

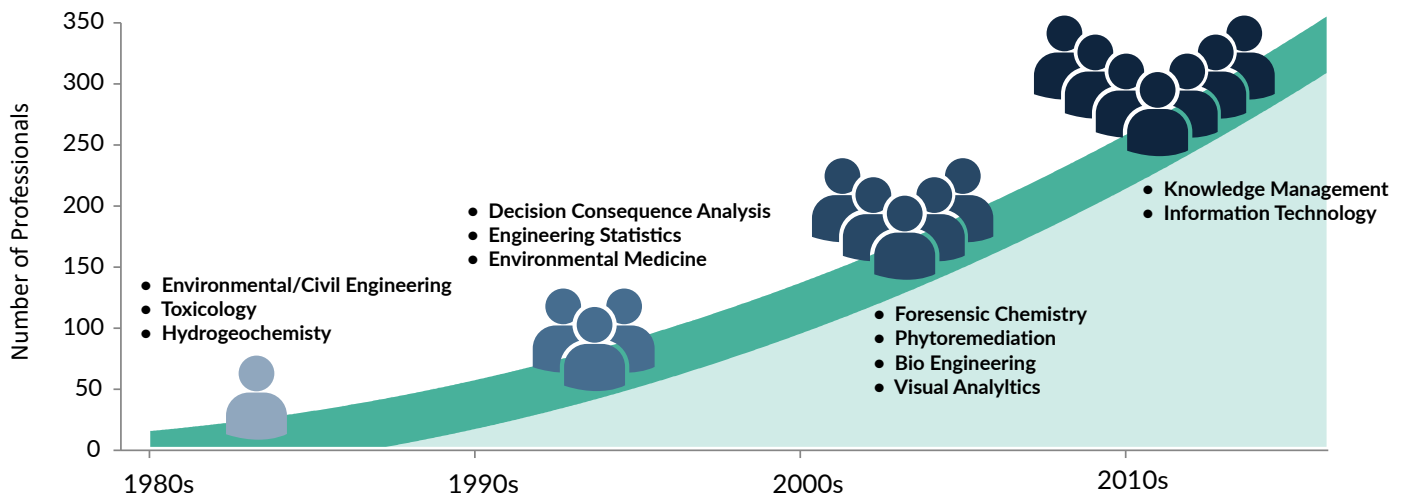


DISRUPTORS

Environmental Mitigation, Remediation, and Restoration (EnMRR)
NewFields, March 2019

Disruptors create value by meeting market needs with better, faster, safer and greener solutions. Across industries successful disruptors share common characteristics.





- Original core team of 10 engineers/scientists began EnMRR optimization projects in the 1980s.
- 350 professionals supported with a Research and Development Group dedicated to applying Disruptor concepts to EnMRR.

COMMONALITIES IN HIGH COST EnMRR PROJECTS

- Conflicting/Unrealistic Objectives
- Impractical/Overly Simplistic Metrics
- Incentives that Favor Expanding Scopes
- Unnecessary Friction in Converting Data to Actionable Intelligence

"It is bad to pay too much; it is much worse to pay too little"
- Benjamin Franklin

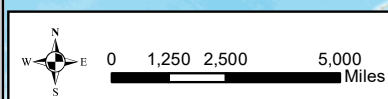
NewFields Remediation Enhancement Projects

Over 750 Enhancement Projects

Total \$50 Billion in Original Budget Estimates
 Cost Reduction Greater than \$10 Billion

LEGEND

- ★ NF Refinery Sites
- ▲ NF Portfolio
- NF Superfund Sites
- NF RCRA Sites
- NF Allocation Projects
- NF Reviewed DOD Bases



**Disruptor Model will provide Better, Faster, Safer,
 and Greener solutions.
 And, by reducing transaction friction,
 it reduces cost, often dramatically.**

How is a Disruptor model applied to environmental mitigation, remediation, and restoration?



Precise Measurable Benefits

- ✓ Protect Receptors
- ✓ Minimize Irrelevant Scope
- ✓ Accelerate Actual or De Facto Closure

**Better,
Faster,
Safer,
Greener**



Real Time Actionable Intelligence

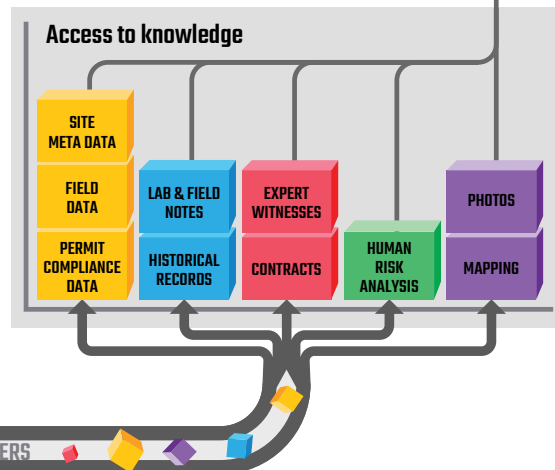
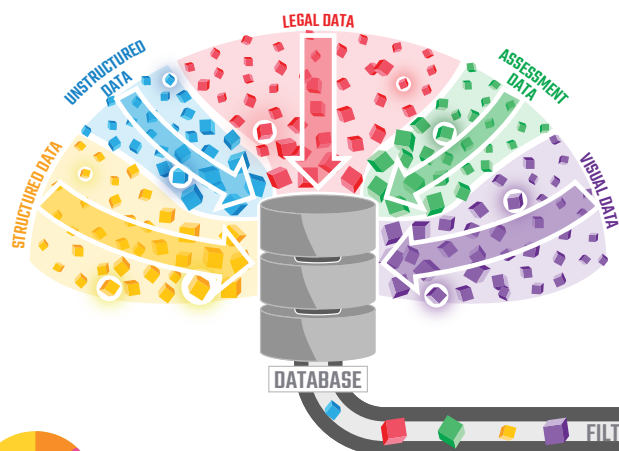


