

From: [Carol McClelland Fields](#)
To: [Coffin Butte Landfill Appeals](#)
Subject: Oppose/Deny LU-24-027 – Odor Complaints - Odor Patrols - Carol McClelland Fields
Date: Sunday, October 19, 2025 10:32:29 PM
Attachments: [Resource 1 - Why Landfill Gas Stinks - google search.pdf](#)
[Testimony - Oppose LU-24-027 - Carol McClelland Fields 10.19.25 - Odor Complaints - Odor Patrols.pdf](#)
[Resource 4 - EPA - Enforcement Alert - EPA Finds MSW Landfills are Violating Monitoring a - www.epa.gov.pdf](#)
[Resource 2 - Loews - Oregon landfills use loophole to avoid methane monitoring Study - www.statesmanjournal.com.pdf](#)
[Resource 3 - Beyond Toxics - Oregons-Secret-Climate-Killers-Feb-2025.pdf](#)

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Hello,

I've attached my testimony and supporting reference documents.

Please add them to the record for LU-24-027.

Please note: Allow the large pdfs to fully populate before saving them. Otherwise the full documents are not saved and cannot be accessed.

Thank you.

Carol

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**Carol McClelland Fields, PhD, BCC**  
541 243 3675

Coffin Butte landfill gas stinks because it contains several foul-smelling compounds, primarily methyl mercaptan, isopropyl mercaptan, and dimethyl sulfide, along with hydrogen sulfide, which all contribute to a strong "rotten egg" or "rotten cabbage" like odor, even at very low concentrations, due to their extreme pungency and ability to be detected by humans at very low levels. 

**Key points about the odor components of Coffin Butte landfill gas:**

**Hydrogen sulfide (H<sub>2</sub>S):**

Known for its rotten egg smell, can cause irritation to eyes, throat, and respiratory system even at low levels, and may lead to headaches, dizziness, and memory issues with long-term exposure. 

**Methyl mercaptan (CH<sub>3</sub>SH):**

Has a strong "fart" or "asparagus-pee" smell, and is detectable by humans at very low concentrations, making it a significant contributor to the landfill's unpleasant odor. 

**Isopropyl mercaptan (C<sub>3</sub>H<sub>8</sub>S):**

Possesses a potent skunk-like smell, further adding to the offensiveness of the landfill gas. 

**Dimethyl sulfide [(CH<sub>3</sub>)<sub>2</sub>S]:**

Associated with a rotten cabbage smell, also contributing to the overall odor profile of the landfill gas. 

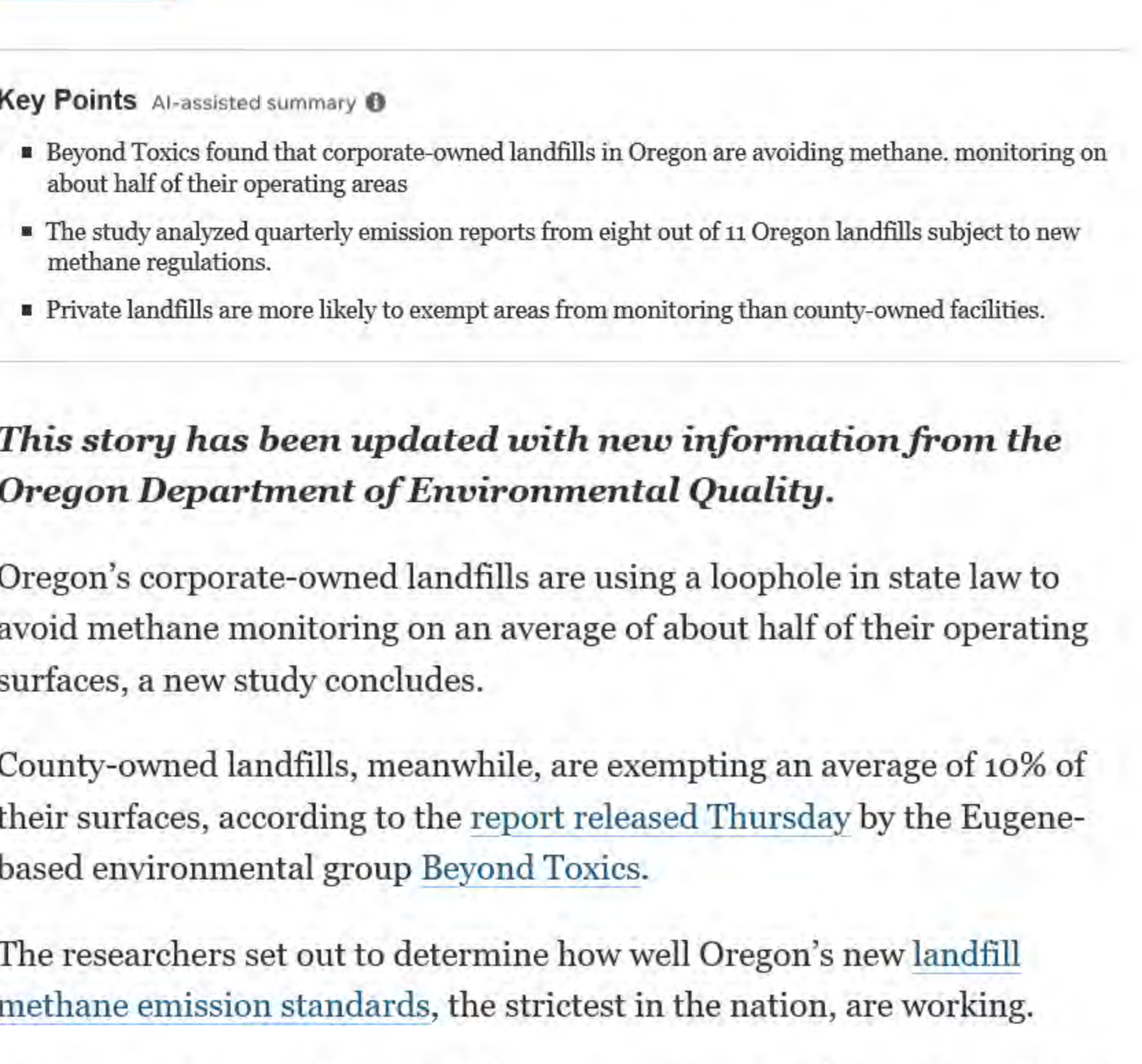
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ENVIRONMENT

# Oregon corporate landfills using loophole to avoid methane monitoring, study finds

**Tracy Loew**  
Salem Statesman Journal

March 6, 2025 Updated March 7, 2025, 8:55 p.m. PT



**Wildfire burns near Halls Ridge communications tower**  
Video of the Beachie Creek Fire burning near a radio tower on Halls Ridge above Detroit on Sept. 8, 2020.

**Key Points** AI-assisted summary

- Beyond Toxics found that corporate-owned landfills in Oregon are avoiding methane monitoring on about half of their operating areas
- The study analyzed quarterly emission reports from eight out of 11 Oregon landfills subject to new methane regulations.
- Private landfills are more likely to exempt areas from monitoring than county-owned facilities.

**This story has been updated with new information from the Oregon Department of Environmental Quality.**

Oregon’s corporate-owned landfills are using a loophole in state law to avoid methane monitoring on an average of about half of their operating surfaces, a new study concludes.

County-owned landfills, meanwhile, are exempting an average of 10% of their surfaces, according to the report released Thursday by the Eugene-based environmental group [Beyond Toxics](#).

The researchers set out to determine how well Oregon’s new [landfill methane emission standards](#), the strictest in the nation, are working.

Landfills are among the nation’s largest sources of methane, a greenhouse gas more potent than carbon dioxide and a major contributor to climate change, according to the U.S. Environmental Protection Agency.

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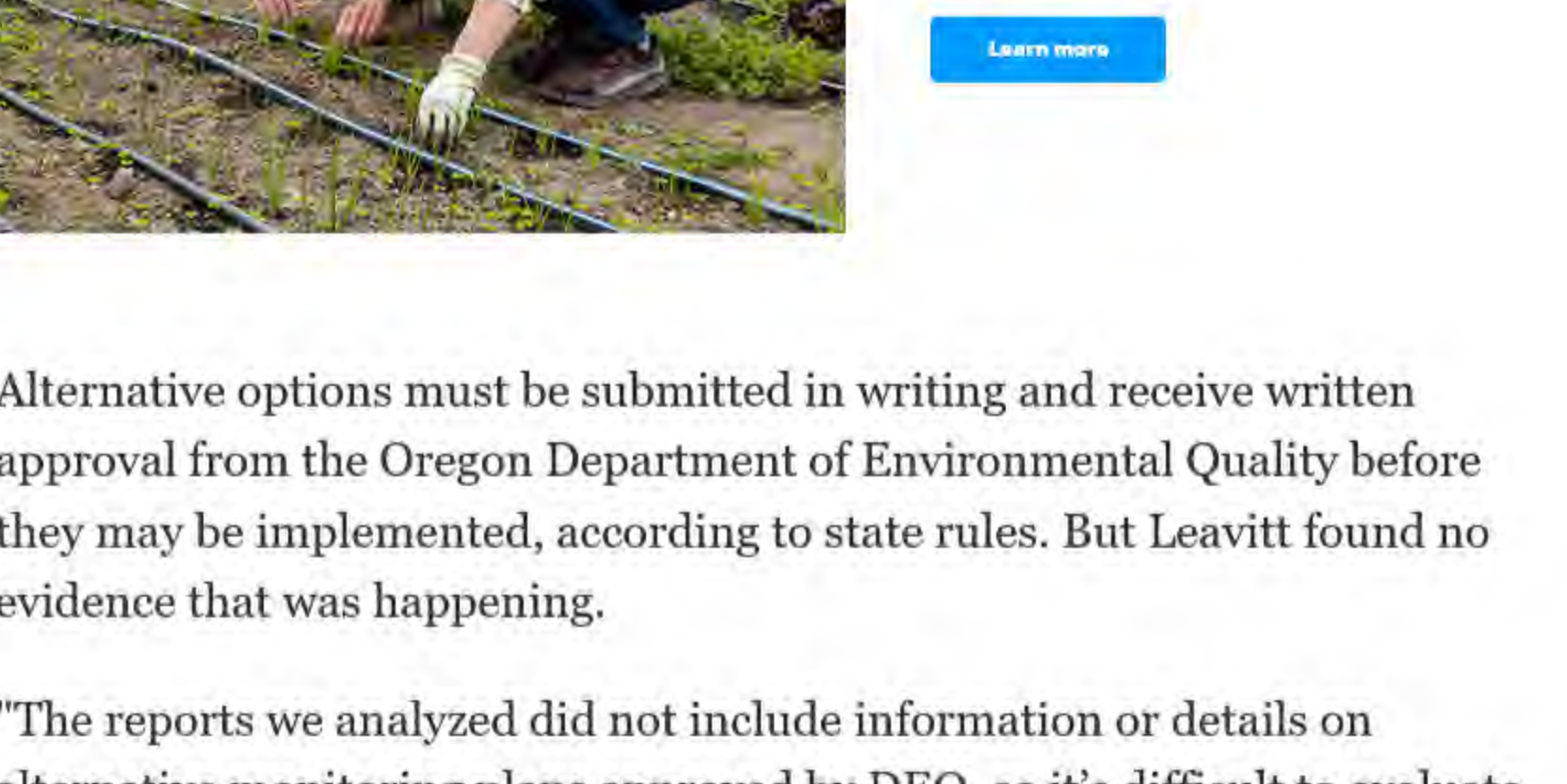
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Oregon’s new rules, part of a larger state effort to curb greenhouse gas emissions, went into effect in October 2021.

The rules require quarterly monitoring of the landfill, by walking the surface with a handheld gas analyzer. Identified leaks measuring over 500 parts per million must be fixed within 10 days.

The rules allow landfills to use “alternative compliance options,” including changing walking paths, to exclude monitoring where there are potential safety and other issues, such as steep or slippery slopes and physical obstructions.



A new report from environmental group Beyond Toxics found between 53% and 62% of Coffin Butte Landfill went unmonitored each quarter for methane in 2023. Abigail Dollins/Statesman Journal

Mason Leavitt, data analytics specialist for Beyond Toxics, said companies appear to be abusing that exemption.

For example, the 178-acre Coffin Butte Landfill, near Corvallis, exempted 40 acres in the third quarter of 2022 and 30 acres in the fourth quarter of the same year, citing “high vegetation,” according to the report. The landfill continued to exempt those areas in 2023 without citing a reason.

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Alternative options must be submitted in writing and receive written approval from the Oregon Department of Environmental Quality before they may be implemented, according to state rules. But Leavitt found no evidence that was happening.

“The reports we analyzed did not include information or details on alternative monitoring plans approved by DEQ, so it’s difficult to evaluate exactly what agreements are made between private owner-operators and DEQ,” the Beyond Toxics report states.

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“Half of private landfill surface area is going completely unmonitored for methane leaks,” Leavitt told the Statesman Journal. “We’re blind to what’s happening in those sections of the landfill.”

The Oregon Department of Environmental Quality just received the report and is reviewing it, spokesman Dylan Darling said.

The findings come as the Oregon Legislature [considers a bill](#) to improve landfill methane monitoring and reporting.

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Senate Bill 726 would require municipal solid waste landfills to use advanced technology, such as drones, planes or satellites, to measure methane releases.

It would require landfill owners to report the results to the DEQ, in GIS software, which would make it easier to visualize.

And it would require landfills to fix any areas exceeding limits, and monitor that area again.

## No methane monitoring data for 3 Oregon landfills

Oregon’s new quarterly surface emissions monitoring rules apply to landfills with more than 200,000 tons of accumulated waste and methane emissions modeled to be greater than 664 tons.

Eleven landfills statewide met that criteria, according to the report.

Beyond Toxics asked DEQ for quarterly emission reports for all 11 landfills for 2023, the first full year of monitoring.

In response, the group received the reports for eight of those landfills.

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Roseburg Landfill, managed by Douglas County, had not complied with the new rules. DEQ has issued a pre-enforcement notice to the landfill, warning that it could be cited and fined, Darling said.

The landfill began monitoring in second quarter 2024 and found two exceedances of the methane emission limits, he said.

Because of that, DEQ has given the landfill until June to submit a design plan to DEQ and until December 2026 to install and begin operation of a gas collection and control system. At that time, it will be required to resume methane emissions monitoring.

Hillsboro Landfill, owned by Waste Management, has until April to begin modeling under the terms of its air quality permit, according to DEQ.

And Baker Landfill, managed by a local private company, argued that it actually was two landfills, with each separately falling under the threshold for monitoring. One of the landfills, which are next to each other, closed in 2002, Darling said.

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**Beyond Toxics found companies exempted as much as 69% of landfill**

Landfills provide data in their quarterly monitoring reports in print form, rather than using GIS software.

Leavitt, working with university students, spent about 300 hours translating it into spatial data, to map the areas monitored at each landfill each quarter. Without that work, it’s difficult to know which areas of a landfill are unmonitored.

That’s another shortcoming of the current rules, Leavitt said.

“That arcane system is currently what DEQ would have to rely on to be able to look at all of this in one place,” he said.

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**Oregon Legislature 2025**

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- Oregon lawmakers pass bill authorizing governor to fill US Senate vacancies

The researchers determined the percentage of each landfill that was unmonitored each quarter. Here are the results:

- Dry Creek Landfill, in Eagle Point, operated by Waste Connections: 69% each quarter
- Coffin Butte Landfill, near Adair Village, operated by Republic Services: Between 53% and 62%
- Wasco County Landfill, in The Dalles, operated by Waste Connections: Between 46% and 62%
- Finley Buttes Landfill, in Boardman, operated by Waste Connections: Between 27% and 58%
- Columbia Ridge Landfill, in Arlington, operated by Waste Management: Between 12% and 19%
- Knott Landfill, in Bend, operated by Deschutes County: Between 12% and 16%
- Short Mountain Landfill, near Eugene, operated by Lane County: 8% each quarter
- Crook County Landfill, in Prineville, operated by Crook County: Between 7% and 8%

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## U.S. EPA finds problems with methane monitoring

Beyond Toxics’ conclusions mirror those in a recent U.S. Environmental Protection Agency [report](#).

More than 100 EPA inspections over the past three years found that many municipal solid waste landfills across the country were not properly monitoring emissions.

“While the regulations allow municipal solid waste landfills to exclude certain areas from the surface emissions monitoring (e.g., areas with steep slopes or other dangerous areas), the EPA observed during recent inspections that areas that are not dangerous are improperly excluded from monitoring,” the EPA report states.

“If a municipal solid waste landfill excludes areas from the surface emissions monitoring, the facility should document and explain the basis for excluding each area from monitoring in the surface emission design plan and SEM reports. The regular side slopes of the landfill may not be excluded from monitoring per the regulations,” the report reads.

Coffin Butte Landfill was among those the EPA inspected.

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In 2022, the EPA found Coffin Butte was [leaking methane](#) at levels that exceed state and federal limits and what the landfill had publicly reported.

EPA investigators returned in 2024 and found more than 40 locations where methane exceeded limits, including at holes in the cover material.

EPA, rather than DEQ, is continuing to lead that investigation, Darling said.

## Coffin Butte expansion decision expected by August

The findings come as Coffin Butte Landfill, which takes waste from Marion and Polk counties, has just passed a major hurdle in its yearslong effort to expand.

On Feb. 28, Benton County deemed the company’s application for a conditional use permit for the expansion “complete.”

Sometime this spring, the county will open a two-week public comment period and a public hearing on the application. The county’s planning commission is expected to decide on the application by Aug. 11.

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Tracy Loew covers the environment at the Statesman Journal. Send comments, questions and tips: [tloew@statesmanjournal.com](mailto:tloew@statesmanjournal.com) or 503-399-6779. Follow her on X at [@Tracy\\_Loew](https://twitter.com/Tracy_Loew)



# OREGON'S SECRET CLIMATE KILLERS

**PULLING BACK THE CURTAIN ON  
HIDDEN LANDFILL METHANE  
EMISSIONS**

**March 2025**

MASON LEAVITT

LISA ARKIN

## BRIEF PURPOSE STATEMENT

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In 2022, the Oregon Department of Environmental Quality implemented new rules which regulate landfill gas emissions. The rules require Oregon landfills with greater than 200,000 tons of waste-in-place to obtain an Air Contaminant Discharge Permit to submit data on the landfill characteristics and potentially monitor, collect and/or control landfill gas emissions. The DEQ's purpose was to reduce methane emissions to meet former Governor Kate Brown's directive provided in Executive Order No. 20-04 to give state agencies the authority to establish science-based greenhouse gas emissions reduction goals. Typically, landfill gas is made up of around 50% methane. Methane is a very strong greenhouse gas, more than 80 times as potent as carbon dioxide in the short-term.

