ALBANWISE
FARMING & ENVIRONMENTAL SERVICES

Soil Health and a Regenerative Approach (on a large arable/mixed farms)

Definitions

- There are numerous definitions

- regenerative agriculture has been defined in a variety of ways, and as differently as “a system of farming principles and practices that **increases biodiversity**, enriches **soils**, improves **water**sheds, and enhances **ecosystem** services” (Terra Genesis International, 2020), to “a long-term, holistic design that attempts to grow as much **food** using as **few resources** as possible in a way that revitalizes the soil rather than depleting it, while offering a solution to **carbon sequestration**” (Rhodes, 2017)

- Usually a **process**….. and an **outcome**

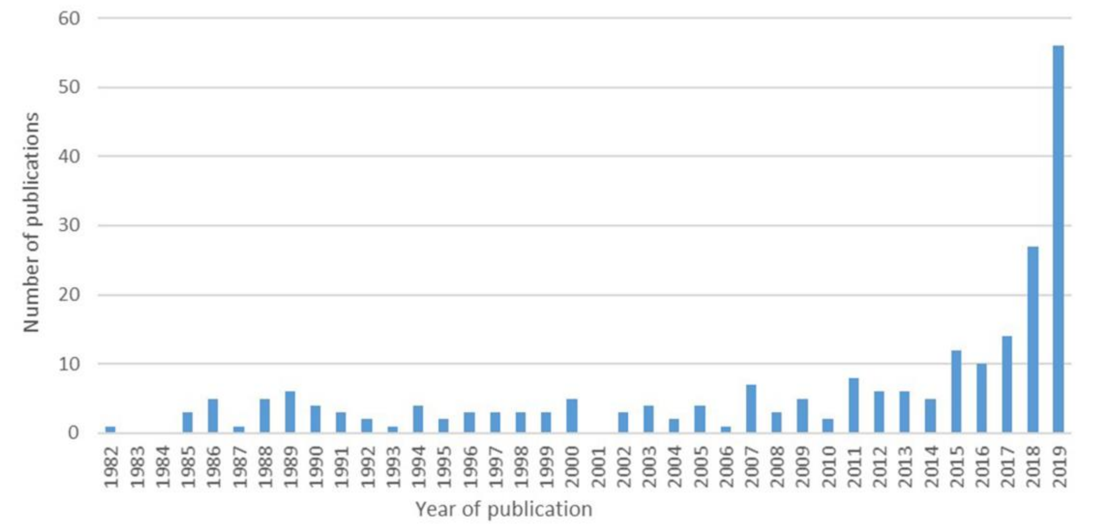
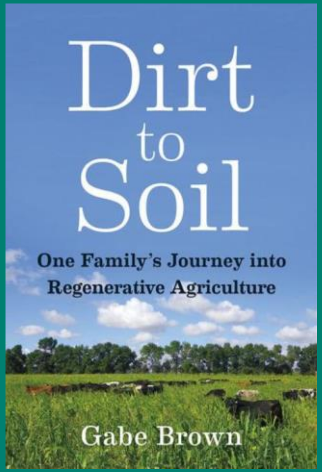
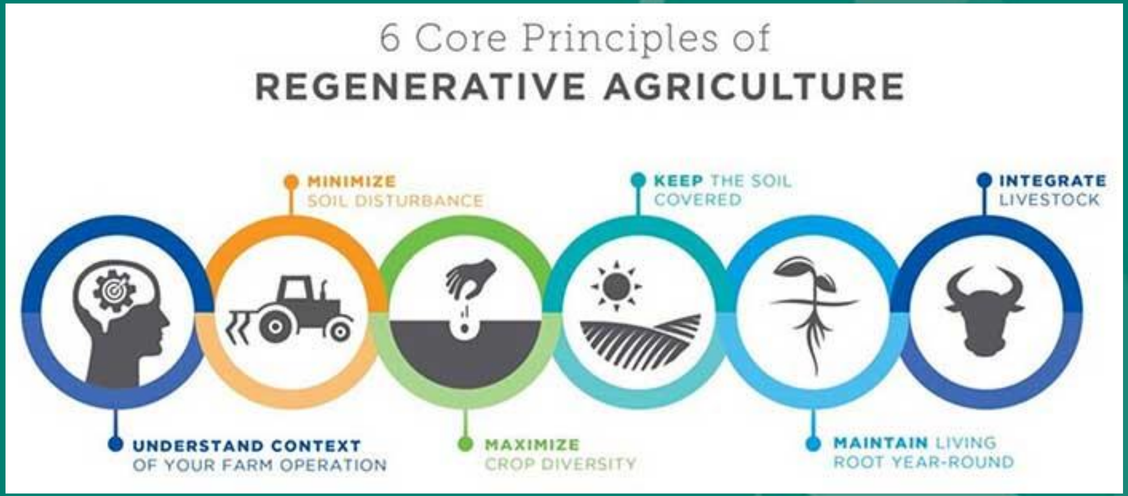