Filter Selection

- Soil
- Vapor Extent
- Risk Based Soil
- Soil Vacuum Extraction

Relevant Knowledge

Data
Analysis
Models
WebGIS
Logic Mapping
Provenance



Performance Simplicity

Control Sources, Enhance Attenuation, Nudge Ecosystems

Controlled

Enhanced

Nudged



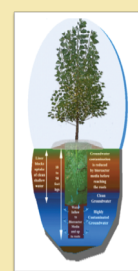
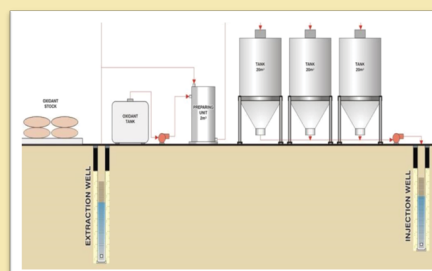
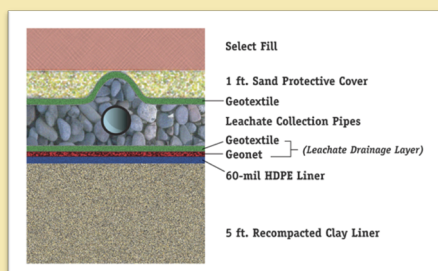
Excavation (Landfill)

Pump & Treat

Soil Washing

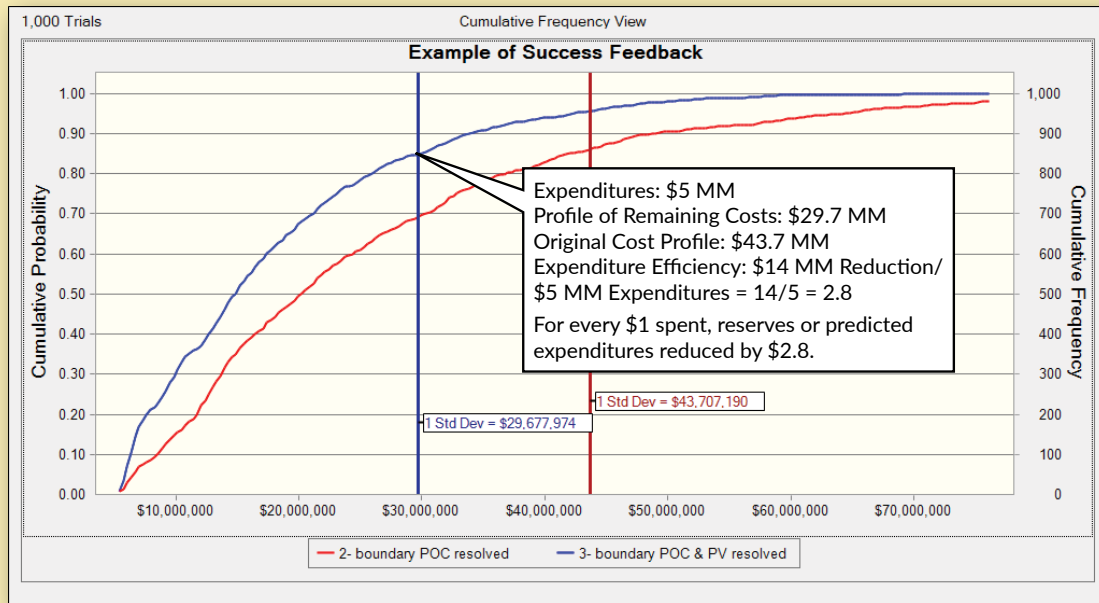
Bioremediation

Phytoremediation





Feedback



NewFields would be pleased to demonstrate how the Disruptor model protects the environment and your business mission.

TOPICS

1. **Characteristics of Problem Sites** Vague targets, conflicting incentives, information flow friction and elusive accountability
2. **Precise Measurable Benefit** You can't get to your destination until you agree what it is - Keep asking: Why or how is an action improving protection of a receptor?
3. **Actionable Intelligence** Real time data and knowledge conversion to actionable intelligence to decision makers
4. **Performance Simplicity** Enhance and nudge ecosystems – minimize complex and disruptive, engineered intervention with no practical exit criteria
5. **Feedback** Quantifying uncertainty and accountability – performance, schedule and cost



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