



When Cleanup Gets Complicated

Bioremediation, Emergency Response, and Environmental Cleanup

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Micro-Bac International · Arkansas Environmental Federation



Micro-Bac has made working bacteria since 1979

We manufacture natural, non-pathogenic microbial products in Round Rock, Texas, and support the contractors and service providers who apply them with our own laboratory.

1979

founded in Texas

234

projects

23

countries

3.5M m³

soil remediated



Sister company BioRemedy runs 24/7 emergency response and remediation in Central Texas.

Cleanup gets complicated when the usual tools run out



You can't dig it out

The waste is in a waterway, under a building or next to utilities, or in-water work is restricted.



Hauling is the budget

Dredging, pump-outs and landfill disposal cost more than the cleanup itself.



It keeps coming back

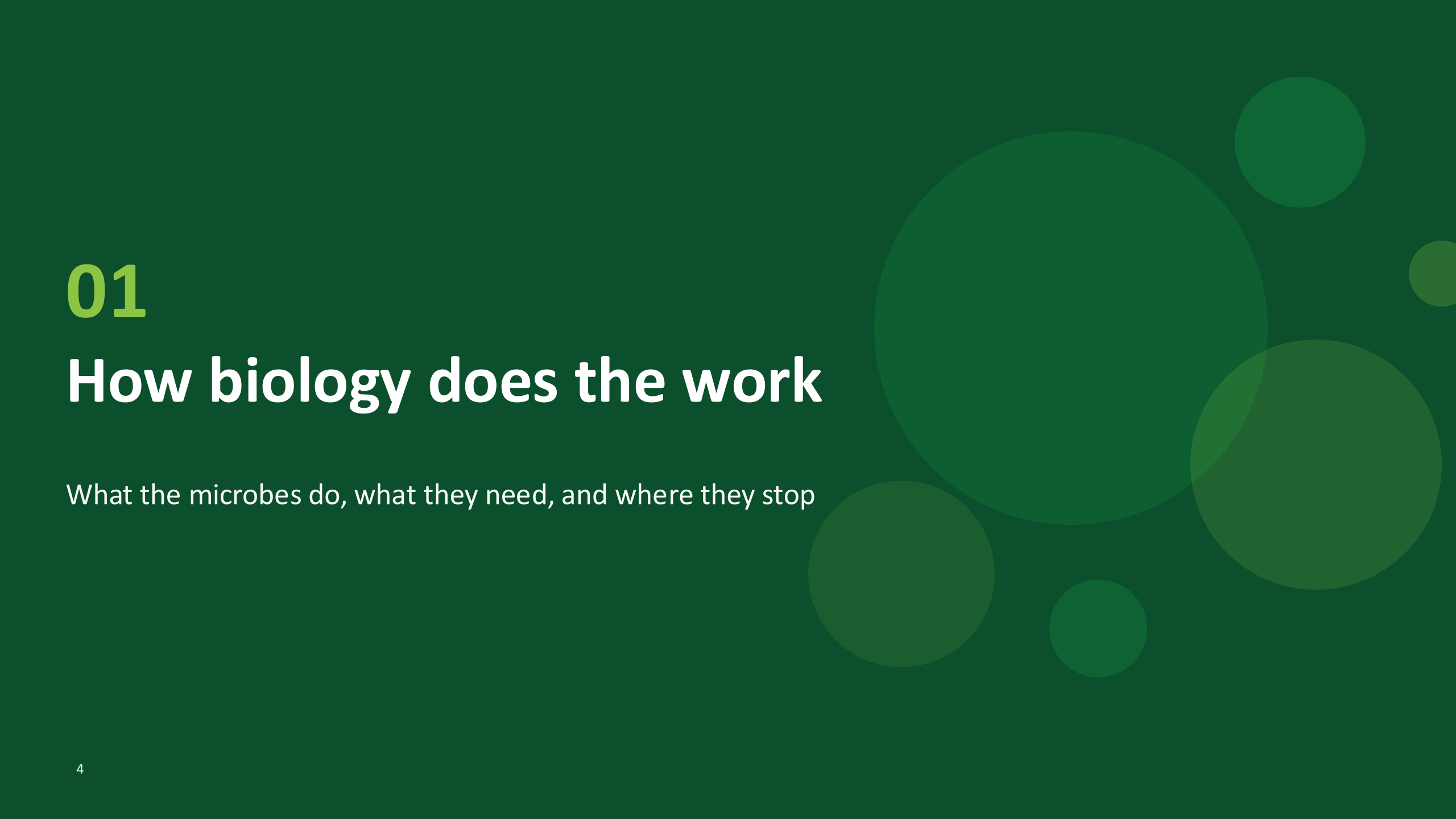
Sludge, grease and odor rebuild between every pump-out.



