Nice to meet you

Executive Director at Friends of Deckers Creek

- Abandoned Mine Lands

Previous Field Technician at Friends of the Cheat

- Primarily Special Reclamation sites

AMD system operator for nearly 9 years

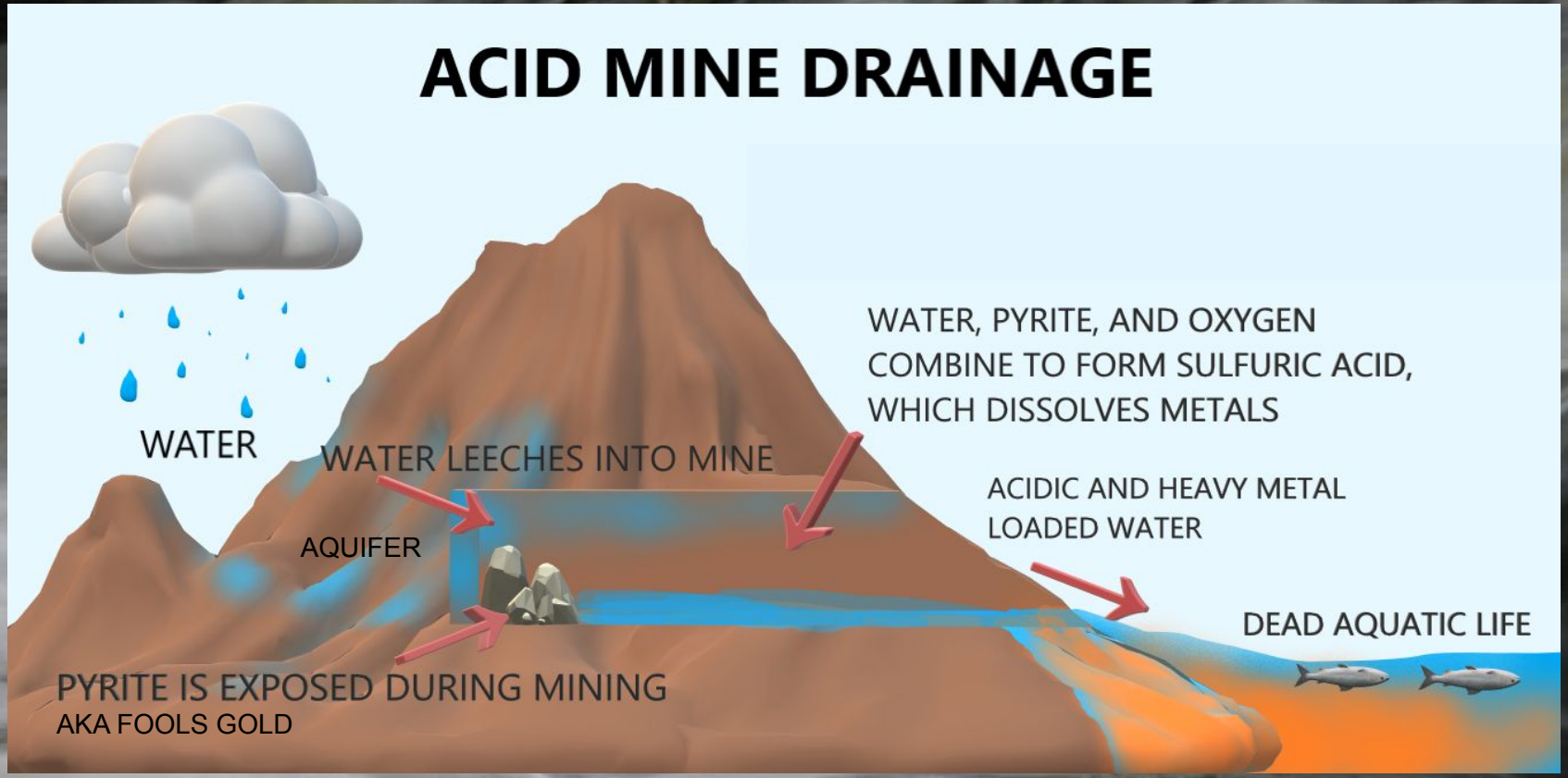
- Abandoned Mine Lands and Special Reclamation