In 2024, Beyond Toxics conducted an analysis of landfill operator compliance with Oregon's new landfill methane regulations which went into effect in October 2022. We examined 32 Surface Emissions Monitoring (SEM) reports submitted by eight Municipal Solid Waste (MSW) landfills out of a total of 11 MSW landfills that are required to follow the new rules. Our report is limited to eight landfills because three of the 11 large landfills received exemptions from the Department of Environmental Quality or did not comply with the new rules. Our investigation resulted in the following findings.

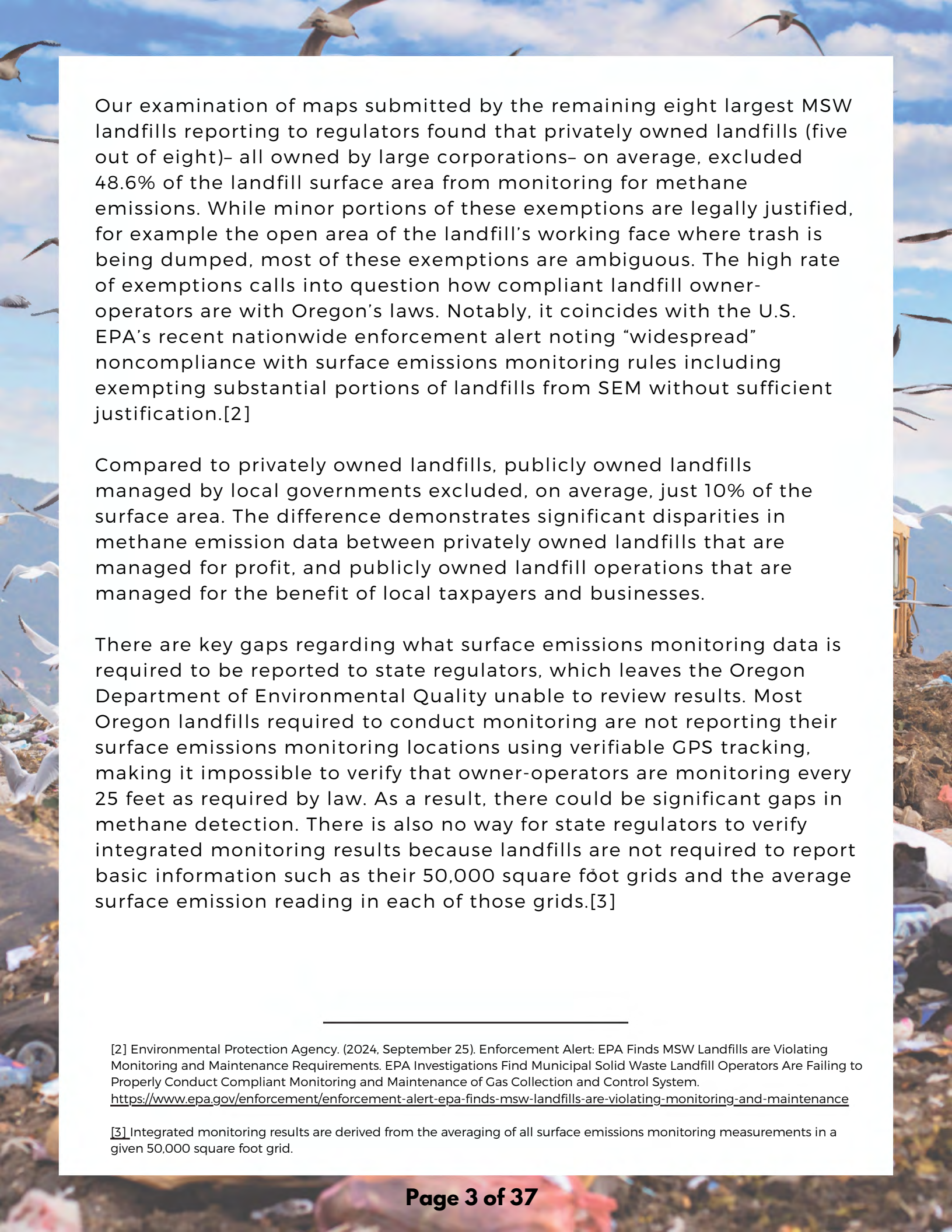
## KEY FINDINGS

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Three out of 11 of Oregon's large, currently operating landfills did not follow the state's surface emissions monitoring rules in 2023, one year after the rules went into effect in 2022. As a result, three of Oregon's largest landfills are completely unmonitored for potent methane emissions. This is important because 90% of the methane emissions produced by industries in Oregon come from its largest landfills.[1]

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[1] Industrious Labs (2025). Don't Waste Our Future. Based on U.S. EPA Greenhouse Gas Reporting Program (GHGRP) 2022, U.S. EPA Landfill Methane Outreach Program (LMOP) (July 2023), and U.S. EPA GHG Equivalency calculator.



Our examination of maps submitted by the remaining eight largest MSW landfills reporting to regulators found that privately owned landfills (five out of eight)– all owned by large corporations– on average, excluded 48.6% of the landfill surface area from monitoring for methane emissions. While minor portions of these exemptions are legally justified, for example the open area of the landfill’s working face where trash is being dumped, most of these exemptions are ambiguous. The high rate of exemptions calls into question how compliant landfill owner-operators are with Oregon’s laws. Notably, it coincides with the U.S. EPA’s recent nationwide enforcement alert noting “widespread” noncompliance with surface emissions monitoring rules including exempting substantial portions of landfills from SEM without sufficient justification.[2]

Compared to privately owned landfills, publicly owned landfills managed by local governments excluded, on average, just 10% of the surface area. The difference demonstrates significant disparities in methane emission data between privately owned landfills that are managed for profit, and publicly owned landfill operations that are managed for the benefit of local taxpayers and businesses.

There are key gaps regarding what surface emissions monitoring data is required to be reported to state regulators, which leaves the Oregon Department of Environmental Quality unable to review results. Most Oregon landfills required to conduct monitoring are not reporting their surface emissions monitoring locations using verifiable GPS tracking, making it impossible to verify that owner-operators are monitoring every 25 feet as required by law. As a result, there could be significant gaps in methane detection. There is also no way for state regulators to verify integrated monitoring results because landfills are not required to report basic information such as their 50,000 square foot grids and the average surface emission reading in each of those grids.[3]

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[2] Environmental Protection Agency. (2024, September 25). Enforcement Alert: EPA Finds MSW Landfills are Violating Monitoring and Maintenance Requirements. EPA Investigations Find Municipal Solid Waste Landfill Operators Are Failing to Properly Conduct Compliant Monitoring and Maintenance of Gas Collection and Control System. <https://www.epa.gov/enforcement/enforcement-alert-epa-finds-msw-landfills-are-violating-monitoring-and-maintenance>

[3] Integrated monitoring results are derived from the averaging of all surface emissions monitoring measurements in a given 50,000 square foot grid.

# RECOMMENDATIONS

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The state of Oregon Department of Environmental Quality (DEQ) should immediately move to integrate the mandatory use of remote sensing technologies into Surface Emission Monitoring (SEM) rules to detect and pinpoint methane leaks at landfills.[4] One available technology is deploying methane detection equipment mounted on drones. The State can also require third party satellite methane detection systems, which provide comprehensive and more accurate measurements of the concentration of methane plumes, the direction of methane plumes moving off the landfill property, and the exact location of emission exceedances from landfills. DEQ can also require fixed monitors for real-time methane tracking. Gathering this comprehensive data set will lead to rapid mitigation of super-emitter leaks, improved methane capture for use in local energy generation or methane destruction through enclosed flaring.

DEQ should update their regulations to require SEM on all areas of landfills including steep slopes, closed cells, locations with covering vegetation and unspecified exemptions. Combining actionable emissions data from these areas along with mitigation strategies such as horizontal gas collection is critical for reducing greenhouse gas impacts and associated air toxics such as volatile organic compounds (VOCs), hydrogen sulfide, forever chemicals and fine particulate matter thereby improving air quality for local communities and climate mitigation to follow state climate action mandates.

Close reporting loopholes to ensure landfill owner-operators are adequately monitoring for methane. DEQ should immediately update its regulations to require that any owner or operator who conducts surface emissions monitoring must:

1

Report the areas exempted from monitoring and report the reasons for requesting those exemptions. This would address the current issue of exemptions being granted on a de facto basis.

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[4] Throughout this report we emphasize Oregon because these are the arenas at which Beyond Toxics focuses its advocacy. Our findings could be replicable in other states or at the federal level.

- 2 Report measured concentration of methane in ppm for each SEM reading.
- 3 Report the SEM path walked by owner-operators.
- 4 All the above data should be in a spatial data format such as a shapefile, which makes for more efficient analysis of data gathered through surface emissions monitoring.

To prevent future potent methane emissions, governments at all scales can introduce mandatory organics diversion policies requiring consumers and haulers to separate and sort organic waste so that food and yard waste can be sent to facilities other than landfills to make compost and other products thereby preventing future generation of methane in landfills.

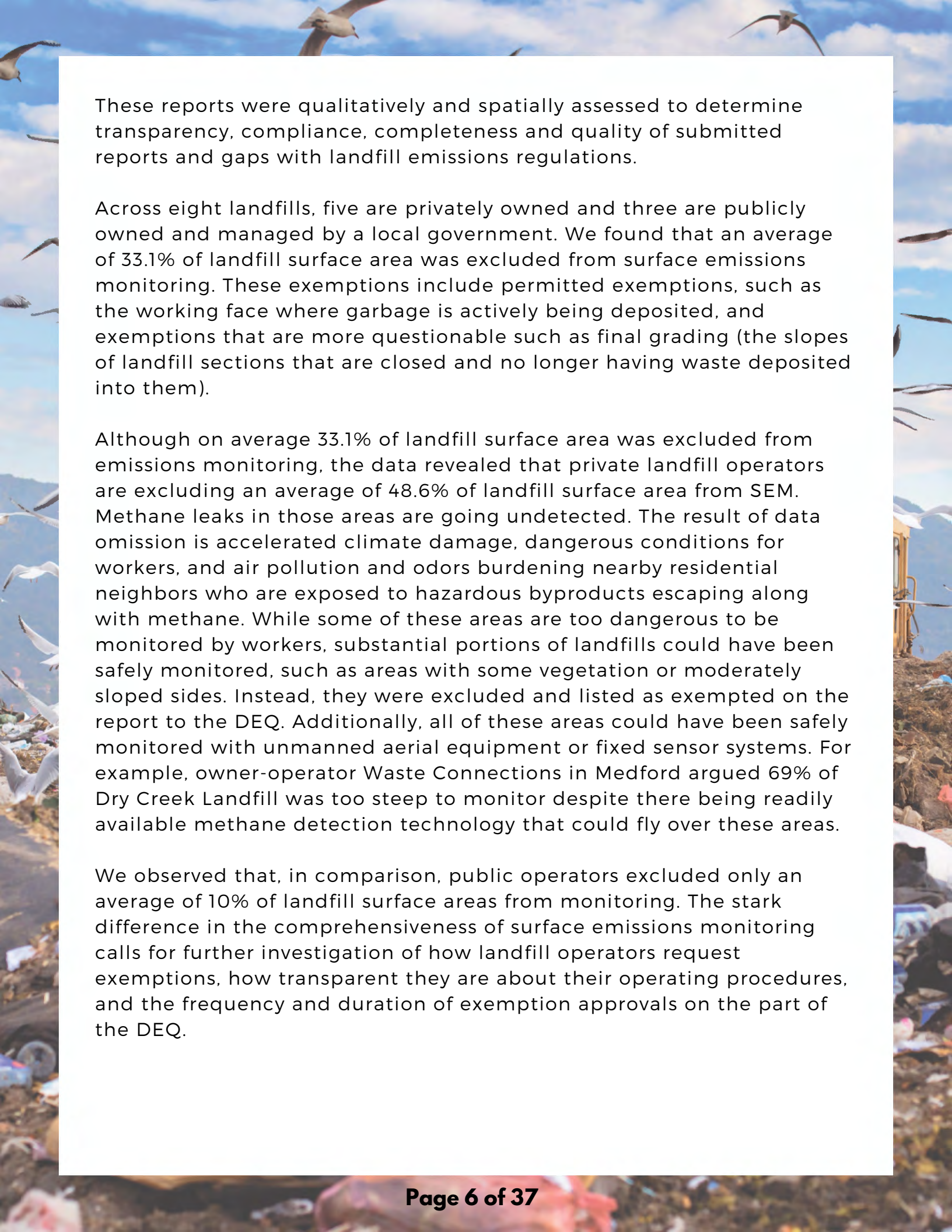
## EXECUTIVE SUMMARY

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Beyond Toxics conducted an analysis of 32 Surface Emissions Monitoring (SEM) reports submitted by eight MSW landfill operators to the Oregon Department of Environmental Quality for the year of 2023.[5] Per state rules, SEM is currently performed at landfills with over 200,000 tons of total lifetime waste and modeled methane emissions greater than 664 tons. We analyzed open landfills currently accepting municipal solid waste (variations of these rules apply to other landfills that are closed and/or accept only industrial waste). According to records from the DEQ, a total of 11 currently operating municipal solid waste landfills in Oregon meet the waste-in-place and methane emissions thresholds for the state's surface emissions monitoring rules. Three of those landfills were not following the new rules; two due to exemptions granted by the DEQ and one did not comply. SEM is performed quarterly by walking portions of the landfill surface with a handheld gas analyzer in a grid pattern to detect methane leaks. Individual leaks detected measuring over 500 parts per million (ppm) require remediation within 10 days. Operators are also required to divide their landfill into 50,000 square foot grids and average their SEM results within each grid, referred to as integrated monitoring. If a grid has an average of 25 ppm or higher, then the operator is required to conduct mitigation efforts to bring it below 25 ppm.

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[5] (See OAR 340-239-0100).

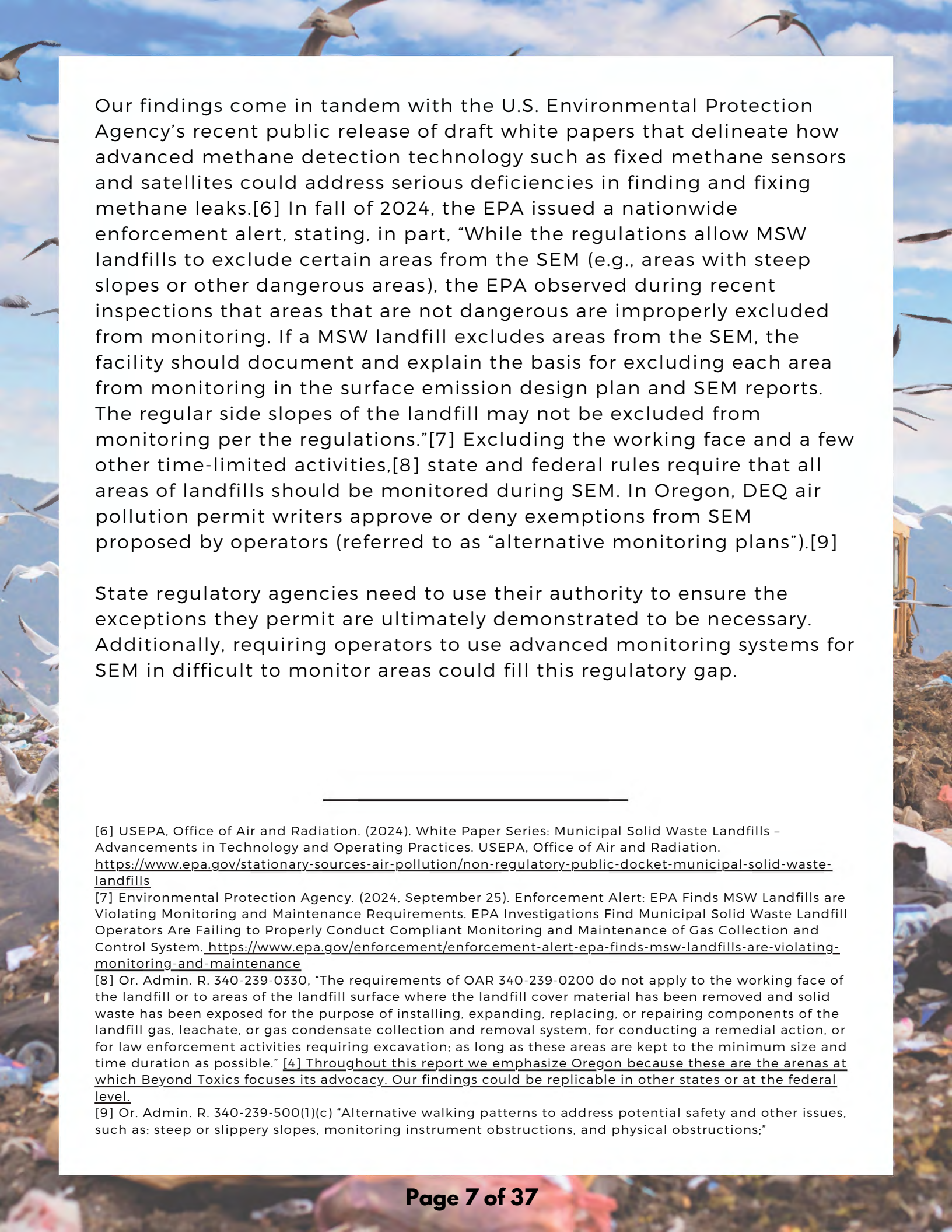
The background of the page is a photograph of a landfill. In the foreground, there is a large pile of brown, decomposing organic waste. Above the waste, several white birds, likely gulls or terns, are in flight against a clear blue sky. The birds are scattered across the upper half of the image, with some closer to the camera and others further away. The overall scene depicts a natural environment interacting with a human-made waste disposal site.

These reports were qualitatively and spatially assessed to determine transparency, compliance, completeness and quality of submitted reports and gaps with landfill emissions regulations.

Across eight landfills, five are privately owned and three are publicly owned and managed by a local government. We found that an average of 33.1% of landfill surface area was excluded from surface emissions monitoring. These exemptions include permitted exemptions, such as the working face where garbage is actively being deposited, and exemptions that are more questionable such as final grading (the slopes of landfill sections that are closed and no longer having waste deposited into them).