People want proof

Regulators, insurers and neighbors want lab data, not a clean-looking site.

Biology treats the waste where it sits, and keeps working after the crew leaves.

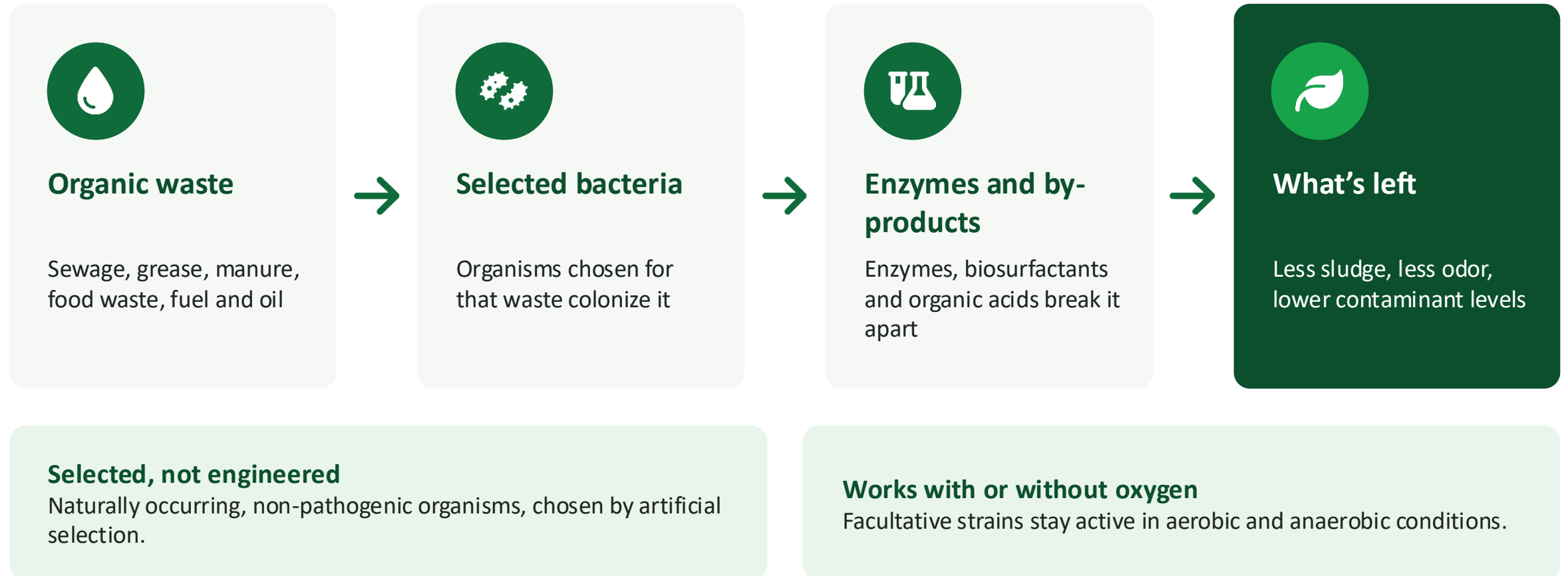


01

How biology does the work

What the microbes do, what they need, and where they stop

Microbes treat waste as food



What biology can and can't break down



Readily degradable

- Sewage, fats, oils and grease
- Manure and food-processing waste
- Fuels and most volatile compounds
- Many semi-volatiles, smaller PAHs



Slower and site-dependent

- Larger PAHs
- PCBs
- Some pesticides
- PFAS (still in research)



Not biodegradable

- Metals
- Inorganic scales

Harder compounds start with a lab treatability test, and often combine removal with treatment.



WHY SOME PROGRAMS FAIL

Conditions decide the outcome



Oxygen

Most hydrocarbons degrade faster with it; chlorinated solvents need low oxygen.



Moisture

Dry soil stalls the organisms.



Nutrients

Nitrogen and phosphorus have to be available.



pH and temperature

Cold or extreme pH slows everything down.



The contaminant

Its level, mobility and toxicity set the dose and the timeline.

Most “bacteria didn’t work” stories come from a condition nobody measured.

02

Waste and wastewater

Septic and collection systems, lagoons, animal waste

Break the waste down before it becomes a backup



Grease traps and drain lines

Dosed upstream of the trap, so fats, oils and grease break down before they harden in the lines.

Fewer backups and odors between pump-outs



Lift stations and collection

Dosed into or ahead of the station to break down the grease mat and organic solids.

