Powell River Project:
Research and Education
to enhance environmental restoration on mined lands

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Purpose of Presentation Today

Briefly Review Powell River Project History & Accomplishments.

Explain Financial Situation

Describe Future Plans
A cooperative project of Virginia Tech and the Appalachian coal industry that conducts research and education programs to enhance environmental restoration on mined lands.

Founded in 1980, continuing today.

Original purpose: Develop mine reclamation methods to:

- Aid coal industry compliance with the “new” federal reclamation law.
- Enhance use capability of land after mining.

Pasture on mined lands, Powell River Project Research and Education Center
Powell River Project Research Findings Have Influenced Mine Reclamation Practice and Policies
Research demonstrated that selection of suitable rock types for use as topsoil substitutes can improve soil productivity on mined lands used for livestock pastures, reforestation, and other post-mining land uses.

W.L. Daniels & J.A. Burger
Research: Develop methods for establishing vegetation on coal refuse with reduced or no soil cover. (W.L. Daniels, CSES).

Outcome: Methods are cost-effective and used by industry.
Research: Development of a “wetland” system (SAPS) that remediates acid mine drainage (AMD) effectively.
A.C. Hendricks, BIOL.

Outcome: Today, SAPS are used to remediate AMD throughout Appalachia.

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Jim Burger with red oaks growing on weathered mine spoils, at controlled overburden placement experiment.

**Research:** develop methods for re-establishing productive native forest trees on coal mines. J.A. Burger, FREC

**Outcome:** “Forestry Reclamation Approach” is used widely by industry.

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A Virginia mine site with trees that were planted as seedlings by the mining firm.
“But what have you done for me lately?”

“The wheel was great. What have you done for me lately?”
Laboratory columns used for testing coal mine spoils to determine rates of mineral salt release.

**Research:** Understand patterns of mineral salt (TDS) release from coal mine spoils, and influencing factors.

W.L. Daniels, CSES.

**Outcome:** Improved capacity by industry to manage mine spoils while reducing TDS.

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Early stages of experimental trial for mining methods to reduce mineral salt release.

Initiated by PRP, funded by ARIES, and now continued by PRP.
**Research:** Understand temporal patterns of TDS release by mine spoil fills, so they can be managed more effectively.

**Outcome:** Patterns as expected, via spoil columns.

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*DM Evans et al. 2014. JAWRA 50: 1449-1460.*

[Graph showing TDS release by a mining operation over time.
 Specific Conductance (μS/cm)]

[Image of a mining operation with trees and spoil fills.]
Examples of research streams.

**Research**: Study aquatic life in streams receiving mine discharge waters. S. Schoenholtz & C. Zipper, CSES.

**Outcome**: Aquatic organisms vary seasonally, as well with water quality.
E.A. Boehme et al. 2016. Ecological Indicators

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Research: Determine effectiveness of stream reconstruction methods for restoring aquatic ecosystem structure & function. S. Schoenholtz, C. Zipper

Outcome: Shading by planted trees can aid restoration of in-stream natural processes.
Research: Identify reclamation methods that can improve reforestation outcomes (more and larger native trees).

Outcome: As an addition to spoil selection, tree-compatible seeding is very effective (and low cost).
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Powell River Project Research and Education Center, in Wise County, is **Essential** to PRP goals and activities.
Field trial of American chestnut varieties developed for improved blight resistant, funded by Forest Health Initiative.

Continuing research on environmental restoration methods for mined lands – with funding by non-coal entities…
Eastern white pines, age 30 growing on a Powell River Project research mine site.

Enables continued research to address long-term mine reclamation and environmental restoration topics.
Field education programs for agencies, industry, and the public. In total, more than 50,000 visitors – easily.

Brian Strahm, Virginia Tech, during educational field tour prior to Powell River Leadership Dinner

VCEA's annual Coal-to-Electricity program for educators.
Host classes from local schools, Virginia Tech, other colleges and universities.

Hundreds of students visit the Research and Education Center every year. Tens of thousands have visited over time.
Cooperative Extension Education Programs at the Center are increasing public knowledge of mined lands.

Extension Agent Phil Meeks and members of the public discussing maple syrup production at PRP Research and Education Center.

20+ year-old sugar maples, with potential for syrup tapping, growing on a mine site at PRP Research and Education Center.
Powell River Project: Future Plans

- Lee Daniels to take over as PRP Director in early 2017.
- Focus funding at the Research Education Center, hoping to maintain it as a valuable resource for students, industry and agencies, researchers, and the public – and VT presence.
- Continue research funding from non-coal-industry entities - but ensuring compatibility with PRP goals!
- Continue efforts to engage early-career VT faculty.

Powell River Project: Financial Challenges

- Site support and maintenance personnel (2 part time) and Cooperative Extension involvement.
- All funding from local sources (industry). VT funding for PRP activities has ceased - but VT faculty support continues.
Thank you!

Thank you, coal industry, agencies for 36 years of help and support. Recent sponsors: Alpha, Consol, Forestland Group, ETP, NS, Red River, Teco

Thank you, former Penn Virginia/PVR Partners for assigning personnel to Research and Education Center management.

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