Although on average 33.1% of landfill surface area was excluded from emissions monitoring, the data revealed that private landfill operators are excluding an average of 48.6% of landfill surface area from SEM. Methane leaks in those areas are going undetected. The result of data omission is accelerated climate damage, dangerous conditions for workers, and air pollution and odors burdening nearby residential neighbors who are exposed to hazardous byproducts escaping along with methane. While some of these areas are too dangerous to be monitored by workers, substantial portions of landfills could have been safely monitored, such as areas with some vegetation or moderately sloped sides. Instead, they were excluded and listed as exempted on the report to the DEQ. Additionally, all of these areas could have been safely monitored with unmanned aerial equipment or fixed sensor systems. For example, owner-operator Waste Connections in Medford argued 69% of Dry Creek Landfill was too steep to monitor despite there being readily available methane detection technology that could fly over these areas.

We observed that, in comparison, public operators excluded only an average of 10% of landfill surface areas from monitoring. The stark difference in the comprehensiveness of surface emissions monitoring calls for further investigation of how landfill operators request exemptions, how transparent they are about their operating procedures, and the frequency and duration of exemption approvals on the part of the DEQ.



Our findings come in tandem with the U.S. Environmental Protection Agency's recent public release of draft white papers that delineate how advanced methane detection technology such as fixed methane sensors and satellites could address serious deficiencies in finding and fixing methane leaks.[6] In fall of 2024, the EPA issued a nationwide enforcement alert, stating, in part, "While the regulations allow MSW landfills to exclude certain areas from the SEM (e.g., areas with steep slopes or other dangerous areas), the EPA observed during recent inspections that areas that are not dangerous are improperly excluded from monitoring. If a MSW landfill excludes areas from the SEM, the facility should document and explain the basis for excluding each area from monitoring in the surface emission design plan and SEM reports. The regular side slopes of the landfill may not be excluded from monitoring per the regulations."[7] Excluding the working face and a few other time-limited activities,[8] state and federal rules require that all areas of landfills should be monitored during SEM. In Oregon, DEQ air pollution permit writers approve or deny exemptions from SEM proposed by operators (referred to as "alternative monitoring plans").[9]

State regulatory agencies need to use their authority to ensure the exceptions they permit are ultimately demonstrated to be necessary. Additionally, requiring operators to use advanced monitoring systems for SEM in difficult to monitor areas could fill this regulatory gap.

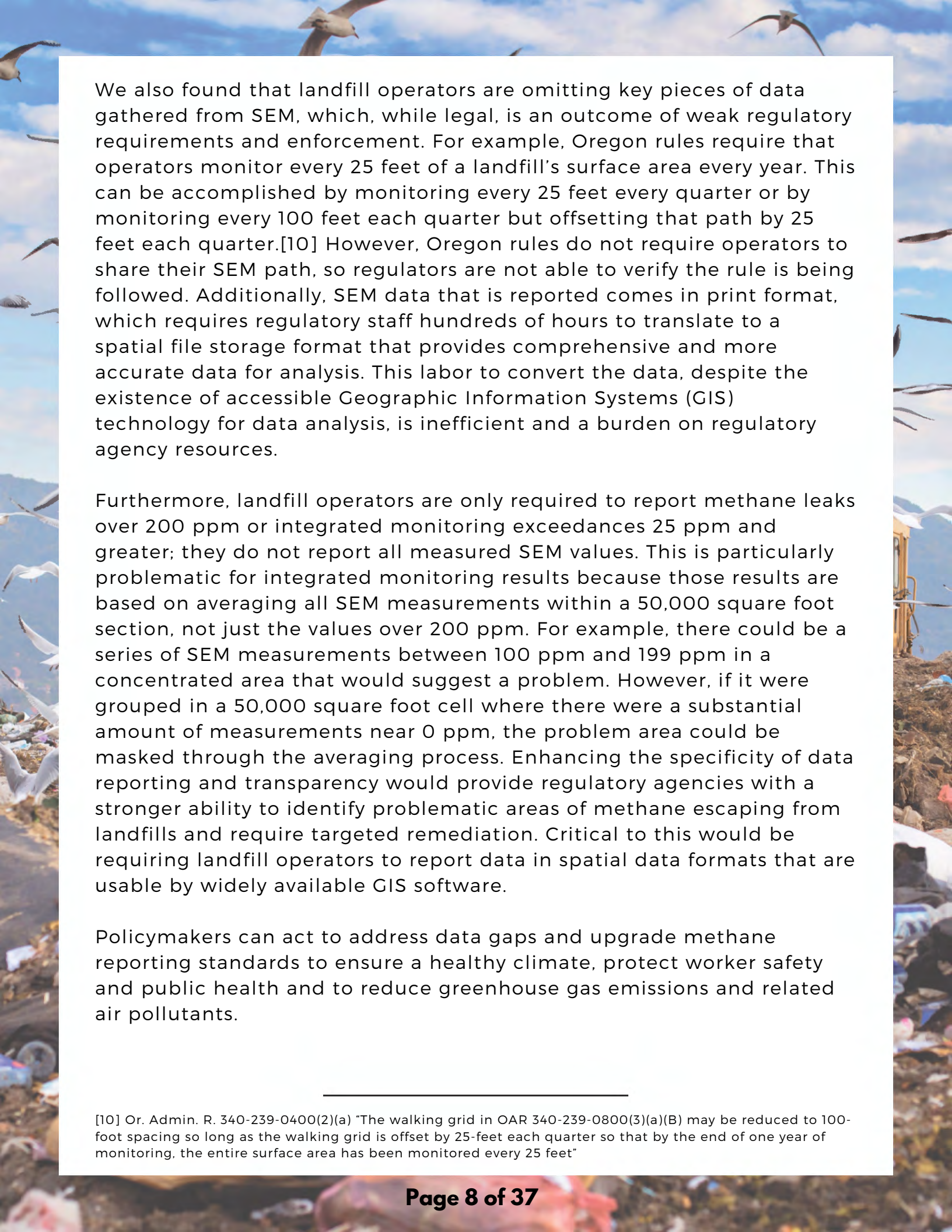
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[6] USEPA, Office of Air and Radiation. (2024). White Paper Series: Municipal Solid Waste Landfills – Advancements in Technology and Operating Practices. USEPA, Office of Air and Radiation. <https://www.epa.gov/stationary-sources-air-pollution/non-regulatory-public-docket-municipal-solid-waste-landfills>

[7] Environmental Protection Agency. (2024, September 25). Enforcement Alert: EPA Finds MSW Landfills are Violating Monitoring and Maintenance Requirements. EPA Investigations Find Municipal Solid Waste Landfill Operators Are Failing to Properly Conduct Compliant Monitoring and Maintenance of Gas Collection and Control System. <https://www.epa.gov/enforcement/enforcement-alert-epa-finds-msw-landfills-are-violating-monitoring-and-maintenance>

[8] Or. Admin. R. 340-239-0330, "The requirements of OAR 340-239-0200 do not apply to the working face of the landfill or to areas of the landfill surface where the landfill cover material has been removed and solid waste has been exposed for the purpose of installing, expanding, replacing, or repairing components of the landfill gas, leachate, or gas condensate collection and removal system, for conducting a remedial action, or for law enforcement activities requiring excavation; as long as these areas are kept to the minimum size and time duration as possible." [4] Throughout this report we emphasize Oregon because these are the arenas at which Beyond Toxics focuses its advocacy. Our findings could be replicable in other states or at the federal level.

[9] Or. Admin. R. 340-239-500(1)(c) "Alternative walking patterns to address potential safety and other issues, such as: steep or slippery slopes, monitoring instrument obstructions, and physical obstructions;"



We also found that landfill operators are omitting key pieces of data gathered from SEM, which, while legal, is an outcome of weak regulatory requirements and enforcement. For example, Oregon rules require that operators monitor every 25 feet of a landfill's surface area every year. This can be accomplished by monitoring every 25 feet every quarter or by monitoring every 100 feet each quarter but offsetting that path by 25 feet each quarter.[10] However, Oregon rules do not require operators to share their SEM path, so regulators are not able to verify the rule is being followed. Additionally, SEM data that is reported comes in print format, which requires regulatory staff hundreds of hours to translate to a spatial file storage format that provides comprehensive and more accurate data for analysis. This labor to convert the data, despite the existence of accessible Geographic Information Systems (GIS) technology for data analysis, is inefficient and a burden on regulatory agency resources.

Furthermore, landfill operators are only required to report methane leaks over 200 ppm or integrated monitoring exceedances 25 ppm and greater; they do not report all measured SEM values. This is particularly problematic for integrated monitoring results because those results are based on averaging all SEM measurements within a 50,000 square foot section, not just the values over 200 ppm. For example, there could be a series of SEM measurements between 100 ppm and 199 ppm in a concentrated area that would suggest a problem. However, if it were grouped in a 50,000 square foot cell where there were a substantial amount of measurements near 0 ppm, the problem area could be masked through the averaging process. Enhancing the specificity of data reporting and transparency would provide regulatory agencies with a stronger ability to identify problematic areas of methane escaping from landfills and require targeted remediation. Critical to this would be requiring landfill operators to report data in spatial data formats that are usable by widely available GIS software.

Policymakers can act to address data gaps and upgrade methane reporting standards to ensure a healthy climate, protect worker safety and public health and to reduce greenhouse gas emissions and related air pollutants.

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[10] Or. Admin. R. 340-239-0400(2)(a) "The walking grid in OAR 340-239-0800(3)(a)(B) may be reduced to 100-foot spacing so long as the walking grid is offset by 25-feet each quarter so that by the end of one year of monitoring, the entire surface area has been monitored every 25 feet"

# BACKGROUND

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Mitigating short-term methane emissions, a climate pollutant about 80 times more powerful than CO<sub>2</sub>,<sup>[11]</sup> is critical to preventing the world from reaching climate tipping points. Climate tipping points are thresholds at which the climate systems would irrevocably change and upend local weather systems, supply chains, and global food productions. Currently landfills are the third leading cause of methane emissions in Oregon and the United States, and the second leading globally.<sup>[12]</sup>

Methane emissions are a byproduct of disposing of organic waste into landfills. As organic waste (food scraps, wood, paper, textiles) decomposes in an oxygen deprived environment, methane gas is generated over the course of decades. Most landfills can be thought of as giant plastic bags containing waste (although some landfills have waste in direct contact with the ground). These cells are lined next to and on top of each other in a pyramid-like structure. Pipes line the bottom of cells in horizontal rows to extract liquid byproducts, referred to as leachate. Gas extraction wells are drilled vertically and sometimes horizontally into landfill cells to capture continually generated methane gas before it escapes to the atmosphere.

Currently, federal rules require certain landfills in the United States to implement gas collection and control systems (GCCS), which use gas wells to extract methane from about 600 U.S. landfills, excluding the working face (where waste is deposited on a daily basis).<sup>[13]</sup> While GCCS are intended to extract and capture methane, several challenges exist regarding their successful and efficient operation.

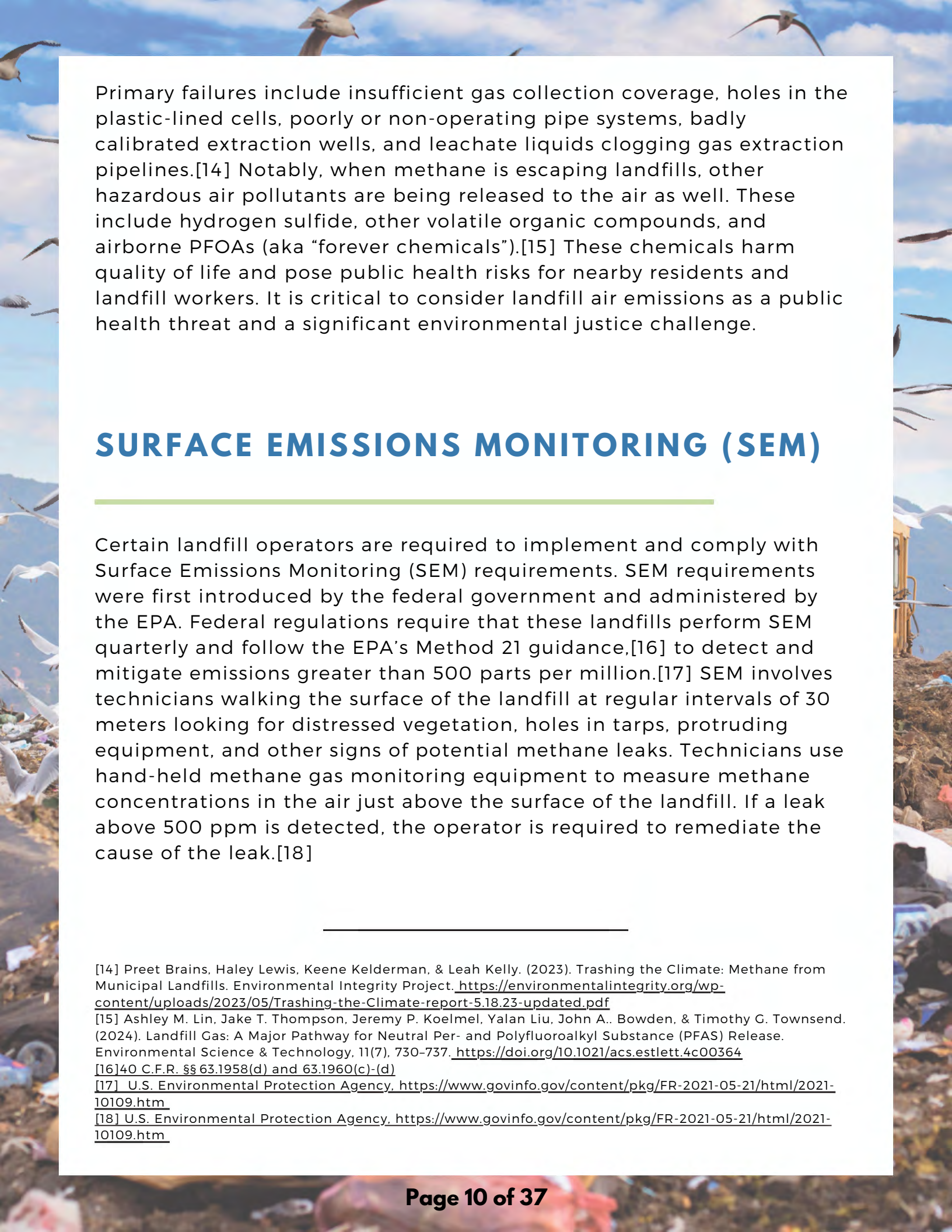
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[11] United Nations Environmental Programme. (2022, October 18). What's the deal with methane? Climate Action: Chemicals & Pollution Action. <https://www.unep.org/news-and-stories/video/whats-deal-methane>

[12] Saunois, M., Martinez, A., Poulter, B., Zhang, Z., Raymond, P., Regnier, P., Canadell, J. G., Jackson, R. B., Patra, P. K., Bousquet, P., Ciais, P., Dlugokencky, E. J., Lan, X., Allen, G. H., Bastviken, D., Beerling, D. J., Belikov, D. A., Blake, D. R., Castaldi, S., ... Zhuang, Q. (2024). Global Methane Budget 2000–2020. Earth System Science Data Discussions, 2024, 1–147. <https://doi.org/10.5194/essd-2024-115>

[13] Rocky Mountain Institute, Ebon Ayandele, Tom Frankiewicz, & Ellie Garland. (2024). Deploying Advanced Monitoring Technologies at US Landfills.

[https://rmi.org/wp-content/uploads/dlm\\_uploads/2024/03/wasteMAP\\_united\\_states\\_playbook.pdf](https://rmi.org/wp-content/uploads/dlm_uploads/2024/03/wasteMAP_united_states_playbook.pdf)



Primary failures include insufficient gas collection coverage, holes in the plastic-lined cells, poorly or non-operating pipe systems, badly calibrated extraction wells, and leachate liquids clogging gas extraction pipelines.[14] Notably, when methane is escaping landfills, other hazardous air pollutants are being released to the air as well. These include hydrogen sulfide, other volatile organic compounds, and airborne PFOAs (aka “forever chemicals”).[15] These chemicals harm quality of life and pose public health risks for nearby residents and landfill workers. It is critical to consider landfill air emissions as a public health threat and a significant environmental justice challenge.