FIGURE 1 | Number of research articles that used the term “regenerative agriculture,” from 1982–2019.

Rhodes CJ (2017) The imperative for regenerative agriculture. Science Progress, 100, 80-129, DOI: https://doi.org/10.3184/003685017X14876775256165



Groundswell



https://knepp.co.uk/knepp-estate/agriculture/regenerative-agriculture/

ALBANWISE
FARMING & ENVIRONMENTAL SERVICES


syngenta.
CONSERVATION AGRICULTURE & SUSTAINABLE FARMING SYSTEMS
UK Agriculture is moving towards a more sustainable farming system. However, there is a need to understand, identify and assess the potential benefits of conservation agriculture and the challenges it poses for adoption to be successful.
OUR PROJECT:
• Focusing on three different cultivation systems at field scale
• Two UK farms on contrasting soils
• Five-year whole farm rotation
• European project across five countries
• Working alongside farmers, researchers and industry specialists to understand the complexity and riskiness of the systems to provide practical advice for sustainable farming adoption
UNDERSTANDING IMPACTS OF DIFFERENT FARMING SYSTEMS:
RISKINESS
SUSTAINABILITY
AGRONOMY
ECONOMICAL
SOCIAL
ECO-LOGICAL
PROFITABILITY
FIELD OPERATIONS
COMPLEXITY
PRODUCTIVITY
3 FARMING SYSTEMS:
CONVENTIONAL BASED ON GOOD AGRICULTURAL PRACTICE E.G. INVERSION TILLAGE WITH WINTER AND SPRING CROPS
SUSTAINABLE SYSTEM 1 BASED ON NON-INVERSION PRACTICES, INCLUDING CATCH AND COVER CROPS
SUSTAINABLE SYSTEM 2 BASED ON A MORE DIRECT DRILL APPROACH, INCLUDING CATCH AND COVER CROPS
SUSTAINABLE FARMING
SCAN HERE FOR MORE INFORMATION ON SUSTAINABLE FARMING

Conservation agriculture crop establishment techniques can deliver up to 18% uplift in growers net profits, whilst also providing significant enhancement of key environmental and ecological measures, according to the latest findings of the Syngenta Sustainable Farming Initiative.

Presented at the Groundswell event - the UK's leading regenerative agriculture showcase - the five-year project's mid-point review has shown positive returns for financial performance, biodiversity and soil health on the farms involved.

syngenta. Presented at Groundswell 2022

Building a regenerative approach in the UK

- Conservation agricultural (the foundation block) to regenerative/restorative systems
- **Reduced Cultivations**
- **Wider Rotations**
- **Soil Cover**
- **Living Roots**