Friends of Deckers Creek

Acid Mine Drainage Monitoring and Evaluation

February 1, 2024

ACID MINE DRAINAGE

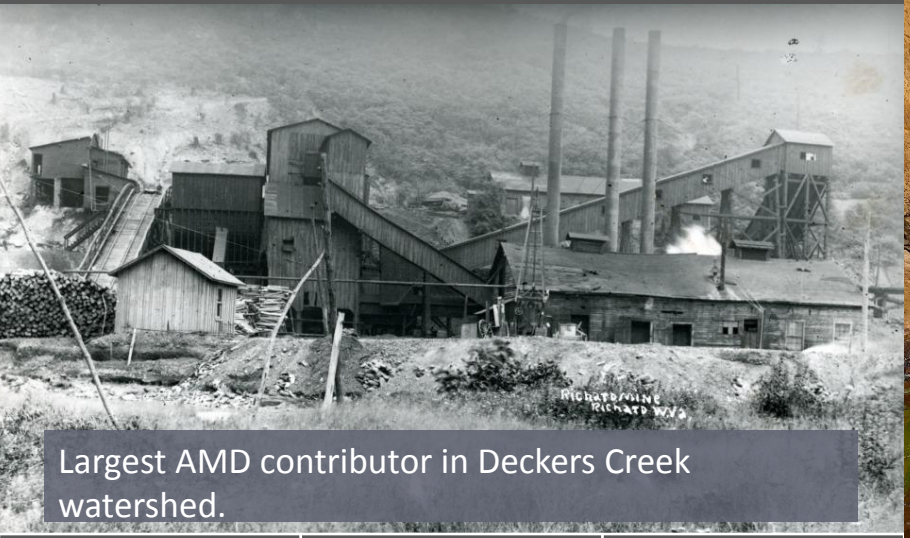


Water Quality

Physicochemical Parameters

- Power of Hydrogen (pH): How acidic or basic a solution
- Conductivity: A measure of water's ability to pass electrical flow
- Salinity: Total concentration of all dissolved salts in water
- Total Dissolved Solids (TDS): A measure of anything dissolved in water that is not an H2O molecule
- Temperature: A measurement of the average thermal energy of a substance
- Nitrates: A form a nitrogen including ammonia (NH3), nitrates (NO3) and nitrites (NO3)
- Dissolved Metals: Dissolved Iron and Dissolved Aluminum main focus of FODC treatment systems
- Flow: Volume of water moving passed a fixed point