## SURFACE EMISSIONS MONITORING (SEM)

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Certain landfill operators are required to implement and comply with Surface Emissions Monitoring (SEM) requirements. SEM requirements were first introduced by the federal government and administered by the EPA. Federal regulations require that these landfills perform SEM quarterly and follow the EPA’s Method 21 guidance,[16] to detect and mitigate emissions greater than 500 parts per million.[17] SEM involves technicians walking the surface of the landfill at regular intervals of 30 meters looking for distressed vegetation, holes in tarps, protruding equipment, and other signs of potential methane leaks. Technicians use hand-held methane gas monitoring equipment to measure methane concentrations in the air just above the surface of the landfill. If a leak above 500 ppm is detected, the operator is required to remediate the cause of the leak.[18]

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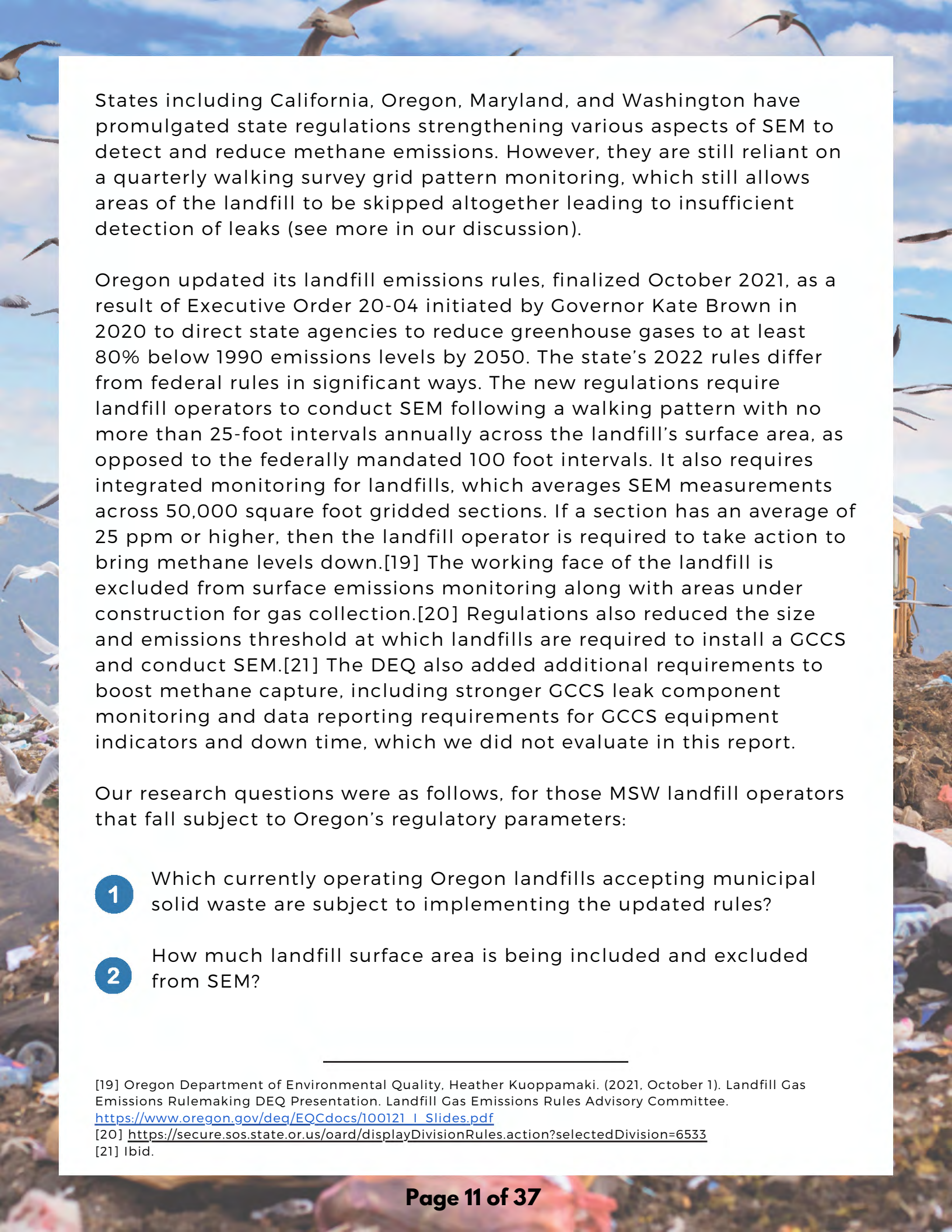
[14] Preet Brains, Haley Lewis, Keene Kelderman, & Leah Kelly. (2023). Trashing the Climate: Methane from Municipal Landfills. Environmental Integrity Project. <https://environmentalintegrity.org/wp-content/uploads/2023/05/Trashing-the-Climate-report-5.18.23-updated.pdf>

[15] Ashley M. Lin, Jake T. Thompson, Jeremy P. Koelmel, Yalan Liu, John A. Bowden, & Timothy G. Townsend. (2024). Landfill Gas: A Major Pathway for Neutral Per- and Polyfluoroalkyl Substance (PFAS) Release. *Environmental Science & Technology*, 11(7), 730-737. <https://doi.org/10.1021/acs.estlett.4c00364>

[16] 40 C.F.R. §§ 63.1958(d) and 63.1960(c)-(d)

[17] U.S. Environmental Protection Agency, <https://www.govinfo.gov/content/pkg/FR-2021-05-21/html/2021-10109.htm>

[18] U.S. Environmental Protection Agency, <https://www.govinfo.gov/content/pkg/FR-2021-05-21/html/2021-10109.htm>



States including California, Oregon, Maryland, and Washington have promulgated state regulations strengthening various aspects of SEM to detect and reduce methane emissions. However, they are still reliant on a quarterly walking survey grid pattern monitoring, which still allows areas of the landfill to be skipped altogether leading to insufficient detection of leaks (see more in our discussion).

Oregon updated its landfill emissions rules, finalized October 2021, as a result of Executive Order 20-04 initiated by Governor Kate Brown in 2020 to direct state agencies to reduce greenhouse gases to at least 80% below 1990 emissions levels by 2050. The state's 2022 rules differ from federal rules in significant ways. The new regulations require landfill operators to conduct SEM following a walking pattern with no more than 25-foot intervals annually across the landfill's surface area, as opposed to the federally mandated 100 foot intervals. It also requires integrated monitoring for landfills, which averages SEM measurements across 50,000 square foot gridded sections. If a section has an average of 25 ppm or higher, then the landfill operator is required to take action to bring methane levels down.[19] The working face of the landfill is excluded from surface emissions monitoring along with areas under construction for gas collection.[20] Regulations also reduced the size and emissions threshold at which landfills are required to install a GCCS and conduct SEM.[21] The DEQ also added additional requirements to boost methane capture, including stronger GCCS leak component monitoring and data reporting requirements for GCCS equipment indicators and down time, which we did not evaluate in this report.

Our research questions were as follows, for those MSW landfill operators that fall subject to Oregon's regulatory parameters:

- 1 Which currently operating Oregon landfills accepting municipal solid waste are subject to implementing the updated rules?
- 2 How much landfill surface area is being included and excluded from SEM?

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[19] Oregon Department of Environmental Quality, Heather Kuoppamaki. (2021, October 1). Landfill Gas Emissions Rulemaking DEQ Presentation. Landfill Gas Emissions Rules Advisory Committee. [https://www.oregon.gov/deq/EQCdocs/100121\\_1\\_Slides.pdf](https://www.oregon.gov/deq/EQCdocs/100121_1_Slides.pdf)

[20] <https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=6533>

[21] Ibid.

3

Are the MSW landfill operators monitoring in a walking 25-foot grid pattern over the course of a year, per state regulatory requirements?

4

Are the MSW landfill operators conducting and reporting integrated monitoring results per a 50,000 sq. ft. grid, per state regulatory requirements?

5

Are reports complete, accurate, easy to analyze and useful to ODEQ to help regulators determine compliance and effective methane mitigation?

## METHODS

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Beyond Toxics procured annual and semiannual reports, which certain landfills are required to file,[22] through a public records request to the Oregon DEQ filed in January 2024. We asked for reports filed by currently operating landfills accepting municipal solid waste that are known to exceed 200,000 tons of waste-in-place and 664 tons of methane a year since those are the thresholds at which Oregon's stricter SEM procedures go into effect.

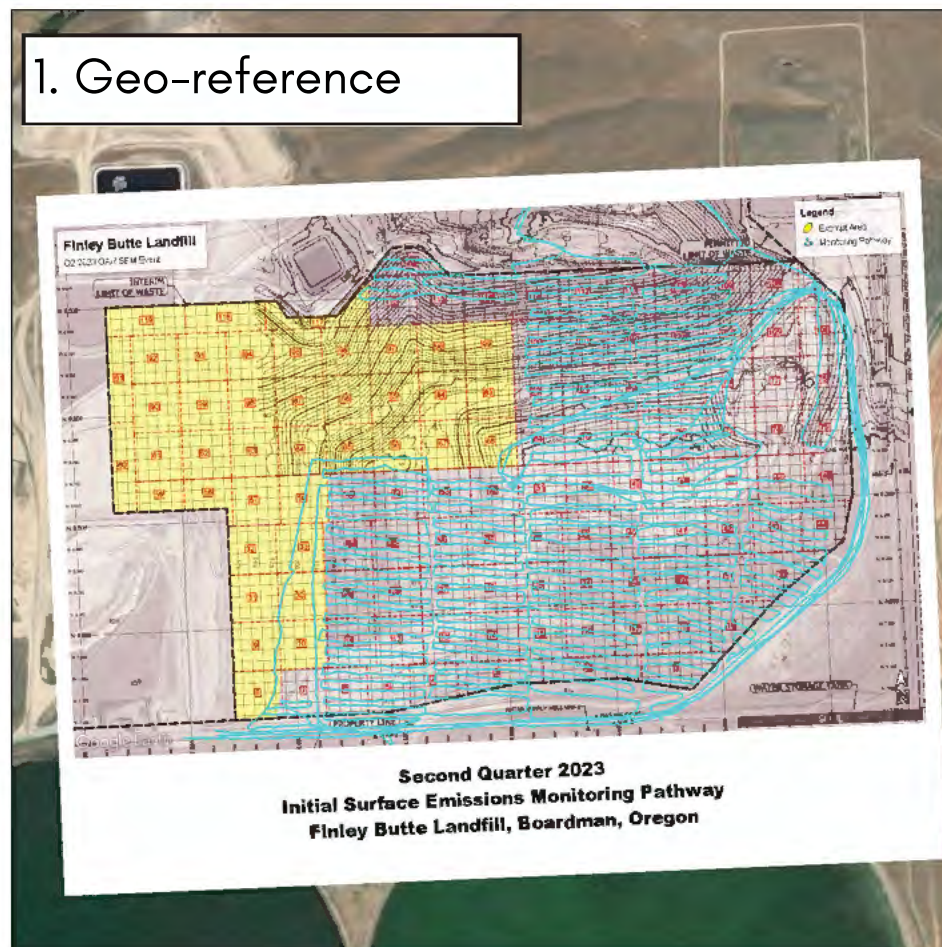
Records were released in June 2024, and included SEM reports from eight of 11 qualifying Oregon landfills in 2022 and 2023. The other three landfills did not conduct SEM, which we inquired further about and will be discussed later. We analyzed solid waste landfills and we excluded landfills exclusively accepting construction and demolition waste, landfills that take only waste from industrial facilities, and all closed landfills. We performed a records analysis of SEM reports included in semiannual and annual reports to DEQ from 2023 for the eight of 11 currently operating municipal solid landfills required to adhere to stricter SEM requirements. In these reports, we analyzed the reporting of integrated monitoring results, 50,000 square foot grids, SEM exclusions, and SEM walking paths. We did not differentiate between SEM exclusions for the working face, asbestos pits, storage piles, steep slopes, overgrown vegetation, etc. because this information is not consistently available in reports compiled by operators. Operators often listed where they did not monitor without a specific justification.

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[22] OAR 340-239-700(3)(c).

For research questions that required a spatial analysis, we georeferenced SEM report maps using ArcGIS Pro software. We then traced mapped features into vector data, which are GPS synchronized shapes that can be spatially analyzed. This allows us to do a few additional modes of analysis. For example, we can calculate the total area of a landfill and the SEM exempted areas. We can also create buffers around SEM paths to see if operators monitored every 25 feet. For the total area of landfill and areas of landfills excluded from SEM, we calculated their surface area in acres. For SEM paths, we created a 12.5 foot buffer around the walking path so we could visualize where gaps larger than 25 feet occurred between walking paths.

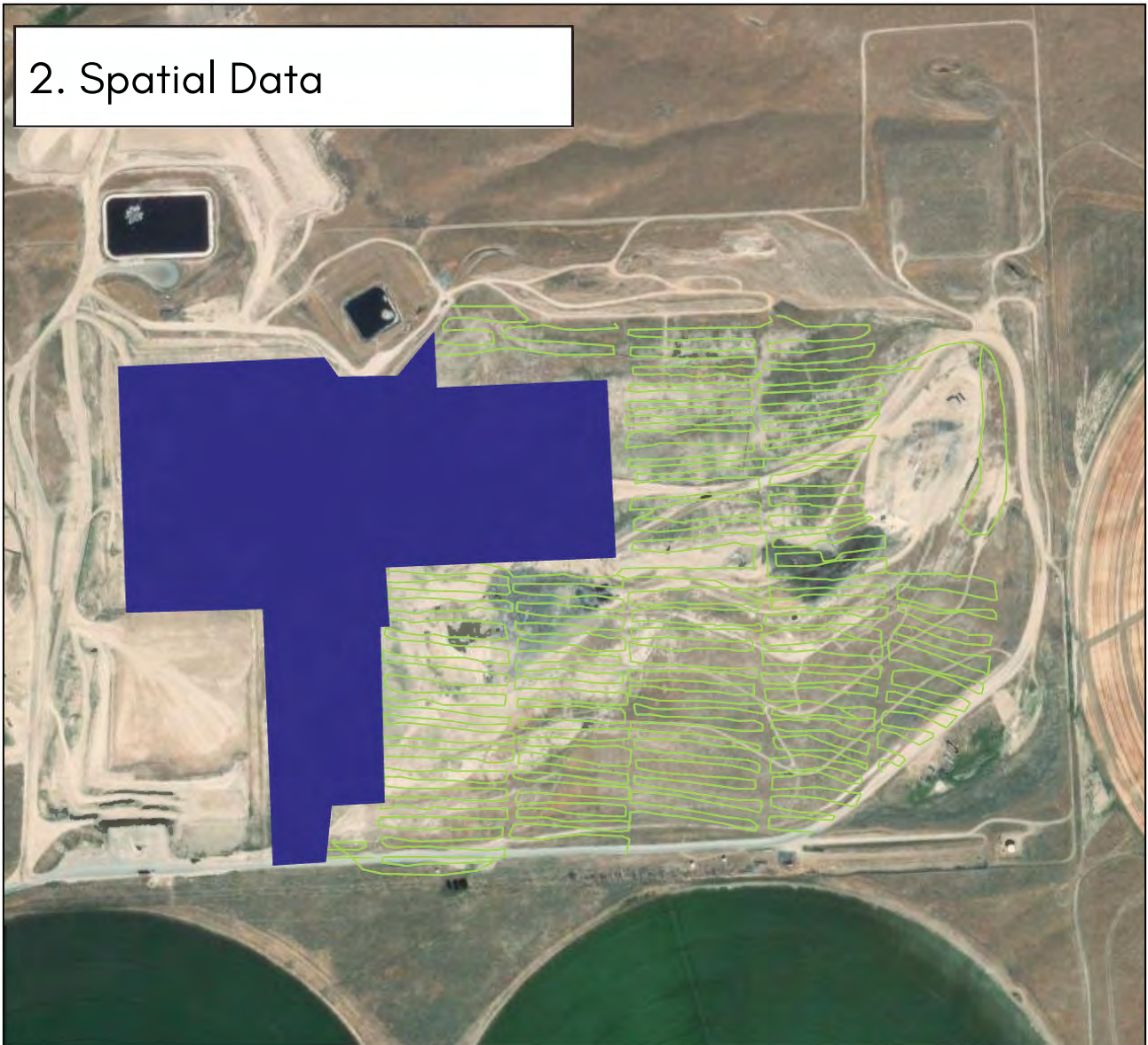
Figure 1: Frame 1, Frame 2, Frame 3, Frame 4



**Frame 1:** Overall, figure 1 shows our process of spatial data analysis for SEM reports using Finley Butte Landfill managed by Waste Connections in Boardman, Oregon as an example.

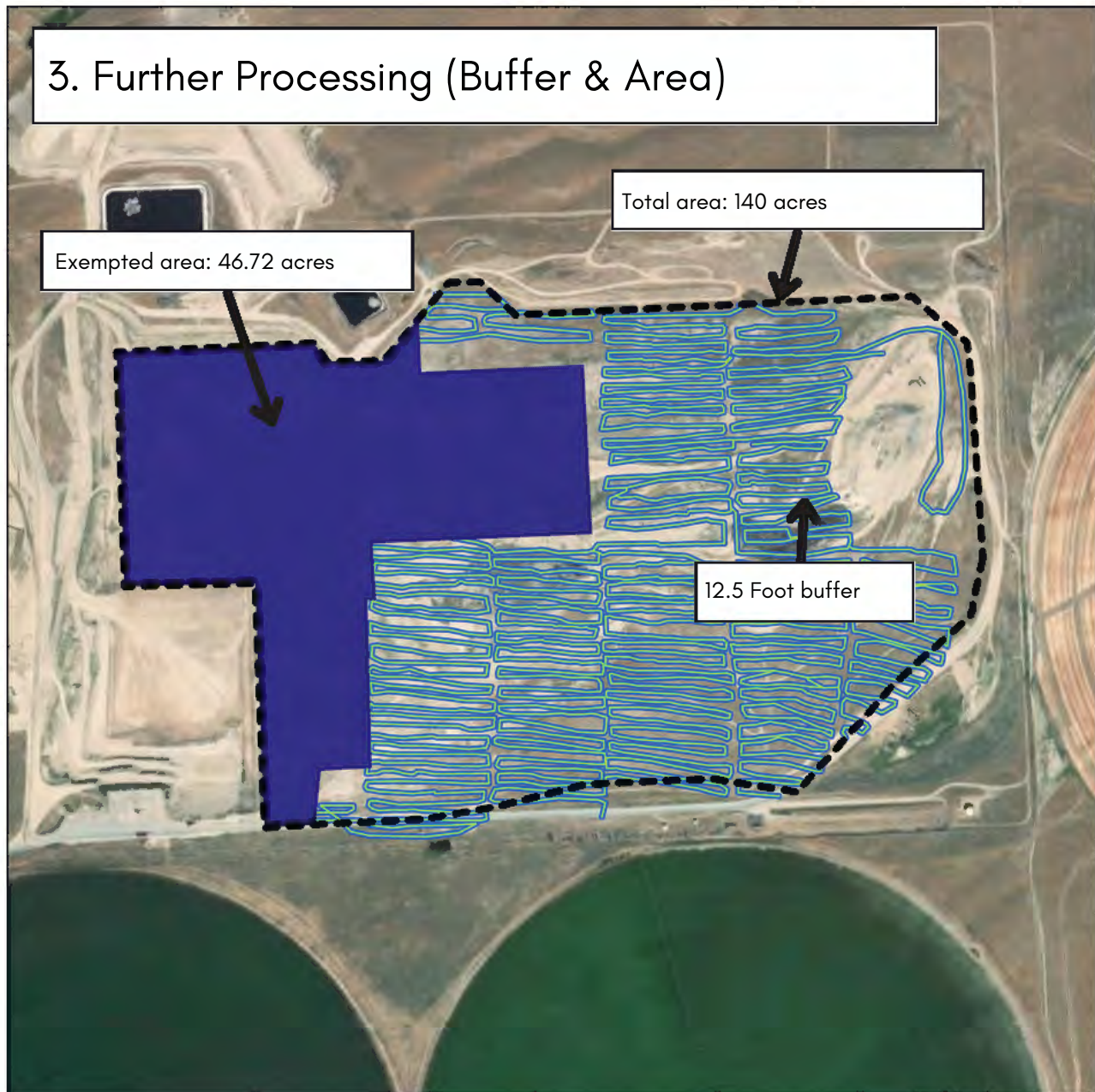
First we take the report graphic provided to the DEQ by the operator, which features a yellow polygon showing the area exempt from monitoring and a blue line showing where operators monitored. The first step is attaching the “paper” graphic to its GPS location. This is referred to as georeferencing. Now the graphic is overlaying its current satellite location.

## 2. Spatial Data



**Frame 2:** Next we build a shapefile, which is a file storage format used by GIS software. This is accomplished by tracing the exempt area into a polygon and the path into lines. Now, the area the operator exempted from SEM, formerly in yellow, is now in dark blue and the SEM monitoring path, formerly in blue and now depicted in green.

