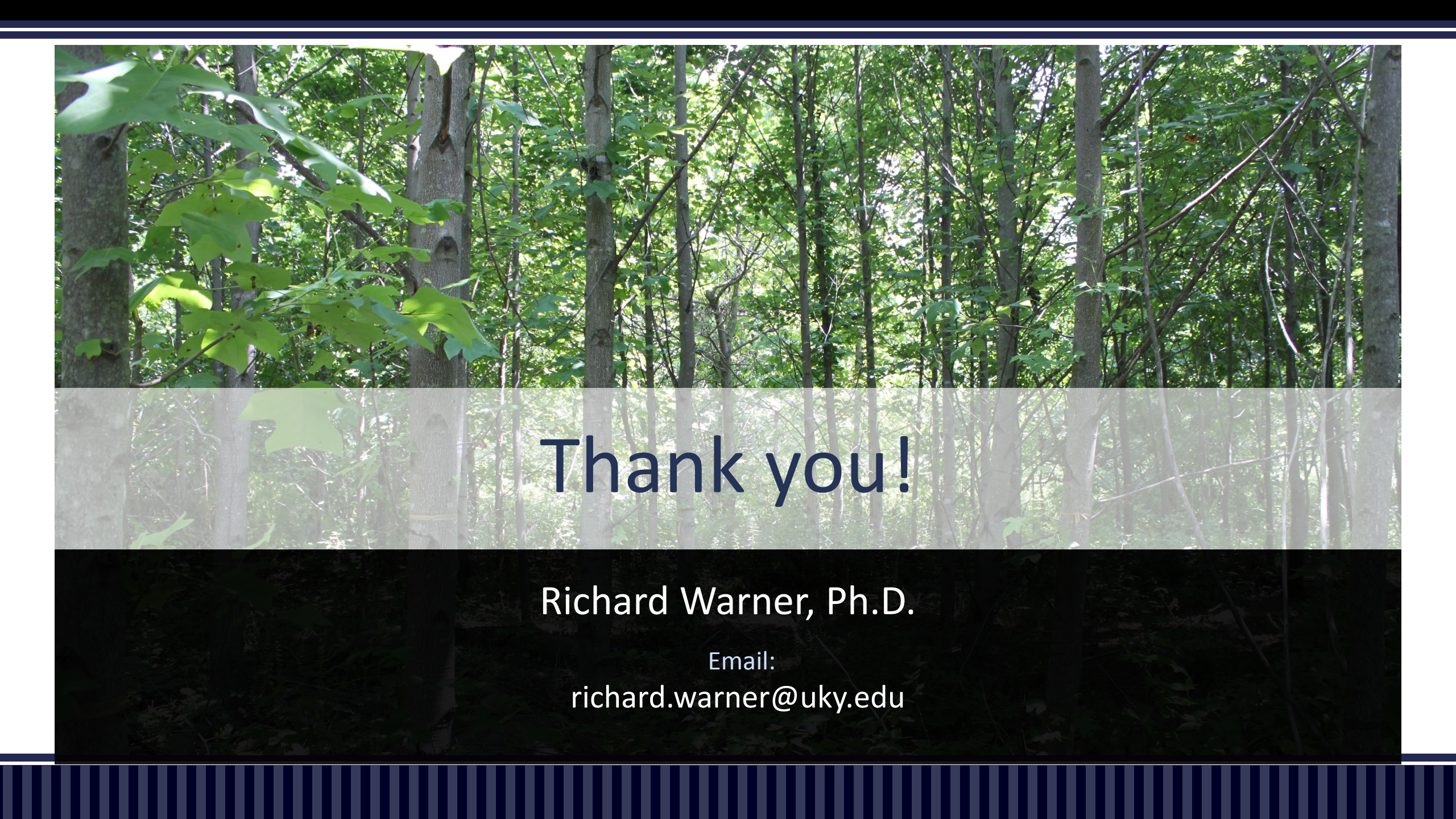


Strategic Actions

Think openly and broadly

- Ask the question, “What is most important?”
- Assess alternatives
- Engage stakeholders
- Serve as a catalyst for regulatory and policy transformation and industry implementation





Thank you!

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