+

- **Grass, Livestock**

CARBON

Economic

Cleaner water

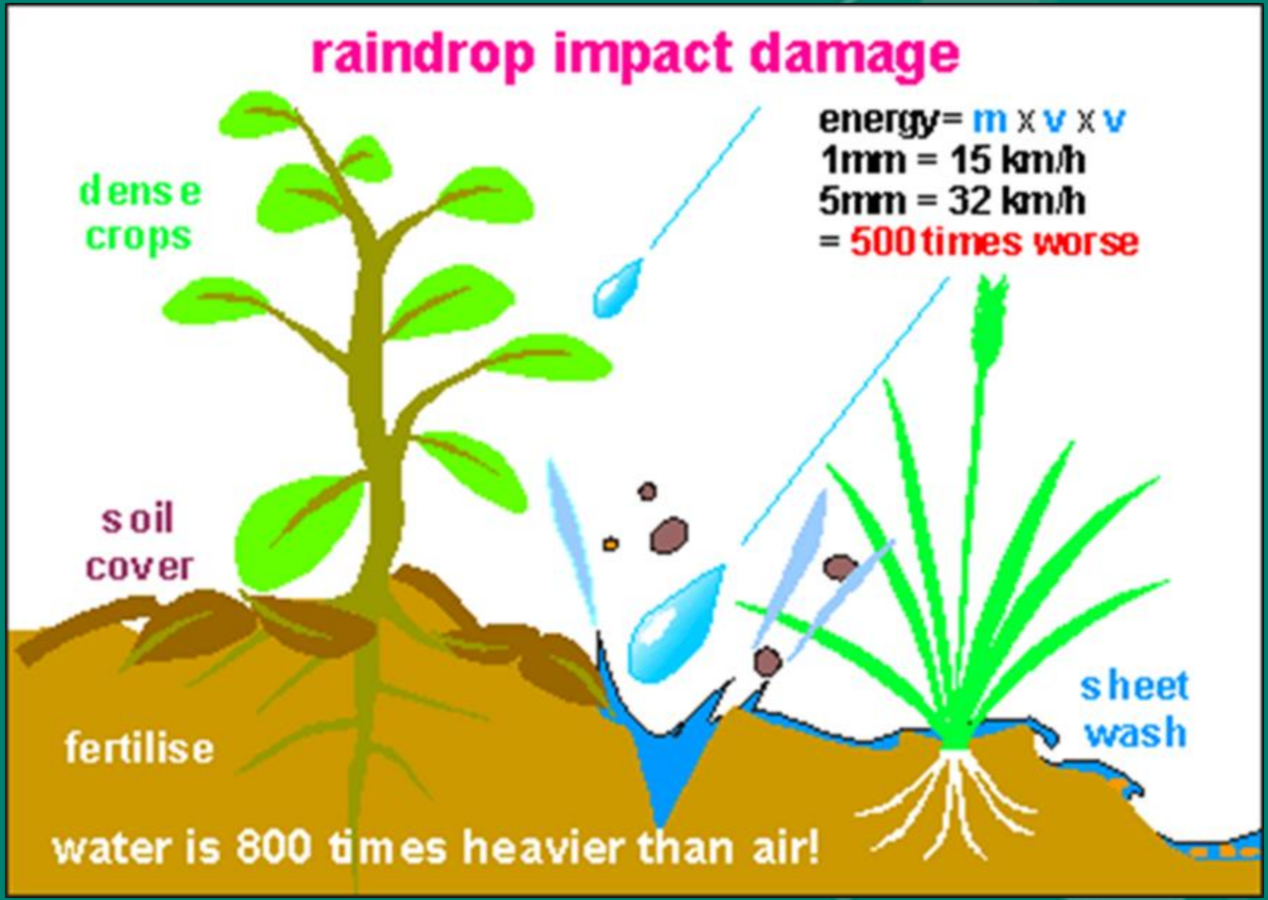
Better soil health

Carbon sequestration

Increased Biodiversity

ALBANWISE
FARMING & ENVIRONMENTAL SERVICES

Soil Cover -The importance of intercepting rain



Dr J Floor Anthoni (2000)