### 3. Further Processing (Buffer & Area)



**Frame 3:** Now that we have a shapefile, we can do further forms of analysis. In this case, we want to know the area of the landfill, which we also traced into a shapefile, and the area of the exempt section. Since the data has been tied to GPS locations, we can calculate those features. The total area of the landfill is 140 acres and 46.72 acres were exempt. We can now calculate that for this quarter, Finley Butte excluded 33.4% of its surface area from monitoring.

We also need to know how well they followed the 25 foot rule. By calculating a 12.5 foot buffer on either side of the path, we can see where the buffers from all paths meet.  $12.5 \times 2$  is 25 feet. We need to put all the paths from the year together to evaluate how well Finley Butte complied with this rule, which we will see in the next graphic.

#### 4. Aggregate (all 2023 SEM path Buffers)



**Frame 4:** In this graphic, we have compiled all of the SEM path buffers from each of the four quarters into one graphic. Areas that are in blue are where operators complied with Oregon's 25 foot rule. Areas where we can see the satellite imagery are where paths aren't offset by 25 feet, which means the operator failed to comply with the law. The only way we can evaluate this is through the ability to view all four paths/buffers around paths from each of the quarterly reports. This underscores how GIS analysis makes compliance monitoring more efficient.

## WHY THIS METHODOLOGY?

By translating all of this data into a format that is usable in GIS software, we have the ability to look at data from across quarterly reports, or even years, in one environment. This allows us to see if areas have been repeatedly excluded from SEM each quarter, if the landfill operator has indeed monitored every 25 feet of the landfill over the course of a year, or if there are areas that repeatedly have high emissions for integrated monitoring.

Furthermore, we can plug in more spatial data for further exploration. Possibilities we didn't examine in this report, but are possible include: adding data on gas extraction wells, data on landfill cover infrastructure, or pulling in third party methane detection data such as Carbon Mapper, which detects methane plumes from space. The ability to see where landfills are experiencing methane exceedances from different sources of detection alongside their gas collection system infrastructure could generate effective insights on weaknesses in landfill gas systems, areas that need better or more frequent monitoring, or areas that DEQ needs to prioritize inspecting.

## RESULTS AND DISCUSSION

### Which Oregon landfills accepting municipal solid waste are complying with the DEQ rules adopted in 2021?

Oregon landfills are required to adhere to stricter DEQ requirements for methane management if they exceed 200,000 tons or more of lifetime waste-in-place and if their projected methane generation reaches 664 or more tons a year. Currently 11 Oregon landfills that are open and accepting municipal solid waste meet these metrics based on DEQ provided data (Table 1). Once a landfill reaches these thresholds, they are required to conduct surface emissions monitoring for four consecutive quarterly monitoring periods, with differing requirements thereafter if there is no measured concentration of methane of 200 ppm or greater are discovered during SEM.

Seven of the 11 MSW landfills are privately owned and operated while the other four are owned and operated by a county government. In total, all 11 landfills have a combined modeled methane generation of 169,943 tons in 2023, equivalent to the emissions of 1.6 billion gallons of gasoline burned.[23] The DEQ stated, “In 2017, six of the twenty-five largest stationary sources of GHG emissions in Oregon were landfills.”[24] The seven private landfills were typically larger, occupying the top five ranked positions by total waste. On the other hand, the four public landfills held three of the bottom four slots by total waste. All 11 landfills are currently in operation and accepting municipal waste as of 2024.

Based on the numbers in Table 1 from Oregon DEQ, we would expect that all 11 Oregon MSW landfills would be subject to the stricter requirements of the state’s current landfill emissions rules pertaining to conducting quarterly surface emissions monitoring. Through analyzing records and conversations with DEQ, we found that three landfills are not held to those higher standards. Each of these three landfills claimed unique circumstances specified below.

### **Examples of limited or non compliance:**

**1** Hillsboro Landfill, managed by Waste Management, Inc., was granted an exception to conducting surface emissions monitoring in its Title V operating permit by the DEQ, and does not have to comply with SEM requirements until April 2025. DEQ did not specify why.

**2** Roseburg Landfill, managed by Douglas County, has not complied, and, as of May 2024, DEQ has stated they are looking into enforcement. We have not heard any developments since.

**3** Baker Sanitary Landfill, managed by a local private company, claimed that its facility is two separate landfills, enabling it to divide its methane emissions between the two facilities and fall below the 664 tons threshold. DEQ has accepted this explanation although its own records present the landfill as one facility.

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[23] [22] OAR 340-239-700(3)(c). We first converted methane to a co2 equivalent of 84.

[24] [22] OAR 340-239-700(3)(c)., page 3

*Table 1: Open Oregon MSW Landfills waste-in-place and Annual Methane Generation*

| Landfill, Owner-Operator                 | Owner-Operator Type | Total Lifetime Waste In Place (Tons) | Annual Methane Generation (Tons) |
|------------------------------------------|---------------------|--------------------------------------|----------------------------------|
| Columbia Ridge Landfill, WM              | Private             | 64,358,280                           | 43,497                           |
| Coffin Butte Landfill, Republic Services | Private             | 18,269,157                           | 34,777                           |
| Hillsboro Landfill, Waste Management     | Private             | 13,158,408                           | 13,933                           |
| Finley Butte Landfill, Waste Connections | Private             | 13,158,408                           | 13,933                           |
| Short Mountain Landfill, Lane County     | County Government   | 11,750,975                           | 13,042                           |
| Dry Creek Landfill, Waste Connections    | Private             | 9,075,149                            | 14,090                           |
| Wasco County Landfill, Waste Connections | Private             | 6,006,973                            | 6,138                            |
| Knott Landfill, Deschutes County         | County Government   | 4,642,663                            | 3,826                            |
| Roseburg Landfill, Douglas County        | County Government   | 3,696,825                            | 35,058                           |
| Crook County Landfill, Crook County      | County Government   | 1,116,102                            | 739                              |
| Baker Landfill, Baker Sanitary Service   | Private             | 766,113                              | 778                              |

Caption: The table features waste-in-place and methane generation rates for Oregon landfills accepting municipal solid waste while DEQ finalized rulemaking in 2021. Landfills highlighted in green were held to the updated SEM standards in 2023 and included in our analysis.

## How much landfill surface area is being excluded from SEM?

We found that Oregon private landfill operators have excluded landfill areas from basic monitoring much more frequently than their publicly operated counterparts. During 2023 private landfills in Oregon exclude an average of 48.6% of landfill surface area from SEM each quarterly monitoring. On the other hand, county government operated landfills exclude an average of 10% surface area from SEM. We documented all exclusions, whether those exclusions have been shown to comply with Oregon rules or are more ambiguous.

Some landfills chose to give a reason for an exemption, and in other cases we were able to speculate a reason based on the design of the landfill. For example, we noticed Short Mountain, operated by Lane County, continuously did not monitor their asbestos pit, but did not specify that reason. In other cases, the landfill simply stated areas were exempt without providing a description and how a claimed exemption complies with the requirements, and we were unable to determine the criteria used to comply with exemption requests. Given this pattern, it was difficult to ascertain which exceptions were for working faces or other reasons consistently across all landfills. For this reason, we combined all exemptions to get a higher level view.

Table 2

| Landfill, Operator              | Private/Public | Quarter  | Total Area (acres) | Exempted areas | % Excluded |
|---------------------------------|----------------|----------|--------------------|----------------|------------|
| Finley Butte, Waste Connections | Private        | 2023 - 1 | 140.08             | 37.52          | 26.78%     |
| Finley Butte, Waste Connections | Private        | 2023 - 2 | 140.08             | 46.72          | 33.36%     |
| Finley Butte, Waste Connections | Private        | 2023 - 3 | 140.08             | 80.92          | 57.77%     |

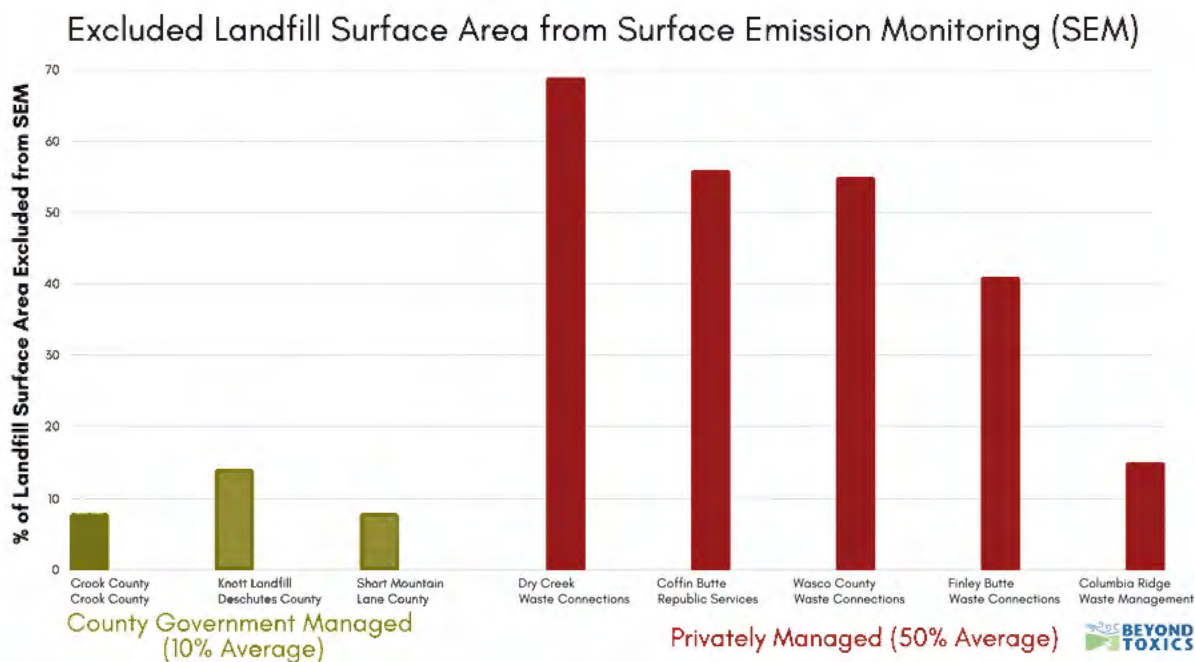
|                                       |         |          |        |        |        |
|---------------------------------------|---------|----------|--------|--------|--------|
| Finley Butte,<br>Waste<br>Connections | Private | 2023 - 4 | 140.08 | 63.23  | 45.14% |
| Dry Creek, Waste<br>Connections       | Private | 2023 - 1 | 85.86  | 59.62  | 69.45% |
| Dry Creek, Waste<br>Connections       | Private | 2023 - 2 | 85.86  | 59.62  | 69.45% |
| Dry Creek, Waste<br>Connections       | Private | 2023 - 3 | 85.86  | 59.62  | 69.45% |
| Dry Creek, Waste<br>Connections       | Private | 2023 - 4 | 85.86  | 59.62  | 69.45% |
| Wasco County,<br>Waste<br>Connections | Private | 2023 - 1 | 176.27 | 109.50 | 62.12% |
| Wasco County,<br>Waste<br>Connections | Private | 2023 - 2 | 176.27 | 81.89  | 46.45% |
| Wasco County,<br>Waste<br>Connections | Private | 2023 - 3 | 176.27 | 89.41  | 50.72% |
| Wasco County,<br>Waste<br>Connections | Private | 2023 - 4 | 176.27 | 100.22 | 56.86% |
| Coffin Butte,<br>Republic Services    | Private | 2023 - 1 | 136.34 | 84.21  | 61.77% |
| Coffin Butte,<br>Republic Services    | Private | 2023 - 2 | 136.34 | 74.04  | 54.31% |

|                                        |         |          |        |       |        |
|----------------------------------------|---------|----------|--------|-------|--------|
| Coffin Butte,<br>Republic Services     | Private | 2023 - 3 | 136.34 | 74.04 | 54.31% |
| Coffin Butte,<br>Republic Services     | Private | 2023 - 4 | 136.34 | 71.87 | 52.71% |
| Columbia Ridge,<br>Waste<br>Management | Private | 2023 - 1 | 335.53 | 41.13 | 12.26% |
| Columbia Ridge,<br>Waste<br>Management | Private | 2023 - 2 | 85.86  | 46.96 | 14.00% |
| Columbia Ridge,<br>Waste<br>Management | Private | 2023 - 3 | 85.86  | 45.83 | 13.66% |
| Columbia Ridge,<br>Waste<br>Management | Private | 2023 - 4 | 176.27 | 64.26 | 19.15% |
| Knott Landfill,<br>Deschutes County    | Public  | 2023 - 1 | 107.48 | 14.91 | 13.88% |
| Knott Landfill,<br>Deschutes County    | Public  | 2023 - 2 | 107.48 | 12.92 | 12.02% |
| Knott Landfill,<br>Deschutes County    | Public  | 2023 - 3 | 107.48 | 16.05 | 14.93% |
| Knott Landfill,<br>Deschutes County    | Public  | 2023 - 4 | 107.48 | 17.14 | 15.95% |
| Short Mountain,<br>Lane County         | Public  | 2023 - 1 | 111.34 | 9.30  | 8.35%  |
| Short Mountain,<br>Lane County         | Public  | 2023 - 2 | 111.34 | 9.30  | 8.35%  |
| Short Mountain,<br>Lane County         | Public  | 2023 - 3 | 111.34 | 9.30  | 8.35%  |

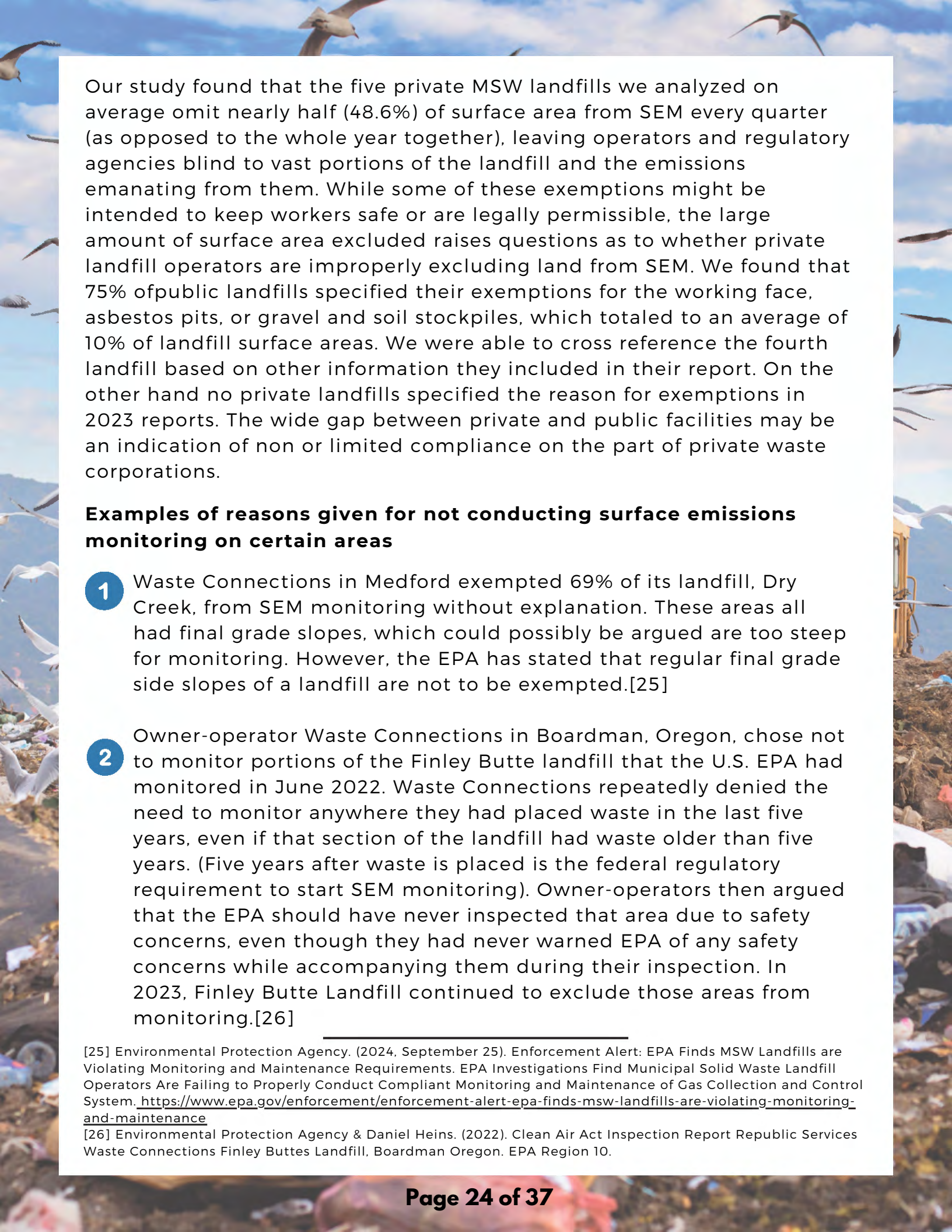
|                                |        |          |        |      |       |
|--------------------------------|--------|----------|--------|------|-------|
| Short Mountain,<br>Lane County | Public | 2023 - 4 | 111.34 | 9.30 | 8.35% |
| Crook County,<br>Crook County  | Public | 2023 - 1 | 84.52  | 5.82 | 6.88% |
| Crook County,<br>Crook County  | Public | 2023 - 2 | 84.52  | 6.29 | 7.44% |
| Crook County,<br>Crook County  | Public | 2023 - 3 | 84.52  | 6.96 | 8.23% |
| Crook County,<br>Crook County  | Public | 2023 - 4 | 84.52  | 6.50 | 7.69% |

The table above features the eight landfills following stricter SEM protocols and the data we were able to derive from their reports. Note that the working face is included in exemptions for SEM because most landfills did not specify the location and why an area of land was exempt. Total acres for landfills did not change over the course of a year because operators did not add any landfill surface area.

Figure 2.



Caption: The bar graph shows the average percentage of landfill surface area omitted from SEM by landfill site. Privately operated landfills for the most part excluded far more surface area than their government operated counterparts.