The Richard Mine

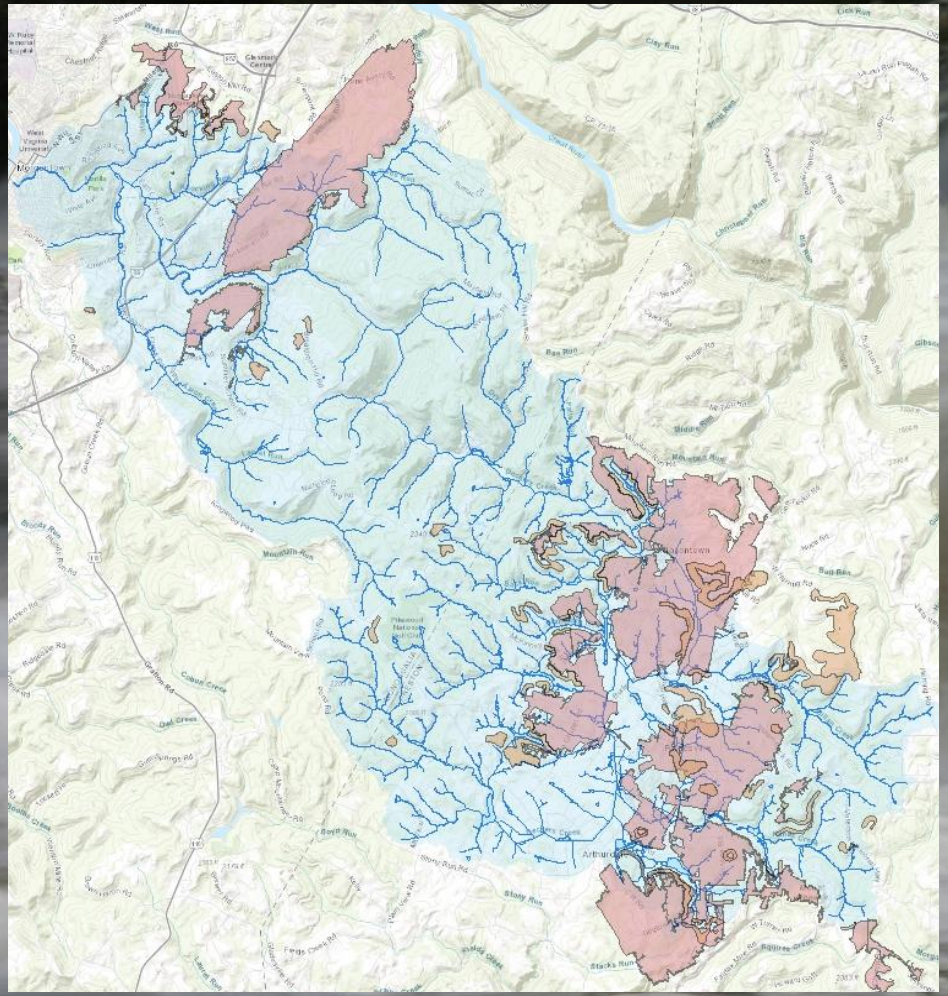


Largest AMD contributor in Deckers Creek watershed.

Iron	Aluminu	Manganes
26	13	25
Fe	**Al**	**Mn**
143,000 lbs / yr	59,000 lbs / yr	3,200 lbs / yr

	pH	Total Dissolved Solids (TDS) (ppm) or (mg/L)	Conductivity (µs/cm)	Salinity (ppm)
Good	6.5-8.0	150-250	170-250	300-500
Fair	6.0-6.5 8.0-9.0	250-350	250-400	200-300 500-600
Marginal	5.0-6.0 9.0-9.5	350-450	400-500	100-200 600-1000
Poor	<5.0 >9.5	>450	>500	<100 >1000

Acid Mine Drainage (AMD)

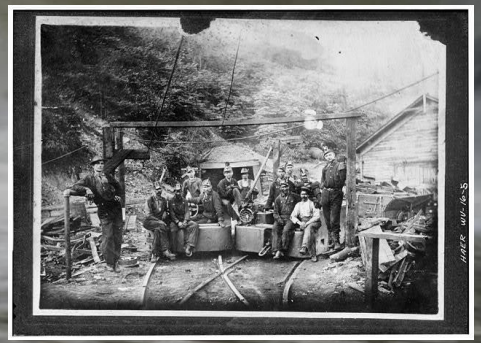


AMD flows from Legacy Mines, or mines closed before:

- Surface Mining Control and Reclamation Act (1977)

Coal Heritage:

- Diverse workforce, job creation, community creation
- 1927-1973 highest coal production in US (still second).



AMD Treatment Sites

Passive Sites

Input (mg/L)