Less odor, fewer pump calls



Septic systems

An initial dose after pumping, then monthly maintenance.

Less sludge and odor

-59%

solids hauled for disposal at a Houston-area utility district after microbial treatment of the plant's process.

Reduce lagoon sludge without dredging

≈90%

less sludge in a food-processor lagoon

≈85%

below the cost of dredging it

How a lagoon program runs

1

Measure

Sludge depth, flow and retention time set the dose.

2

Shock dose

A heavy first dose establishes the organisms.

3

Maintain

Regular dosing matched to retention time keeps them working.

4

Re-measure

Sludge depth is checked again to prove the change.

Livestock pits and lagoons that pump more easily



Manure solids break down

Bacteria digest manure solids and milk wastes in pits and lagoons.



Less odor

Less decaying sludge means less odor at the fence line.



Easier to pump and agitate

Thinner sludge moves, so lagoons hold capacity longer.

The dosing rhythm

1

Initial dosing plan

2

Monthly
maintenance

3

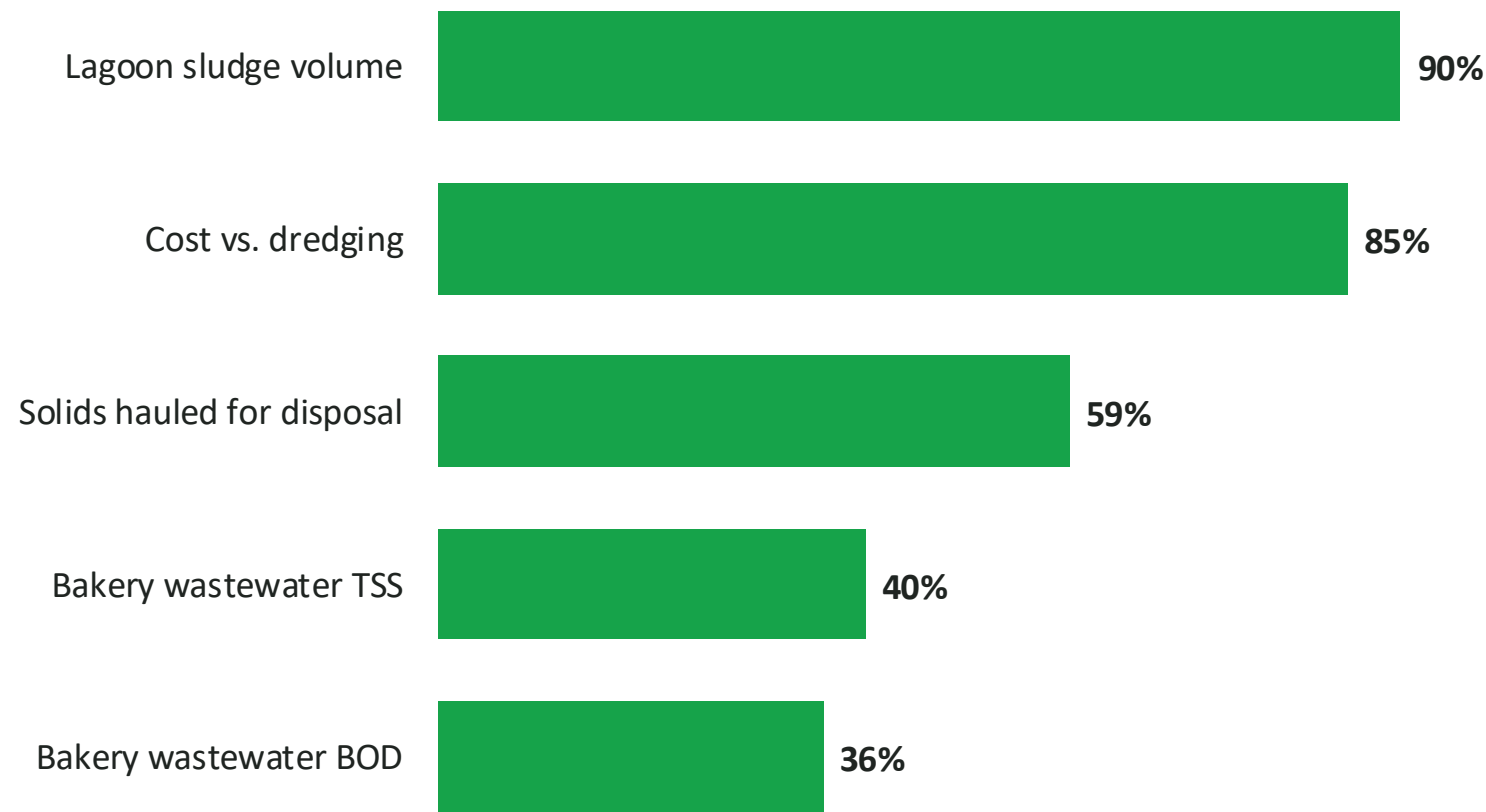
Periodic shock
treatments

In the field

Long-running hog-production programs, including with Seaboard Foods.