Our study found that the five private MSW landfills we analyzed on average omit nearly half (48.6%) of surface area from SEM every quarter (as opposed to the whole year together), leaving operators and regulatory agencies blind to vast portions of the landfill and the emissions emanating from them. While some of these exemptions might be intended to keep workers safe or are legally permissible, the large amount of surface area excluded raises questions as to whether private landfill operators are improperly excluding land from SEM. We found that 75% of public landfills specified their exemptions for the working face, asbestos pits, or gravel and soil stockpiles, which totaled to an average of 10% of landfill surface areas. We were able to cross reference the fourth landfill based on other information they included in their report. On the other hand no private landfills specified the reason for exemptions in 2023 reports. The wide gap between private and public facilities may be an indication of non or limited compliance on the part of private waste corporations.

### **Examples of reasons given for not conducting surface emissions monitoring on certain areas**

- 1** Waste Connections in Medford exempted 69% of its landfill, Dry Creek, from SEM monitoring without explanation. These areas all had final grade slopes, which could possibly be argued are too steep for monitoring. However, the EPA has stated that regular final grade side slopes of a landfill are not to be exempted.[25]
- 2** Owner-operator Waste Connections in Boardman, Oregon, chose not to monitor portions of the Finley Butte landfill that the U.S. EPA had monitored in June 2022. Waste Connections repeatedly denied the need to monitor anywhere they had placed waste in the last five years, even if that section of the landfill had waste older than five years. (Five years after waste is placed is the federal regulatory requirement to start SEM monitoring). Owner-operators then argued that the EPA should have never inspected that area due to safety concerns, even though they had never warned EPA of any safety concerns while accompanying them during their inspection. In 2023, Finley Butte Landfill continued to exclude those areas from monitoring.[26]

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[25] Environmental Protection Agency. (2024, September 25). Enforcement Alert: EPA Finds MSW Landfills are Violating Monitoring and Maintenance Requirements. EPA Investigations Find Municipal Solid Waste Landfill Operators Are Failing to Properly Conduct Compliant Monitoring and Maintenance of Gas Collection and Control System. <https://www.epa.gov/enforcement/enforcement-alert-epa-finds-msw-landfills-are-violating-monitoring-and-maintenance>

[26] Environmental Protection Agency & Daniel Heins. (2022). Clean Air Act Inspection Report Republic Services Waste Connections Finley Buttes Landfill, Boardman Oregon. EPA Region 10.

3

Republic Services, the owner-operator of Coffin Butte landfill near Corvallis, Oregon, argued 30-40 acres[27] of its landfill had too much vegetation to monitor. We would emphasize the owner-operators chose not to maintain the vegetation, which means this is a problem they created. Vegetation breaks through the upper cover material which would be highly prone to methane leakage (figure 3).

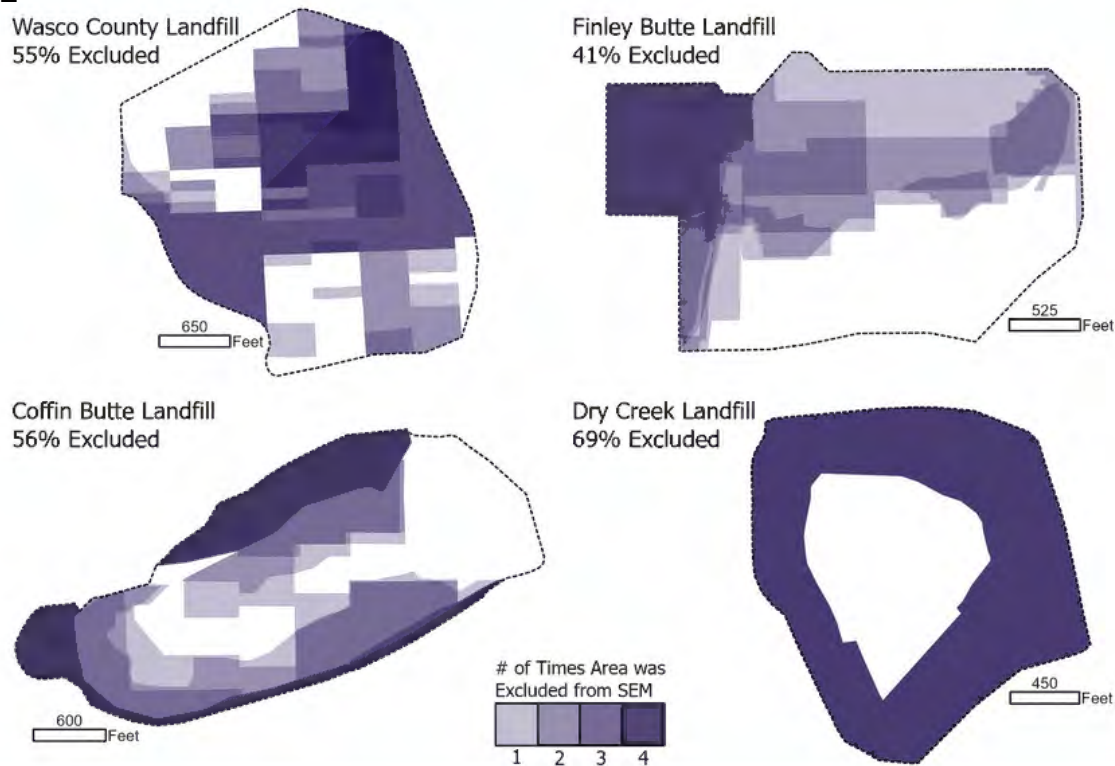


Caption: The EPA found multiple instances of vegetation growing through the tarp of the Coffin Butte landfill in both 2022 and 2024. The picture is one such example. The EPA measured methane at 1,000 ppm, twice the regulatory limit, near the base of the plant. Operators are supposed to constantly monitor the tarp integrity to ensure that there are no areas where methane could be leaking.

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[27] Coffin Butte specifically exempted 40 acres in quarter 3 2022 and 30 acres in quarter 4 for high vegetation (both outside of our study). However, they continued to exempt the same areas in 2023, which spans the duration of our study, but they decline to specify the reason. We assume they are exempting those areas for the same reason based on satellite imagery from the times of inspection in 2023.

Figure 2

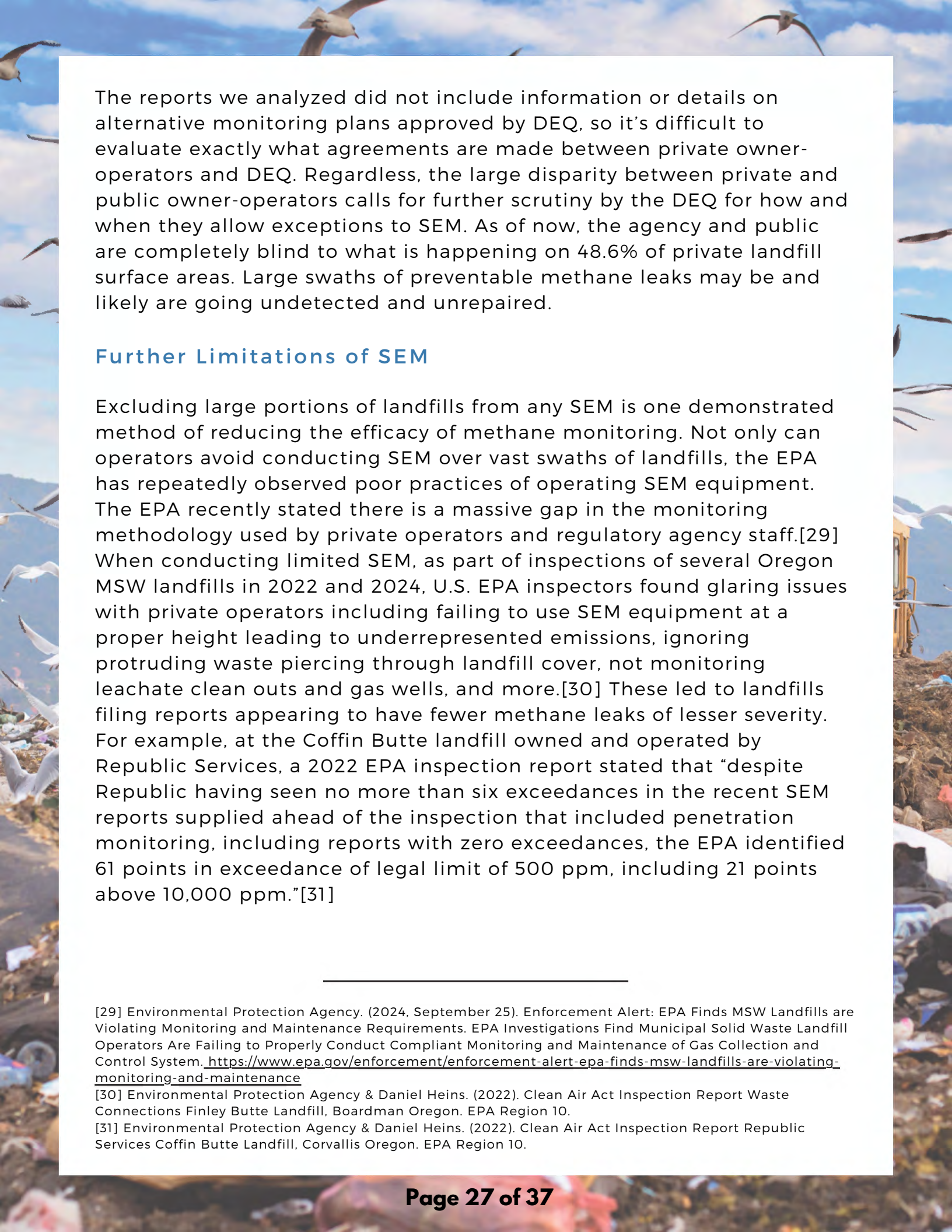


Caption: The maps feature four privately operated Oregon landfills with waste deposits outlined in black dotted lines. Each exempted area for the four quarterly reports in 2024 is layered and features where operators did not conduct SEM. The darker the shade of violet, the more frequently the area of the landfill went unmonitored. Oregon's private landfills excluded an average of 48.6% of landfill surface area from each quarterly monitoring.

Oregon rules exempt “the working face of the landfill to areas of the landfill surface where the landfill cover material has been removed and solid waste has been exposed for the purpose of installing, expanding, replacing, or repairing components of the landfill gas, leachate, or gas condensate collection and removal system, for conducting a remedial action, or for law enforcement activities requiring excavation. Rules specify this exclusion should be kept to the minimum size and time duration as possible.”[28]

However, Oregon rules also allow for an alternative monitoring plan for “Alternative walking patterns to address potential safety and other issues, such as: steep or slippery slopes, monitoring instrument obstructions, and physical obstructions” approved by DEQ.

[28] <https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=6533>



The reports we analyzed did not include information or details on alternative monitoring plans approved by DEQ, so it's difficult to evaluate exactly what agreements are made between private owner-operators and DEQ. Regardless, the large disparity between private and public owner-operators calls for further scrutiny by the DEQ for how and when they allow exceptions to SEM. As of now, the agency and public are completely blind to what is happening on 48.6% of private landfill surface areas. Large swaths of preventable methane leaks may be and likely are going undetected and unrepaired.

### Further Limitations of SEM

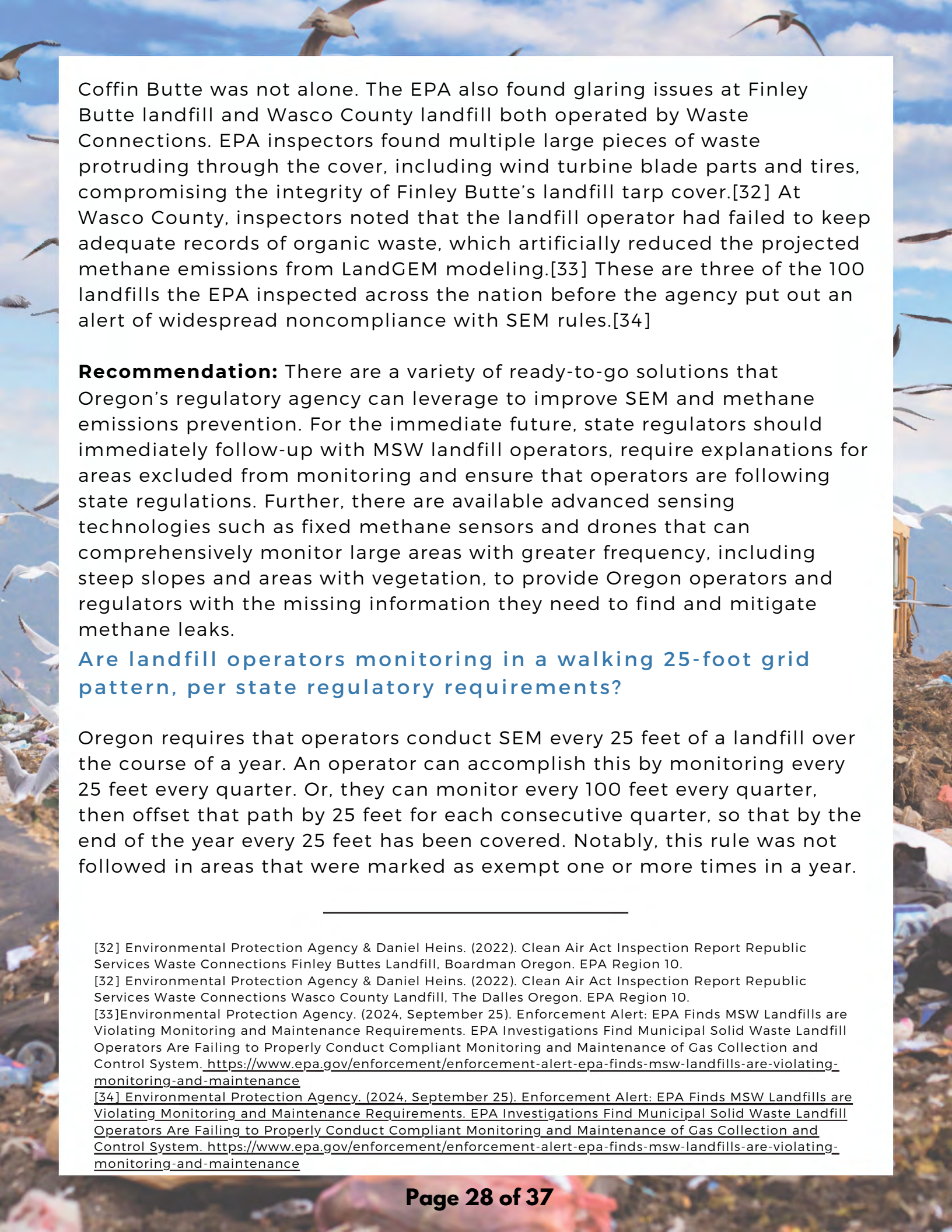
Excluding large portions of landfills from any SEM is one demonstrated method of reducing the efficacy of methane monitoring. Not only can operators avoid conducting SEM over vast swaths of landfills, the EPA has repeatedly observed poor practices of operating SEM equipment. The EPA recently stated there is a massive gap in the monitoring methodology used by private operators and regulatory agency staff.[29] When conducting limited SEM, as part of inspections of several Oregon MSW landfills in 2022 and 2024, U.S. EPA inspectors found glaring issues with private operators including failing to use SEM equipment at a proper height leading to underrepresented emissions, ignoring protruding waste piercing through landfill cover, not monitoring leachate clean outs and gas wells, and more.[30] These led to landfills filing reports appearing to have fewer methane leaks of lesser severity. For example, at the Coffin Butte landfill owned and operated by Republic Services, a 2022 EPA inspection report stated that “despite Republic having seen no more than six exceedances in the recent SEM reports supplied ahead of the inspection that included penetration monitoring, including reports with zero exceedances, the EPA identified 61 points in exceedance of legal limit of 500 ppm, including 21 points above 10,000 ppm.”[31]

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[29] Environmental Protection Agency. (2024, September 25). Enforcement Alert: EPA Finds MSW Landfills are Violating Monitoring and Maintenance Requirements. EPA Investigations Find Municipal Solid Waste Landfill Operators Are Failing to Properly Conduct Compliant Monitoring and Maintenance of Gas Collection and Control System. <https://www.epa.gov/enforcement/enforcement-alert-epa-finds-msw-landfills-are-violating-monitoring-and-maintenance>

[30] Environmental Protection Agency & Daniel Heins. (2022). Clean Air Act Inspection Report Waste Connections Finley Butte Landfill, Boardman Oregon. EPA Region 10.

[31] Environmental Protection Agency & Daniel Heins. (2022). Clean Air Act Inspection Report Republic Services Coffin Butte Landfill, Corvallis Oregon. EPA Region 10.



Coffin Butte was not alone. The EPA also found glaring issues at Finley Butte landfill and Wasco County landfill both operated by Waste Connections. EPA inspectors found multiple large pieces of waste protruding through the cover, including wind turbine blade parts and tires, compromising the integrity of Finley Butte's landfill tarp cover.[32] At Wasco County, inspectors noted that the landfill operator had failed to keep adequate records of organic waste, which artificially reduced the projected methane emissions from LandGEM modeling.[33] These are three of the 100 landfills the EPA inspected across the nation before the agency put out an alert of widespread noncompliance with SEM rules.[34]

**Recommendation:** There are a variety of ready-to-go solutions that Oregon's regulatory agency can leverage to improve SEM and methane emissions prevention. For the immediate future, state regulators should immediately follow-up with MSW landfill operators, require explanations for areas excluded from monitoring and ensure that operators are following state regulations. Further, there are available advanced sensing technologies such as fixed methane sensors and drones that can comprehensively monitor large areas with greater frequency, including steep slopes and areas with vegetation, to provide Oregon operators and regulators with the missing information they need to find and mitigate methane leaks.

### **Are landfill operators monitoring in a walking 25-foot grid pattern, per state regulatory requirements?**

Oregon requires that operators conduct SEM every 25 feet of a landfill over the course of a year. An operator can accomplish this by monitoring every 25 feet every quarter. Or, they can monitor every 100 feet every quarter, then offset that path by 25 feet for each consecutive quarter, so that by the end of the year every 25 feet has been covered. Notably, this rule was not followed in areas that were marked as exempt one or more times in a year.

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[32] Environmental Protection Agency & Daniel Heins. (2022). Clean Air Act Inspection Report Republic Services Waste Connections Finley Buttes Landfill, Boardman Oregon. EPA Region 10.

[32] Environmental Protection Agency & Daniel Heins. (2022). Clean Air Act Inspection Report Republic Services Waste Connections Wasco County Landfill, The Dalles Oregon. EPA Region 10.