AHDB soil health scorecard

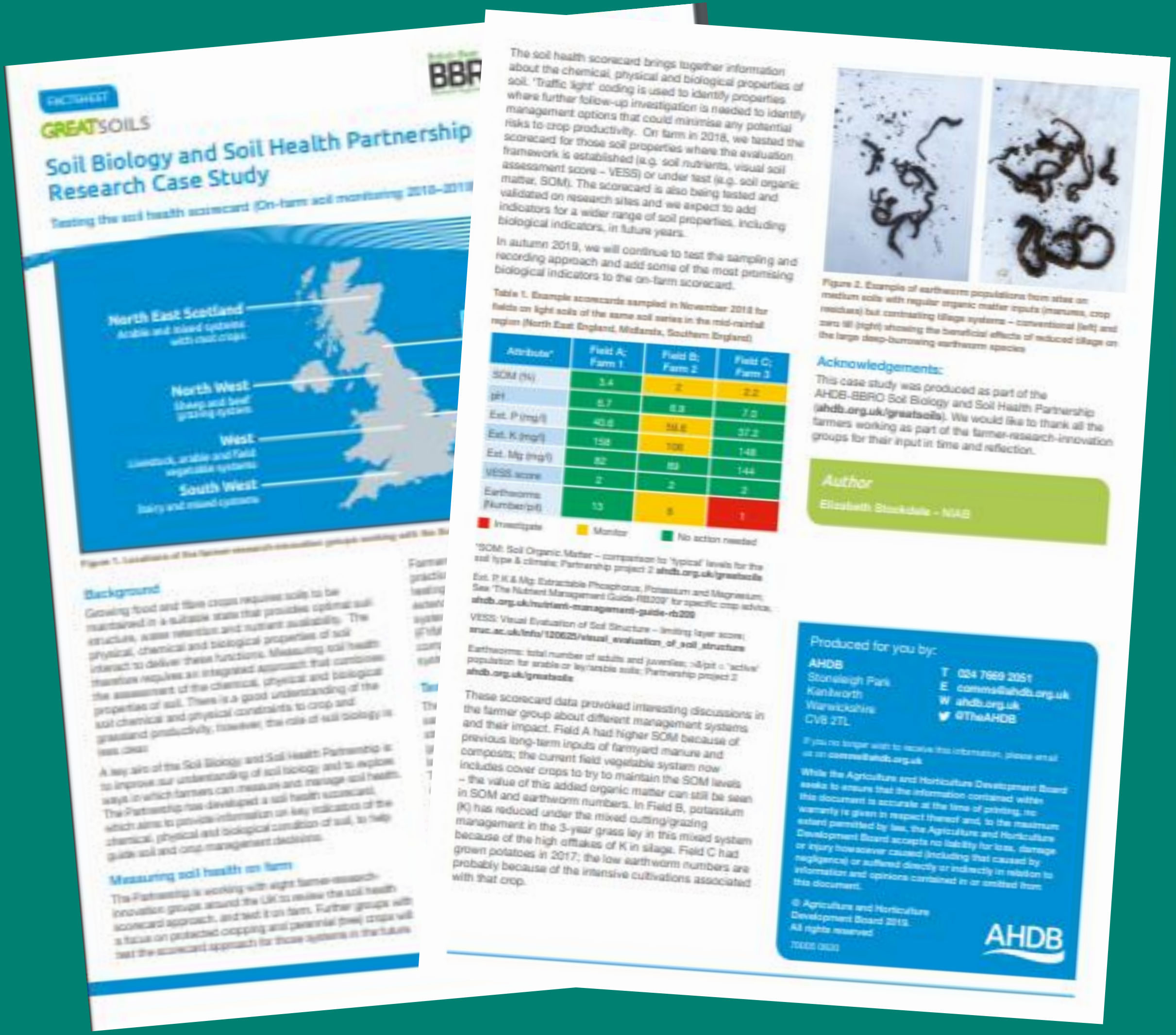


Table 1. Example scorecards sampled in November 2018 for fields on light soils of the same soil series in the mid-rainfall region (North East England, Midlands, Southern England)

Attribute*	Field A; Farm 1	Field B; Farm 2	Field C; Farm 3
SOM (%)	3.4	2	2.2
pH	6.7	6.9	7.0
Ext. P (mg/l)	40.6	59.6	37.2
Ext. K (mg/l)	158	106	148
Ext. Mg (mg/l)	82	89	144
VESS score	2	2	2
Earthworms (Number/pit)	13	8	1

Investigate | Monitor | No action needed

ALBANWISE
FARMING & ENVIRONMENTAL SERVICES

Table 8. Indicative main effects of nine regenerative systems (expressed as effect of intervention divided by baseline) with illustrative references