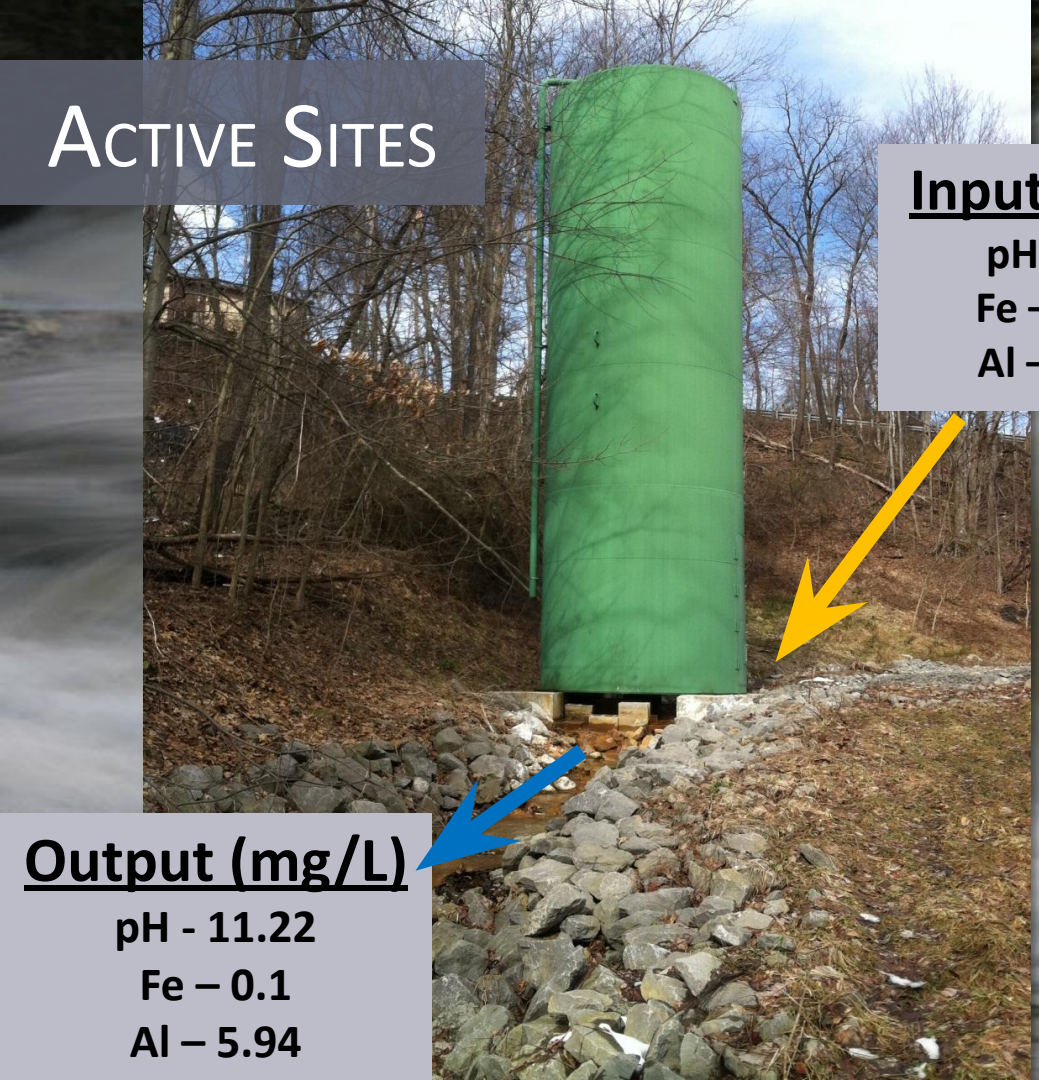
pH - 3.1
Fe – 9.70
Al – 10.17

- \+ Low cost
- \+ Low maintenance
- \+ Effective treatment
- \+ 24/7 treatment without power source
- \- Require large amounts of space & funds

Output (mg/L)

pH - 8.35
Fe – 0.16
Al – 0.08

Active Sites



Input (mg/L)

pH - 2.36
Fe – 97.59
Al – 37.98

Output (mg/L)

pH - 11.22
Fe – 0.1
Al – 5.94

+ Consistent treatment over system's lifespan
+ Arguably more effective
+ Less land required