[33] Environmental Protection Agency. (2024, September 25). Enforcement Alert: EPA Finds MSW Landfills are Violating Monitoring and Maintenance Requirements. EPA Investigations Find Municipal Solid Waste Landfill Operators Are Failing to Properly Conduct Compliant Monitoring and Maintenance of Gas Collection and Control System. <https://www.epa.gov/enforcement/enforcement-alert-epa-finds-msw-landfills-are-violating-monitoring-and-maintenance>

[34] Environmental Protection Agency. (2024, September 25). Enforcement Alert: EPA Finds MSW Landfills are Violating Monitoring and Maintenance Requirements. EPA Investigations Find Municipal Solid Waste Landfill Operators Are Failing to Properly Conduct Compliant Monitoring and Maintenance of Gas Collection and Control System. <https://www.epa.gov/enforcement/enforcement-alert-epa-finds-msw-landfills-are-violating-monitoring-and-maintenance>

Five of the eight landfill operators did not report the GPS route they took to conduct SEM. Unfortunately, they are not required to report this information by Oregon rule. In our analysis of walking 25-foot grid patterns, we focused on landfill reports that provided actual monitoring paths because actual monitoring each quarter differs substantially from planned monitoring paths (see Figure 4).

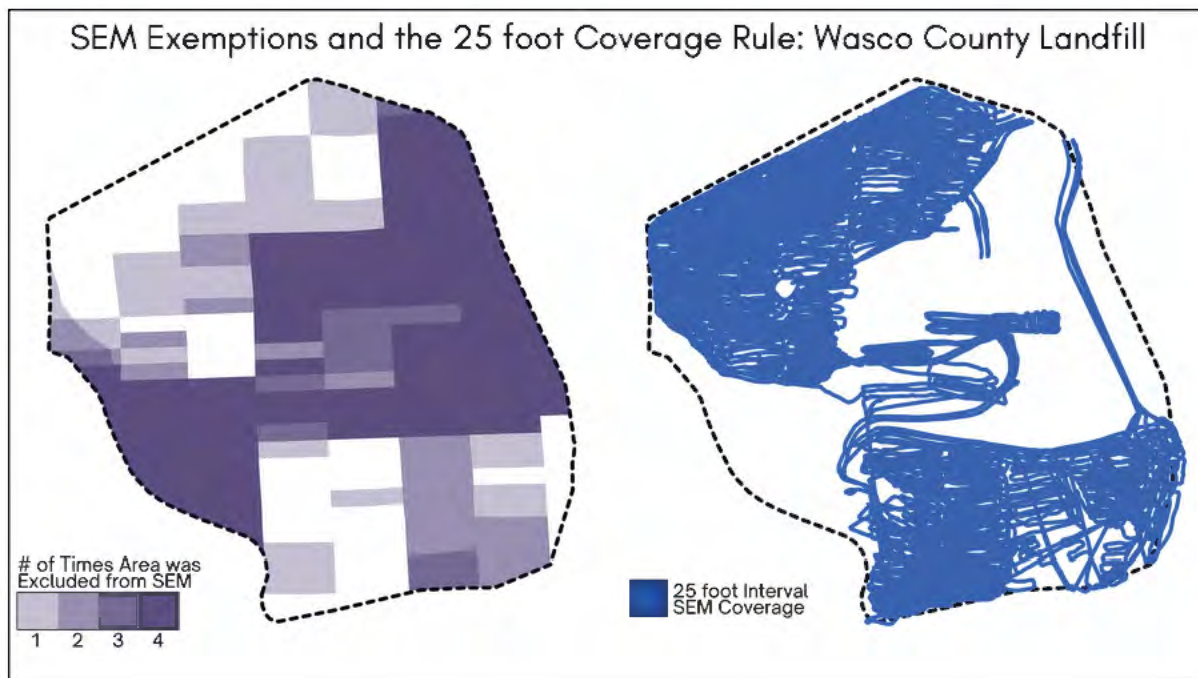
*Figure 4 - Planned SEM route Differs Greatly from Actual SEM route*



Caption: The first frame of the figure features a planned SEM path that the Coffin Butte Landfill operator submitted to the DEQ. The second frame is a map of the actual GPS tracked SEM route. We can see far less of the landfill was actually monitored with the GPS path than the estimated route. These GPS referenced paths are much more accurate than planned routes when evaluating the comprehensiveness of SEM.

Only three out of eight MSW landfills (Coffin Butte, Finley Butte, and Wasco County) that conducted SEM voluntarily reported the GPS tracked SEM monitoring path. Our analysis found that, for the most part, those landfill operators that shared their SEM traversed path in reports appeared to have followed this rule with some room for improvement and one substantial failure. Given many of these operators excluded substantial surface area of their landfill from any SEM (see above section), the 25 foot rule was often not followed in areas that were excluded one or more times (Figure 5).

Figure 5



Caption: On the left is Waste Connections' exempted areas for Wasco County Landfill in 2023. The darker shade of violet, the more often that area was excluded from SEM over the course of the year. On the right, the graphic shows how the 25 foot rule was followed. If an area is completely blue, the 25 foot rule was followed. Gaps of white show where operators failed to monitor every 25 feet. By comparing the two graphics, we can see that operators most consistently met the 25 foot rule in areas that were monitored all four quarters. We can also observe the inverse relationship. The more often operators excluded an area from SEM, the more that area failed to follow the 25 foot rule.



**Recommendation:** This can easily be remedied by adding GPS tracked SEM paths to the recordkeeping and reporting requirements in OAR 340-239-0700, and a similar mechanism at the federal level. It would be beneficial to require that this data is not only reported in print form, but also in some spatial data format (shapefile, GeoJSON, etc.). The reason for this is Oregon does not require monitoring every 25 feet every quarter. Rather, they require that over the course of a calendar year, every 25 feet of a landfill is monitored. Having access to the spatial data will allow regulatory agencies to view all quarterly monitoring paths and results at once, and quickly verify the results.

### Are landfill operators conducting integrated monitoring and reporting results?

Integrated monitoring is a key early identification monitoring strategy to identify where there are problematic methane emissions. It involves dividing the landfill into an integrated monitoring grid of 50,000 square foot cells, an area slightly smaller than a football field. After conducting SEM looking for individual, instantaneous exceedances of 500 ppm, the operators create an aggregate reading for each 50,000 square foot cell by averaging all individual SEM readings within each grid. If a grid has an aggregate SEM average above 25 ppm, then the landfill needs to perform remediation and do follow up SEM to ensure the average falls below 25 ppm.[35] State regulations require the landfill to report integrated monitoring exceedances over 25 ppm. State regulations do not specifically require the reporting of operators' integrated monitoring grids or non-exceedance integrated monitoring results. The requirements only stipulate that operators must tell DEQ if they have a 50,000 square foot cell exceeding 25 ppm.

Given that, we found that seven out of eight landfills reported at least some integrated monitoring result. Two of those landfills only reported their grid cells that exceeded 25 ppm as legally required. Five out of eight voluntarily shared all of their integrated monitoring results – the average SEM reading for each grid cell including their exceedances of 25 ppm.[36] The last landfill either did not have a 25 ppm integrated exceedance, or it simply did not report any data

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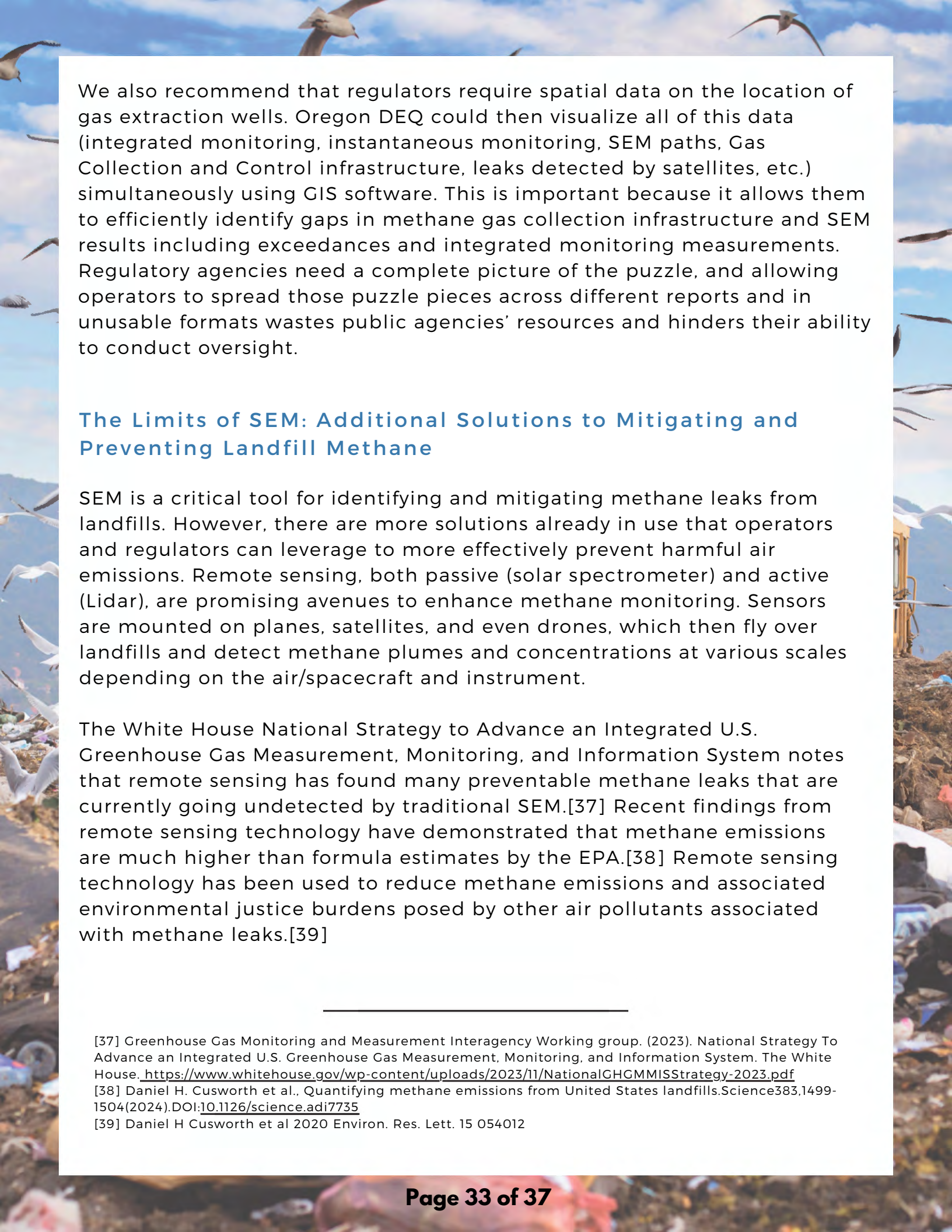
[35] [https://www.oregon.gov/deq/EQCdocs/100121\\_I\\_Slides.pdf](https://www.oregon.gov/deq/EQCdocs/100121_I_Slides.pdf)

[36] <https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=6533> 340-239-0700, 3(c) Semi-Annual Report. A landfill owner or operator subject to this rule, must prepare semi-annual reports for the periods of January 1 through June 30 of each year, unless otherwise approved in writing by DEQ. The Semi-Annual Report will be due on July 30, unless otherwise approved in writing by DEQ. The Semi-Annual Report must contain the following information:

[illegible]

Oregon Administrative Rules do not require operators to report the grid or integrated monitoring results unless a grid exceeds 25 ppm. We strongly recommend regulatory agencies require this basic information and they add a requirement for it to be in a spatial data format. We also recommend agencies require all SEM measurements and the coordinate it was recorded at (also in spatial data). Some landfills already report this information, but it's in a print table, which is too time intensive for a state agency to turn into spatial data.

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We also recommend that regulators require spatial data on the location of gas extraction wells. Oregon DEQ could then visualize all of this data (integrated monitoring, instantaneous monitoring, SEM paths, Gas Collection and Control infrastructure, leaks detected by satellites, etc.) simultaneously using GIS software. This is important because it allows them to efficiently identify gaps in methane gas collection infrastructure and SEM results including exceedances and integrated monitoring measurements. Regulatory agencies need a complete picture of the puzzle, and allowing operators to spread those puzzle pieces across different reports and in unusable formats wastes public agencies' resources and hinders their ability to conduct oversight.

### **The Limits of SEM: Additional Solutions to Mitigating and Preventing Landfill Methane**

SEM is a critical tool for identifying and mitigating methane leaks from landfills. However, there are more solutions already in use that operators and regulators can leverage to more effectively prevent harmful air emissions. Remote sensing, both passive (solar spectrometer) and active (Lidar), are promising avenues to enhance methane monitoring. Sensors are mounted on planes, satellites, and even drones, which then fly over landfills and detect methane plumes and concentrations at various scales depending on the air/spacecraft and instrument.

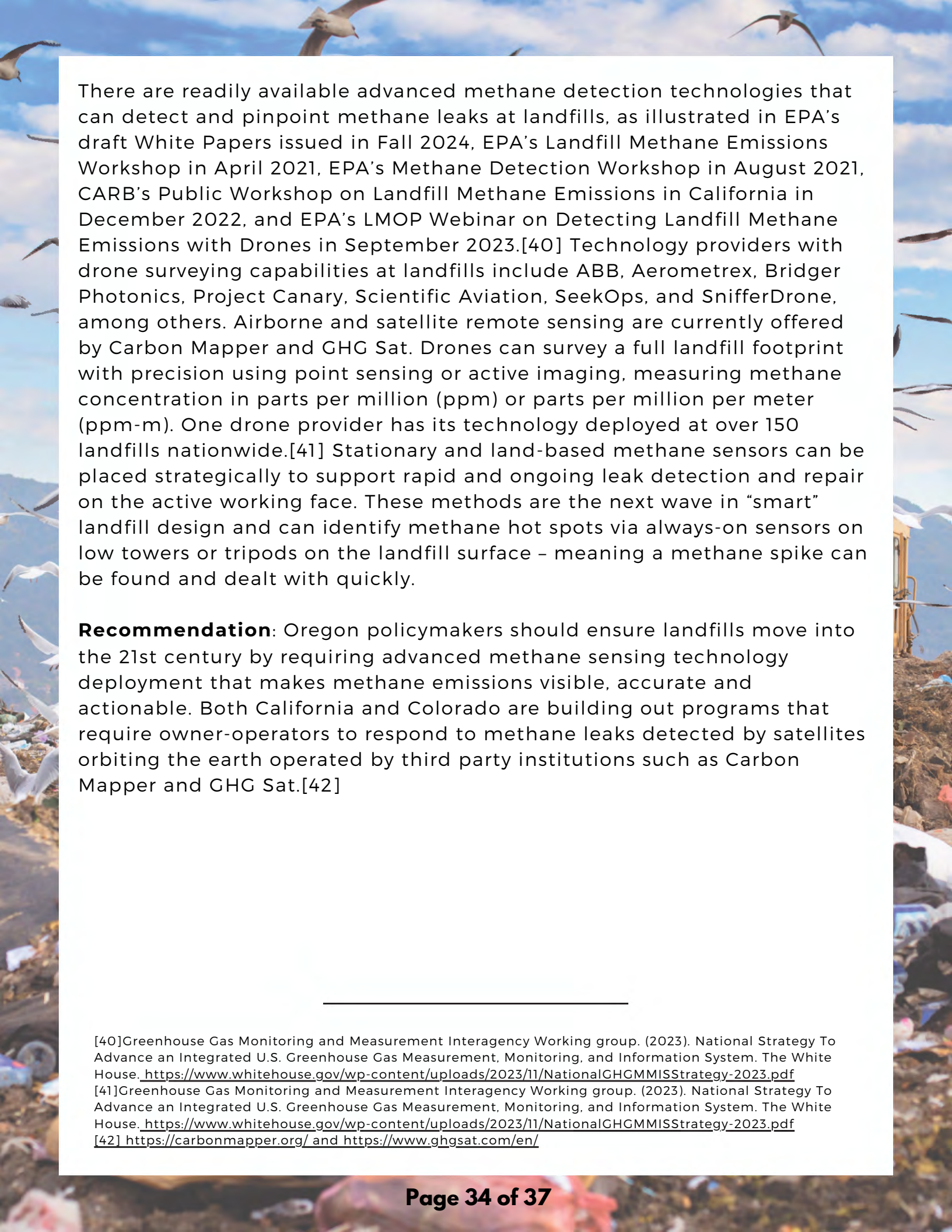
The White House National Strategy to Advance an Integrated U.S. Greenhouse Gas Measurement, Monitoring, and Information System notes that remote sensing has found many preventable methane leaks that are currently going undetected by traditional SEM.[37] Recent findings from remote sensing technology have demonstrated that methane emissions are much higher than formula estimates by the EPA.[38] Remote sensing technology has been used to reduce methane emissions and associated environmental justice burdens posed by other air pollutants associated with methane leaks.[39]

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[37] Greenhouse Gas Monitoring and Measurement Interagency Working group. (2023). National Strategy To Advance an Integrated U.S. Greenhouse Gas Measurement, Monitoring, and Information System. The White House. <https://www.whitehouse.gov/wp-content/uploads/2023/11/NationalGHGMMISStrategy-2023.pdf>

[38] Daniel H. Cusworth et al., Quantifying methane emissions from United States landfills. *Science* 383, 1499-1504 (2024). DOI:10.1126/science.adf7735

[39] Daniel H Cusworth et al 2020 *Environ. Res. Lett.* 15 054012



There are readily available advanced methane detection technologies that can detect and pinpoint methane leaks at landfills, as illustrated in EPA's draft White Papers issued in Fall 2024, EPA's Landfill Methane Emissions Workshop in April 2021, EPA's Methane Detection Workshop in August 2021, CARB's Public Workshop on Landfill Methane Emissions in California in December 2022, and EPA's LMOP Webinar on Detecting Landfill Methane Emissions with Drones in September 2023.[40] Technology providers with drone surveying capabilities at landfills include ABB, Aerometrex, Bridger Photonics, Project Canary, Scientific Aviation, SeekOps, and SnifferDrone, among others. Airborne and satellite remote sensing are currently offered by Carbon Mapper and GHG Sat. Drones can survey a full landfill footprint with precision using point sensing or active imaging, measuring methane concentration in parts per million (ppm) or parts per million per meter (ppm-m). One drone provider has its technology deployed at over 150 landfills nationwide.[41] Stationary and land-based methane sensors can be placed strategically to support rapid and ongoing leak detection and repair on the active working face. These methods are the next wave in "smart" landfill design and can identify methane hot spots via always-on sensors on low towers or tripods on the landfill surface – meaning a methane spike can be found and dealt with quickly.