Regenerative Intervention	Counterfactual or baseline	Soil carbon	On-farm biodiversity	Mean crop, grass or livestock yield	Input costs	Tree carbon and products
Conservation agriculture	Crop production with intensive tillage	1.09 (Haddaway et al. 2017)	~1.00 (Doran 1980)	0.86-1.01 (Pittelkow et al. 2015)	Lower (Huggins and Reganold 2008)	0
Regenerative organic (e.g. organic crop production with organic amendments)	Crop production with fertilizers and/or agrochemicals	1.07-1.09 (Mondelaers et al. 2009; Tuomisto et al. 2012)	1.30-1.50 (Bengtsson et al. 2005)	0.48-0.92 (Clark & Tilman 2017; Cooper et al. 2016)	Lower to higher (LaCanne and Lundgren 2018; Crowder and Reganold 2015)	0
	Crop production with no amendments or fertilizers	1.07-1.09 (Mondelaers et al. 2009; Tuomisto et al. 2012)	Inconclusive	1.01-1.07 (Hijbeek et al. 2017)	Higher (Crowder and Reganold 2015)	0
Tree crops	Annual crop production	1.18 (Guo and Gifford 2002)	Higher (Simon et al. 2010)	0.75-1.60 (Bidogeza et al. 2015)	Inconclusive	Higher
Tree intercropping	Annual crop production	1.16 (Kim et al. 2016)	1.37 (Torralba et al. 2016)	0.42-1.00[a] (Garcia de Jalon et al. 2018a)	Lower to higher (Garcia de Jalon et al. 2018b)	Higher
Multistrata agroforestry	Monoculture permanent crops	1.57 (Zake et al. 2015)	Higher (De Beenhouwer et al.2013)	Variable (Niether et al. 2019)	Inconclusive	Higher
Silvopasture	Grassland	1.00-1.18 (Upson et al., 2013; Seddaiu et al. 2018)	1.21 (Torralba et al. 2016)	0.77-1.18[a] (Seddaiu et al. 2018) (Torralba et al. 2016)	Similar to higher (Garcia de Jalon et al. 2018b)	Higher
Multi-paddock Grassland	Grassland; continuously grazed	0.99-1.50 (Sanderman et al. 2015; Teague et al. 2011)	Inconclusive	0.98-1.00[b] (Hawkins 2017) (Derner and Hart 2007)	Higher (Hawkins 2017)	0
Grassland receiving organic fertiliser but not synthetic fertilizer	Grassland: receiving synthetic fertilizer	1.20 (Kidd et al. 2015)	Higher (Mueller et al. 2014)	0.70-1.50 (Mueller et al. 2014) (Kidd et al. 2015)	Inconclusive	0
	Grassland: receiving no fertilizer	1.30 (Gravuer et al. 2019)	0.94 (Gravuer et al. 2019)	1.98 (Gravuer et al. 2019)	Inconclusive	0
Rewilding and abandonment of agriculture	Crop and grazing systems	Higher (Conant et al. 2001)	Variable (Rey Benayas et al. 2007) (Lasanta et al. 2015)	0.11-0.80 (Cerqueira et al. 2015) (derived from Spencer 2017)	Inconclusive	Higher

[a]: Crop and grass yield responses in agroforestry are very sensitive to number of trees per unit area;
[b]: Whilst grass production may be similar; multi-paddock systems may allow higher stocking rates.

Positive effect: [ ] Positive/similar: [ ] Similar or very variable: [ ] Similar or negative: [ ] Negative: [ ]

Each of the nine selected regenerative systems demonstrates positive impacts in terms of increased **soil carbon and/or on-farm biodiversity**

ALBANWISE
FARMING & ENVIRONMENTAL SERVICES

Albanwise Cultivations

Difficult harvest conditions often make extra cultivations necessary.

Reduced cultivations lead to less fuel and aid increases in organic matter in soil, all positive for net zero journey.