- Higher cost
- Higher maintenance
- Requires outside power source

Ingrand

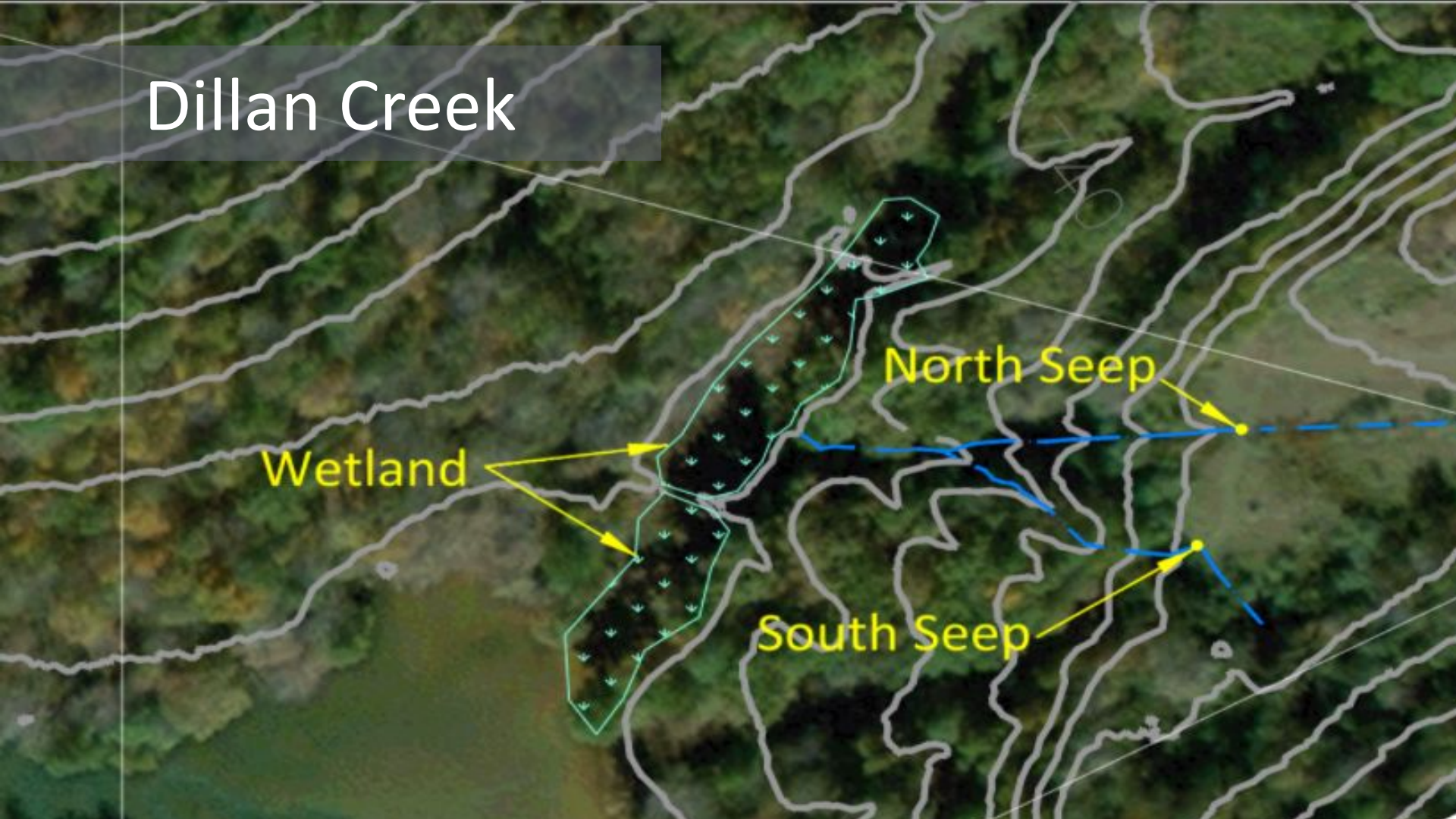
Kanes Creek South I

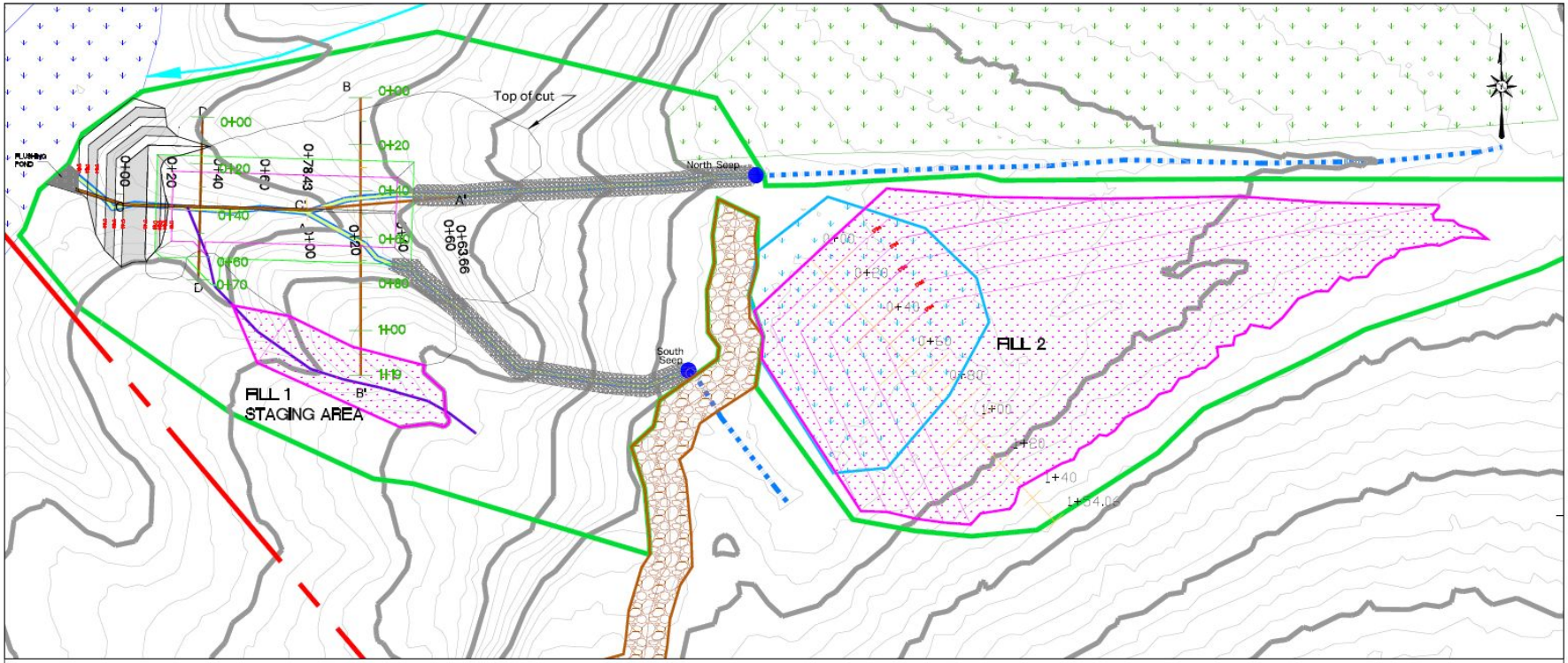
Upper Deckers - Before and After

Deckers Creek Gorge, 1995

Deckers Creek Gorge, 2017

Dillan Creek





LEGEND

- NWI Wetland
- Fill
- Bottom pond
- Top Pond
- Top of cut
- Channel below seep (Perennial)
- Channel above seep (Ephemeral)
- Dry channels
- Projected Stream Impacts
- Seeps
- Access Road

REV.	DATE	DESCRIPTION	BY

SHEET: 1 of 1 EXHIBIT:

DILLAN Creek AMD Remediation Phase 1

PREPARED BY:
101 Carriage Way, Suite 201
Hurricane, WV 25526
www.respec.com

SMA: NPDES:

FRIENDS OF DECKERS CREEK

Dillan Creek

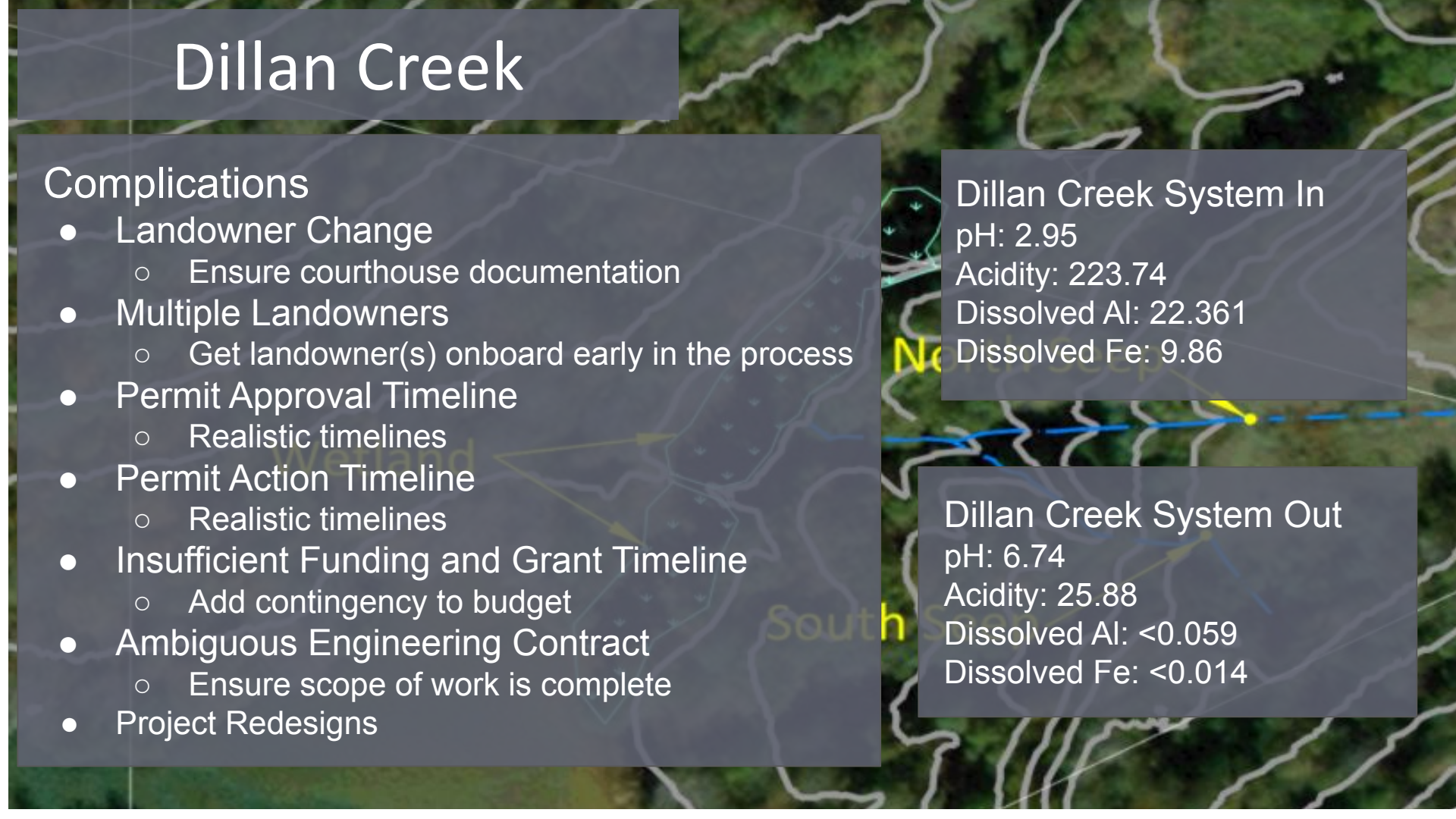
Dillan Creek

Dillan Creek

Dillan Creek

Complications

- Landowner Change
  - Ensure courthouse documentation
- Multiple Landowners
  - Get landowner(s) onboard early in the process
- Permit Approval Timeline
  - Realistic timelines
- Permit Action Timeline
  - Realistic timelines
- Insufficient Funding and Grant Timeline
  - Add contingency to budget
- Ambiguous Engineering Contract
  - Ensure scope of work is complete
- Project Redesigns



Dillan Creek System In

pH: 2.95
Acidity: 223.74
Dissolved Al: 22.361
Dissolved Fe: 9.86

Dillan Creek System Out

pH: 6.74
Acidity: 25.88
Dissolved Al: <0.059
Dissolved Fe: <0.014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DECKERS CREEK