- Bill Wilson - Comment -

Item 6.9
7/8/25

Peer reviewed

## Odour annoyance is linked to stress, poor mental health, and decreased well-being

Numerous studies have shown that exposure to unpleasant odours is associated with annoyance, and that the level of annoyance is strongly associated with neurological, respiratory, and gastrointestinal symptoms that impact quality of life and mental health (Aatamila et al., 2011; Baldacci et al., 2015; Blanes-Vidal 2015; Hooiveld et al., 2015; Luginaah et al., 2002). Being exposed to a strongly unpleasant odour can trigger an individual's stress response, as characterized by self-reported anxiety and salivary alpha amylase secretion, a marker of activation of the sympathetic nervous system (Hirasawa et al., 2019). Co-exposure to odour and other stressors, such as noise, light, and vibration, may also have cumulative effects on mental stress (Ojamo et al., 2015). On top of all of this, perception plays a powerful role in modulating the overall strength of the response. The subjective "offensiveness of the smell, an individual's perceived control over their exposure, or their subjective health status can all affect the stress response. In addition, the stress response can be moderated by perception that an odour producer has broken laws or, conversely, that they are making a genuine effort to reduce disruption (Hayes et al., 2017; Hirasawa et al., 2019; Luginaah et al., 2002).

# Setbacks

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To answer the question of why 1,000 foot setbacks for cannabis cultivation. Livestock and poultry industries, like cannabis industries, require odor control measures. The following chart is from a study of odor dispersion from livestock facilities.

1,600 chickens or 30 pigs create a comparable odor as 1,700 cannabis plants. One acre planted in cannabis can contain 2,000 to 3,000 odor producing plants. Setbacks of 1,000 feet should be a bare minimum to control VOC emissions and odors from cannabis.

The most effective way to control the odors is to grow in greenhouses that are filtered.

3- Chart from the Odor and VOC Emissions 2000 Conference for the Cincinnati Water Environment Federation. Reasons for at least 1,000 foot setbacks.

Table 9.2. Estimates of plume lengths under stable atmospheric conditions (nighttime) and a wind speed of 2 mph or less (open terrain).

| Odor Level Downwind | Odor Source Strength High | Medium | Low |
|---|---|---|---|
| | ---- Distance Downwind (ft) ---- | | |
| Slight (just detectable by 1/2 of the population) | 1,875 | 1,250 | 800 |
| Mild (Detectable by most everyone) | 1,250 | 800 | 500 |
| Strong | 750 | 500 | 250 |

Table 9.3. Estimates of plume lengths under stable atmospheric conditions (nighttime) and a wind speed of 4 mph (open terrain).

| Odor Level Downwind | Odor Source Strength High | Medium | Low |
|---|---|---|---|
| | ---- Distance Downwind (ft) ---- | | |
| Slight (just detectable by 1/2 of the population) | 1,250 | 800 | 500 |
| Mild (Detectable by most everyone) | 800 | 500 | 300 |
| Strong | 500 | 250 | 200 |

These results indicate that short-term extreme odors during the day will not have a large impact on people who are 1,000 ft away.

## References

Chastain, J.P., and F.J. Wolak. 2000. Application of a Gaussian Plume Model of Odor Dispersion to Select a Site for Livestock Facilities. Proceedings of the Odors and VOC Emissions 2000 Conference, sponsored by the Water Environment Federation, April 16-19, Cincinnati, OH., 14 pages, published on CD-ROM.