NET ZERO 2030

ALBANWISE
FARMING & ENVIRONMENTAL SERVICES

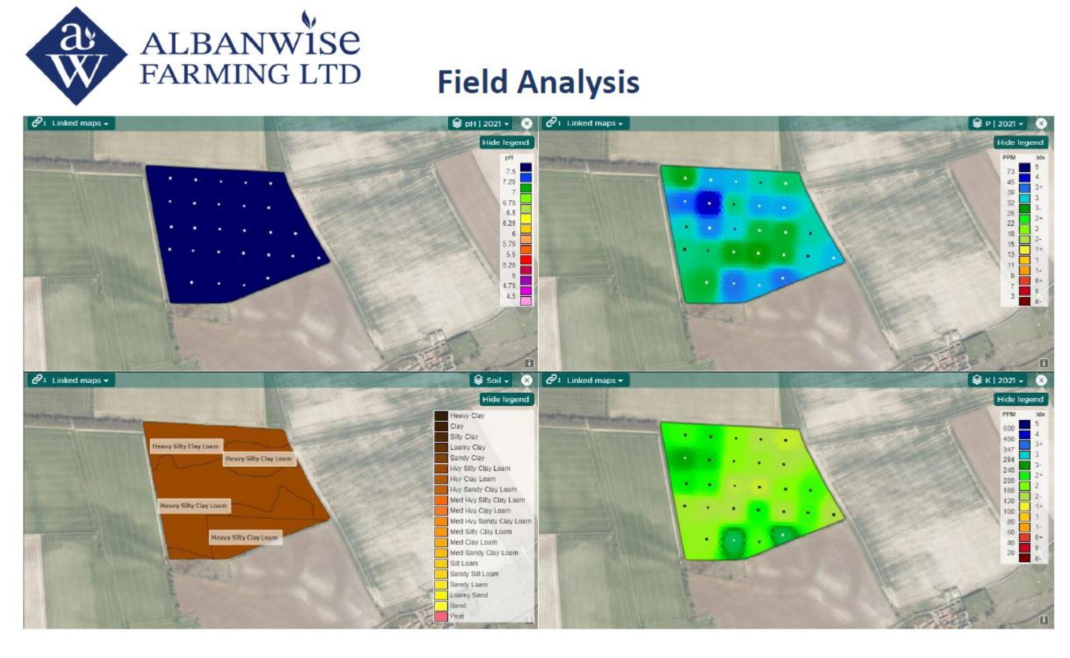
Albanwise Cultivations

More difficult with potatoes.

However, strip reduced tillage is possible for Maize and Sugar Beet area.

AFL have implemented reduced tillage practices in West Norfolk and North Norfolk with the inclusion of cultivator drills such as the Claydon drill.

Albanwise Cultivations - Trials

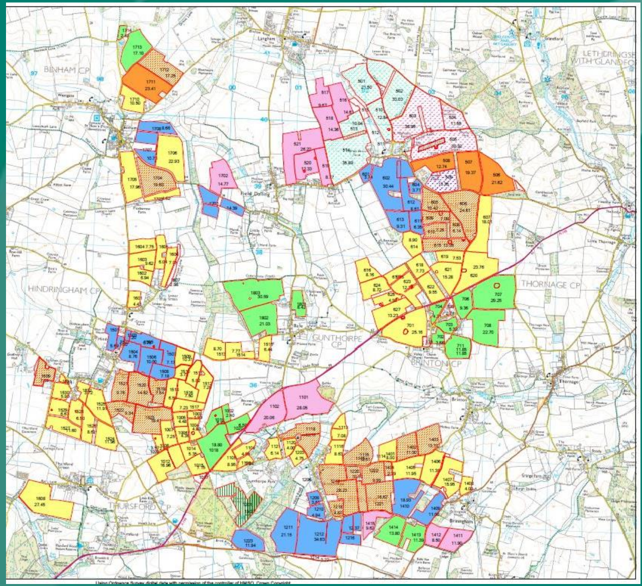


Albanwise Rotations

Diverse rotations – peas, beans, sunflowers, sugar beet, maize, cereals, potatoes,

Herbal leys ~ next step – Stewardship or SFI?

All farms have comprehensive stewardship.



ALBANWISE
FARMING & ENVIRONMENTAL SERVICES

Cover Crops

Herbal leys within an arable rotation

Using natural fertility building systems to boost soil condition.

Nitrogen fixing leguminous plants build soil N whilst deep rooting plants within the mix will break up compaction and harvest nutrients from deeper in the soil profile.

Lots of natural drought tolerance as well.

ALBANWISE FARMING & ENVIRONMENTAL SERVICES

Albanwise Soil Cover

- With the introduction of more cover and companion crops this has increased our soil cover during the growing season.

- Cultivation Challenges with root crops, crop volunteers – strip tillage?

- Overgrazing cover crops reduces soil cover.

ALBANWISE
FARMING & ENVIRONMENTAL SERVICES

Livestock

ALBANWISE
FARMING & ENVIRONMENTAL SERVICES