RESULTS

What the reductions look like



Food-processor lagoon

Sludge down about 90%, at about 85% less than dredging.

Utility district

Solids disposal down 59%.

Regional bakery

TSS down about 40%, BOD about 36%, cutting sewer surcharges.

03

Emergency response

Spills, releases and contaminated ground

In a spill, biology finishes the job



STEP 1

Contain

Boom the outfall and protect drains.



STEP 2

Recover

Skim and vacuum free product.



STEP 3

Clean

Hot-water wash hard surfaces and recover the water.



STEP 4

Treat

Apply microbes to what can't be removed.



STEP 5

Verify

Sample until the lab says it's done.

Treatment matters most where removal stops: creek banks, storm drains, ponds, and soil you can't excavate.



CASE · NORTH AUSTIN, TEXAS · 2024

Hospital sewage in a shared pond

THE COMPLICATION

Wastewater from a manhole overflow ran through a storm drain into a pond managed by two cities. Draining and dredging was the default plan.

WHAT WE DID

Contained the pond and treated it in place with a blend formulated for that wastewater, spray-applied over three weeks.

\$10M+

dig-and-haul estimate

\$1.1M

actual cost, treated in
place

3 weeks

of treatment



CASE · AUSTIN, TEXAS · 2024

Diesel in a storm drain and river

THE COMPLICATION

A truck rollover sent about 100 gallons of diesel into a storm drain that discharges to a river. The city restricted in-water work, so the banks could not be excavated.

WHAT WE DID

Boomed the outfall, then applied a microbial solution from a spray trailer once a week for three weeks.

~100 gal

diesel released

3

weekly applications

Non-detect

for hydrocarbons, week
four



CASE · PFLUGERVILLE, TEXAS · 2025

Cooking grease in a storm drain

THE COMPLICATION

About 200 gallons of commercial cooking oil and grease entered a street storm drain, with significant rain forecast within two hours.

WHAT WE DID

Boomed and vacuumed the bulk, hot-water washed the road, culvert and a confined-space outfall, then treated the drain system and river for residual grease.

20 min

from call to on site

~200 gal

grease released

Non-detect

in post-treatment river
samples



ENVIRONMENTAL CONTAMINATION

Soil and groundwater, treated in place

Petroleum in soil

Sprayed, mixed or injected with a nutrient, in place or in a land-treatment cell. It cuts hauling and landfill cost.

45,000 m³

of oil-impacted rainforest soil restored in Ecuador

Solvents in groundwater

PCE and TCE plumes are treated through injection points, then monitored toward a closure target.

25 points

in a Florida PCE program now in monitoring; target 0.03 ppm

PFAS: promising in the lab, unproven in the field

2022



Work begins on bacterial strains for PFOS

2024



Lab trial starts

2026



Lab-trial success reported

Next



Field trials in preparation



We are not making field performance claims until field data exists. If you have a PFAS site and want to be part of a trial, come talk to me.

04

Your turn

When to reach for biology, and bring us your problem

When to reach for biology



A good fit when

- The waste is organic: sewage, grease, manure, fuel or oil
- Digging, dredging or in-water work is restricted
- Hauling and disposal dominate the budget
- The problem keeps coming back between pump-outs
- You have days or weeks, and can sample



Use other tools first when

- There is free product to contain and recover
- The contaminant is a metal or inorganic
- The site must be clean in hours, not weeks
- Nobody can manage moisture, nutrients or oxygen
- There is no plan to monitor

Three things to take home

1

Biology is a tool with rules

It works on organic waste and fuels, under conditions someone measures and manages.

2

It pays where removal is hard

Ponds, creeks, lagoons and storm drains: places where digging and dredging cost the most.

3

Proof is lab data

Sludge depth, BOD and non-detect results are what close a job.

THE LAST 10 MINUTES

Stump the Microbiologist

Bring your real problem: lagoons, lift stations, pretreatment, spills, odor.

Need a starter?

- 1 My lagoon is losing capacity. Do I have to dredge?
- 2 My pretreatment keeps failing and I'm paying surcharges.
- 3 What do I do in the first hour of a manure or wastewater release?

Questions?

Bring me your complicated cleanup.

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