**Recommendation:** Oregon policymakers should ensure landfills move into the 21st century by requiring advanced methane sensing technology deployment that makes methane emissions visible, accurate and actionable. Both California and Colorado are building out programs that require owner-operators to respond to methane leaks detected by satellites orbiting the earth operated by third party institutions such as Carbon Mapper and GHG Sat.[42]

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[40]Greenhouse Gas Monitoring and Measurement Interagency Working group. (2023). National Strategy To Advance an Integrated U.S. Greenhouse Gas Measurement, Monitoring, and Information System. The White House. <https://www.whitehouse.gov/wp-content/uploads/2023/11/NationalGHGMMISStrategy-2023.pdf>

[41]Greenhouse Gas Monitoring and Measurement Interagency Working group. (2023). National Strategy To Advance an Integrated U.S. Greenhouse Gas Measurement, Monitoring, and Information System. The White House. <https://www.whitehouse.gov/wp-content/uploads/2023/11/NationalGHGMMISStrategy-2023.pdf>

[42] <https://carbonmapper.org/> and <https://www.ghgsat.com/en/>

## Diverting Organic Waste

Given that methane generation is the byproduct of placing organic waste in landfills, an obvious solution is to stop placing organic waste into landfills. Food rescue, food waste as an animal feedstock, composting food waste, placing synthetic organics (inorganic/organic hybrids for example carpet) in anaerobic digesters, and other forms of waste sorting are desirable alternatives to landfilling or incineration. These strategies preserve space in landfills for other uses, preventing or significantly delaying the need for landfill expansions and, depending on the policy, make progress towards zero-waste circular economies.

It's critical to note that methane is generated over the course of decades. Therefore, while organic diversion is an important solution to implement, we will need to monitor and mitigate methane from active and closed landfills decades into the future regardless.

## CONCLUSION

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In this report, we analyzed 36 Surface Emissions Monitoring (SEM) reports from eight currently operating municipal solid waste landfills in Oregon. We found that landfills in Oregon have varying levels of compliance with state regulations. Additionally, although legal, owner-operators under-report key pieces of information, which make it hard for regulators to ensure full compliance with the law. The Oregon DEQ needs to act quickly to remedy this situation by requiring owner-operators to monitor larger sections of their landfills and use other forms of monitoring when walking SEM is not possible or to support walking SEM with early identification of leaking emissions. Landfills are responsible for 90% of Oregon's industriously produced methane emissions ahead of both enteric fermentation (cattle) and the oil and gas sector. Curbing the pollutant is key to mitigating climate damage in the immediate future. The technology is available, and taking advantage of it is low hanging fruit for fighting the climate crisis.

### Recommendations Review:

1

Use Advanced Methane Sensing Technology. Gathering this comprehensive data set will lead to rapid mitigation of super-emitter leaks, improved methane capture for use in local energy generation or methane destruction through enclosed flaring.

- The Oregon Department of Environmental Quality (DEQ)[43] should immediately move to require the use of advanced methane detection technology such as drones.
- Require landfill operators to respond to third party satellite methane detection systems, which provide comprehensive and more accurate measurements of the concentration of methane plumes, the direction of methane plumes off the landfill property, and the exact location of emission exceedances from landfills.

## 2 Update regulations to require Surface Emissions Monitoring (SEM) on all areas of landfills

- Require fixed monitors for real time methane tracking in unsafe or other areas to ensure full coverage and to protect workers from hazards of conducting walking SEM. This requirement should also be instituted for landfills with high volumes of odor complaints from nearby communities.
- Include steep slopes, closed cells, locations with covering vegetation and unspecified exemptions.
- Actionable emissions data combined with mitigation strategies such as vertical and horizontal gas collection is critical for reducing greenhouse gas impacts and associated air toxics such as VOCs, hydrogen sulfide, forever chemicals and fine particulate matter thereby improving air quality and climate mitigation.

## 3 Oregon DEQ should immediately address reporting gaps by updating their regulations to require landfill owners and operators who are required to conduct surface emissions monitoring to:

- Report all data in a spatial data format such as a shapefile, which makes for more efficient analysis of data gathered through surface emissions monitoring.
- Report and identify the areas exempted from monitoring and report the reasons for those exemptions.

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[43] Throughout this report we emphasize Oregon because these are the arenas at which Beyond Toxics focuses their advocacy. Our findings could be replicable in other states. Thus regulatory recommendations are likely also applicable to other U.S. states.

- Report measured concentration of methane in ppm for each instantaneous SEM reading and integrated monitoring results.
- The SEM path walked by operators.
- Gas Control and Collection System Infrastructure- Gas extraction wells, piping, landfill cover.

4

To prevent future potent methane emissions, advance mandatory organic diversion policies requiring consumers and haulers to sort organic waste so that food waste can be used as a resource that is sent to facilities other than landfills to make compost and other products thereby preventing future generation of methane in landfills.

## Acknowledgements

This report was funded by the U.S. Energy Foundation and Meyer Memorial Trust. We would like to thank Industrious Labs for providing funding to cover costs associated with procuring public records. We would like to thank the Rocky Mountain Institute, Carbon Mapper, and Industrious Labs for their technical assistance. We would also like to thank Zoe Kleiner, Leif Lindquist, and Jack Madigan, students at the University of Oregon, for their work in digitizing the spatial data from the 2023 SEM reports.



To: [landfillappeals@bentoncountyor.gov](mailto:landfillappeals@bentoncountyor.gov)

Subject: Oppose/Deny LU-24-027 – **Odor Complaints – Odor Patrols**

Dear Benton County Commissioners Wyse, Malone and Shepherd,

Submitted by:

Carol McClelland Fields – 37326 Soap Creek Road

PhD in Industrial/Organizational Psychology.

Co-Chair of Soap Creek Prepared (since 2022) and Soap Creek Valley Firewise (since 2023)

Author of five published books

10-year resident living less than 5 miles from Coffin Butte Landfill, which was less than 1/2 the size it is now when we moved here.

I have smelled the landfill stench INSIDE my house several times in 2025

Health challenges exacerbated by landfill toxins and PFAS

Avid observer of nature and impacts on the environment

I am writing because we strongly oppose any expansion of the Coffin Butte landfill and urge you to **uphold your Planning Commission's unanimous denial of LU-24-027**, Republic Services' application to expand the Coffin Butte Landfill. The Planning Commission carefully considered all evidence provided by the applicant, as well as considerable testimony, and concluded unanimously that the application did not meet the required Burden of Proof.

Expanding Coffin Butte Landfill **seriously threatens the livability on and uses of adjacent properties (and counties)** [Benton County Code 53.215 (1)], **seriously impacts the character of the area** [Benton County Code 53.215 (1)], **and imposes an undue burden on the county's and region's fire services, emergency management services, first responders, and health professionals and services, and the county's residents and neighboring residents.** [Benton County Code 53.215 (2)]

Topics I cover in this testimony:

- My personal experience with escalating landfill stench on my property about 4 miles from the landfill.
- Odor complaint process
- "Odor Patrol" by Republic Services and questionable factors

- “All landfill systems are operating normally,” which ignores neighbors’ personal experience of the landfill stench).
- *Why are the stories so different?*
  - **40 Methane Leaks** – EPA reports, maps of methane plumes
  - **53% and 62%** of Coffin Butte Landfill are **excluded from methane tracking**...why such a high percentage of area?

## Conclusions

- **Methane measurements and repairs MUST BE monitored by neutral, professionally qualified, third-party entities.**
- Given applicant’s loose, reckless, and blatant disregard for State and Federal laws, measuring protocols, and reporting standards, and Republic Services failures to repair methane leaks, **we cannot rely on or trust the Applicant’s ability to accurately measure and report what is happening at Coffin Butte even if they are using technological methods. Nor can we trust their ability or willingness to repair new or longstanding methane leaks.**

## MY PERSONAL EXPERIENCE

I live 4.1 miles south of Coffin Butte Landfill.

On a good day, I don't smell any landfill stench.

On a bad day, I smell the landfill stench as soon as I walk out my door in the morning. I limit my time outdoors on these days!

**On a very bad day, I smell the landfill stench INSIDE MY HOUSE!** Specifically on the second floor of my home. This has happened twice in 2025...so far. It's a very disconcerting sensation to meet that acrid stench inside my own home. This is new. Prior to 2025, I had never had this experience. It is hard to escape the stench and toxic cocktail of chemicals when there's nowhere else to go! The timing aligned with when Coffin Butte Landfill started turning the corner to set up cells to link the existing landfill and the gravel pit cells. **This does not bode well for the future when they start filling the gravel pits that align directly with Soap Creek Valley.**

**The smell that is not the most disconcerting aspect of this experience...it is knowing**

that the landfill stench is caused by dangerous chemicals and that methane is highly flammable.

**Methane itself is odorless.**

However, when methane is released into the atmosphere, methane is **accompanied by other toxic pollutants**. These chemicals have serious health impacts, primarily on the lungs and immune system.

This is why **Coffin Butte landfill gas stinks**:

**Hydrogen sulfide [H<sub>2</sub>S]**: Rotten-egg smell. Even low concentrations cause eye irritation, sore throat and cough, nausea, shortness of breath, and fluid in the lungs. Long-term, low-level exposure can cause headaches, dizziness, and memory issues. **Coffin Butte landfill gas has about 8 parts per million by volume.**

**Methyl Mercaptan [CH<sub>3</sub>SH]**: Bad fart smell / asparagus-pee smell, also produced by pulp mills. Detectable by humans down to 1 part per billion. **Coffin Butte landfill gas has 2300 times that level.**

**Isopropyl mercaptan [C<sub>3</sub>H<sub>8</sub>S]**: Skunk smell, extremely pungent. **Coffin Butte landfill gas has over 2 parts per million by volume.**

**Dimethyl sulfide [(CH<sub>3</sub>)<sub>2</sub>S]**: Rotten cabbage smell, also what you smell if a batch of home-brew goes bad. **Coffin Butte landfill gas has about 2 parts per million by volume.** #cleanair #corvallis  
(Resource 1: Google search)

In addition, Methane plumes often **carry PFAS (forever chemicals) and microplastics**; both of which are very toxic and are the cause of a number of dangerous health impacts. *(See Pam Castle's testimony for more details.)*

Furthermore, methane is **highly flammable**. Methane mixed with air can be an explosive combination. A disconcerting thought given that the nature of our region is bucolic meadows and forests as well as agricultural lands.

## **Odor Complaint**

When I report the bad and very bad days to the State of Oregon Department of Environmental Quality (DEQ) during February and March, my complaint was acknowledged by the Permitting and Compliance Specialist -- Air Quality. She informed the Coffin Butte Landfill's Environmental Manager, and he sends a response about what they noted on that

day. **Our odor patrol on the Xth at XX am did not detect anything. It includes driving out Soap Creek Road. All landfill systems were operating normally that day. Let me know if you have any questions.** Everyone who submits a complaint receives a message along this theme.

## Odor Patrol?

From what we can tell, Republic Services employees drive around trying to smell the landfill stench. We have questions.

**Olfactory fatigue** occurs when the olfactory receptors in the nose become desensitized to a noxious smell after being exposed to it for a long time. The nose filters out what it considers "background noise." This is a physiological response and cannot be overridden. When this happens, the person can no longer smell the landfill stench. Even if they have a number of people on Odor Patrol, working anywhere near the landfill has likely changed their ability to smell the stench.

**Geographic range.** How does the Odor Patrol know where to check for landfill stench. Do they only check when they smell it? Is it a daily operation? At what time of day? Are they constantly on the move? Where do they focus? We've heard of landfill stench complaints from people driving by the landfill on 99W as well as from people in North Corvallis, which is 8-12 miles away, and on Hwy 20 south of town.

**Altitude.** It's not enough to just measure the smell at ground level. Plumes of methane have been reported from drone / flight data. *(See Ken Eklund's testimony.)* How is the Odor Patrol accounting for altitude? Based on reports by neighbors, I know that someone high on the ridge directly across Soap Creek from my property smells the landfill stench on days I don't smell it on the valley floor. There can be pockets of stench that would be hard to isolate while driving around.

**Weather patterns and air currents** may mean that they don't smell anything at the landfill, because the wind patterns send the methane mixed with dangerous, noxious chemicals up into the atmosphere. When those particles come back down, they can be miles from the landfill and the Odor Patrol.

## "All landfill systems were operating normally."

My nose tells me that I have landfill stench inside my home.

The Republic Services claims the landfill systems were operating as they should.

Something doesn't compute.

**Without objective, third-party methane measurements, this rapidly becomes a "he said/she said" situation.**

## **Why Are the Stories So Different?**

**If the landfill systems are working, then why are the neighbors in the area regularly impacted by the landfill stench?**

- Are there leaks that the landfill operators are not aware of? This is likely based on recent EPA reports about large methane plumes above and around Coffin Butte Landfill that were never reported by the landfill operators.
- Are they just measuring methane on part of Coffin Butte Landfill? What's happening on the **53% and 62%** of Republic Services has been deemed exempt from monitoring? **Please read about the findings in the following article that will shed more light on this sentence.**

In an article entitled, **Oregon corporate landfills using loophole to avoid methane monitoring, study finds**, Tracy Loew of the Salem Statesman Journal reports: *(the following italicized excerpts were taken directly from this article):*

(Resource 2:

<https://www.statesmanjournal.com/story/tech/science/environment/2025/2003/06/oregon-landfills-methane-monitoring-loophole-study/81163394007/>)

***Oregon's corporate-owned landfills are using a loophole in state law to avoid methane monitoring on an average of about half of their operating surfaces, a new study concludes.***

***County-owned landfills, meanwhile, are exempting an average of 10% of their surfaces,*** according to the report released Thursday by the Eugene-based environmental group Beyond Toxics. *(That 37-page report: OREGON'S SECRET CLIMATE KILLERS: Pulling Back the Curtain on Hidden Landfill Methane Emissions. March 2025. Authors Mason Leavitt, Lisa Arkin.*

*(Resource 3: <https://www.beyondtoxics.org/wp-content/uploads/2025/03/Oregons-Secret-Climate-Killers-Feb-2025-Beyond-Toxics.pdf>)*

*The rules require quarterly monitoring of the landfill, by walking the surface with a handheld gas analyzer. Identified leaks measuring over 500 parts per million must be fixed within 10 days.*

The rules allow landfills to use “alternative compliance options,” including changing walking paths, to exclude monitoring where there are potential safety and other issues, such as steep or slippery slopes and physical obstructions.

Mason Leavitt, data analytics specialist for Beyond Toxics, said companies appear to be abusing that exemption.

For example, **the 178-acre Coffin Butte Landfill, near Corvallis, exempted 40 acres in the third quarter of 2022 and 30 acres in the fourth quarter of the same year, citing “high vegetation,” according to the report. The landfill continued to exempt those areas in 2023 without citing a reason.**

The researchers determined the percentage of each landfill that was unmonitored each quarter. **Coffin Butte Landfill, near Adair Village, operated by Republic Services: Between 53% and 62%.**

### **U.S. EPA finds problems with methane monitoring**

Beyond Toxics’ conclusions mirror those in a recent U.S. Environmental Protection Agency report.

(Resource 4 – EPA Report - <https://www.epa.gov/enforcement/enforcement-alert-epa-finds-msw-landfills-are-violating-monitoring-and-maintenance>)

More than 100 EPA inspections over the past three years found that many municipal solid waste landfills across the country were not properly monitoring emissions.

“While the regulations allow municipal solid waste landfills to exclude certain areas from the surface emissions monitoring (e.g., areas with steep slopes or other dangerous areas), the **EPA observed during recent inspections that areas that are not dangerous are improperly excluded from monitoring,**” the EPA report states.

“If a municipal solid waste landfill excludes areas from the surface emissions monitoring, **the facility should document and explain the basis for excluding each area** from monitoring in the surface emission design plan and SEM reports. **The regular side slopes of the landfill may not be excluded** from monitoring per the regulations,” the report reads.

**Coffin Butte Landfill was among those the EPA inspected.**

Furthermore, **we need third-party methane measurements using drone equipment and satellite imaging.** Wouldn't it be helpful for Republic Services, DEQ, EPA, surrounding counties, and the residents:

- **To know how much danger we are in due to methane with dangerous chemicals mixed in** - health impacts, fire danger, greenhouse gases that contribute to climate change, etc.
- To know **the extent of the leaks...and more importantly, where to fix those leaks.**
- To know the **emissions in the entire plume**, not just at ground level.

**To reiterate, these measurements MUST BE monitored with technically accurate devices by neutral, qualified, third-party entities.** Based on numerous instances of ignoring, evading, and lying in the past, **we cannot rely on the Applicant's ability to accurately measure and report what is happening at Coffin Butte.**

From the same article referenced above:

*In 2022, the EPA found **Coffin Butte was leaking methane at levels that exceed state and federal limits** and what the landfill had publicly reported.*

*EPA investigators returned in 2024 and found more than **40 locations** where methane exceeded limits, including at holes in the cover material.*

*EPA, rather than DEQ, is continuing to lead that investigation, Darling said.*

**Expanding the landfill will dramatically increase the methane / dangerous chemicals production and influence the frequency of the landfill stench.** As the landfill moves to different cells, different neighborhoods will be more impacted. **I believe the landfill stench I smelled inside my house had to do with Republic Services rounding a corner to dump trash in a new cell that is more aligned with where my property is.**

**I strongly oppose Republic Services' Conditional Use Permit application LU-24-027 to expand the Coffin Butte landfill. I urge the Planning Commission to deny this application.**

**As noted above: The Applicant's proposed use seriously interferes with my use of my property,** just four miles from Coffin Butte, seriously interferes with the character of Soap Creek Valley area and beyond. [Benton County Code 53.215 (1)]

Between the toxic landfill stench, the flammable methane, and **the Applicant's loose, reckless, and blatant disregard for State and Federal laws, measuring protocols, and reporting standards**, do we know what's actually happening at Coffin Butte Landfill?

**We are ALL at risk of health issues, catastrophic fires, dangerous air quality, and deadly water quality** – in Benton County and the counties and residents that near the landfill – and **drinking water sent to the Willamette River tainted** by disposal for the toxic leachate. Our lives and the character of our area could easily be irrevocably changed with a spark, breathing the air, or drinking the water!

**I firmly oppose LU-24-027.**

Expanding Coffin Butte Landfill **seriously threatens the livability on and uses of adjacent properties** [Benton County Code 53.215 (1)], **seriously impacts the character of the area** [Benton County Code 53.215 (1)], **and imposes an undue burden on the county's and region's fire services, emergency management services, first responders, and health professionals and services, and the county's residents and neighboring residents.** [Benton County Code 53.215 (2)]

Respectfully Submitted

Carol McClelland Fields, PhD  
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