

# DIESEL RANGE ORGANICS in the garden

**Diesel range organics**, or DROs, are a group of compounds commonly found in diesel fuel. All DROs are made of carbon and hydrogen, along with some other compounds, and all are thick and oily. DROs can vary greatly in their associated health risks due to their different chemical structures.

## Summary for Gardeners

- » Children should avoid playing in or unintentionally eating DRO-contaminated soil.
- » Carefully rinse produce, wear garden gloves, and use mulch to reduce dust to help reduce exposure to DRO-contaminated soil in the garden.
- » DROs bind strongly to soil particles and so are not easily taken up by plants. Produce grown in DRO contaminated soil is generally safe to eat.

## Sources of exposure to DROs

Because DROs are not easily taken up by plants, direct contact with contaminated soil is the most common exposure pathway in the garden. This can include breathing in or eating soil particles, or tracking soil inside the home and breathing or eating the soil at a later time.

DROs can stay in soils for a long time. This means that a past land use may be a potential source. Regular, low-level contamination can also build up over time, like with rain runoff from roadways.

## Where DROs in soil might come from



**gas stations** Underground fuel storage tanks, like those at gas stations, may leak over time. As a result, DROs can move into nearby native garden soils



**traffic** Water runoff from heavily trafficked areas and parking lots can contain fuels, motor oil, and other petroleum compounds. like DROs



**nearby industry** Past or current industrial sites, including car- and truck-related industry, can release petroleum compounds into the soil, water, and air



**roofing shingles** If you collect rain water from your roof for gardening, it may contain petroleum compounds if your shingles are made with asphalt

## Exposure to DROs in the garden

**How am I exposed?** Gardeners can be exposed to DROs by eating or touching DRO-contaminated soil and by breathing in soil dust. Ingesting DROs is the main way exposure occurs.

**Are my garden plants safe to eat?** DROs are unlikely to accumulate in garden produce, but can remain in soil for a long time due to their thick, oily nature, so be sure to remove all soil from produce.

**Should I be worried?** Short-term, infrequent exposure to DROs are less likely to cause significant health effects when compared to long-term, daily exposures to these contaminants. However, reducing or limiting exposure is still a good idea.

## Limit children's exposure

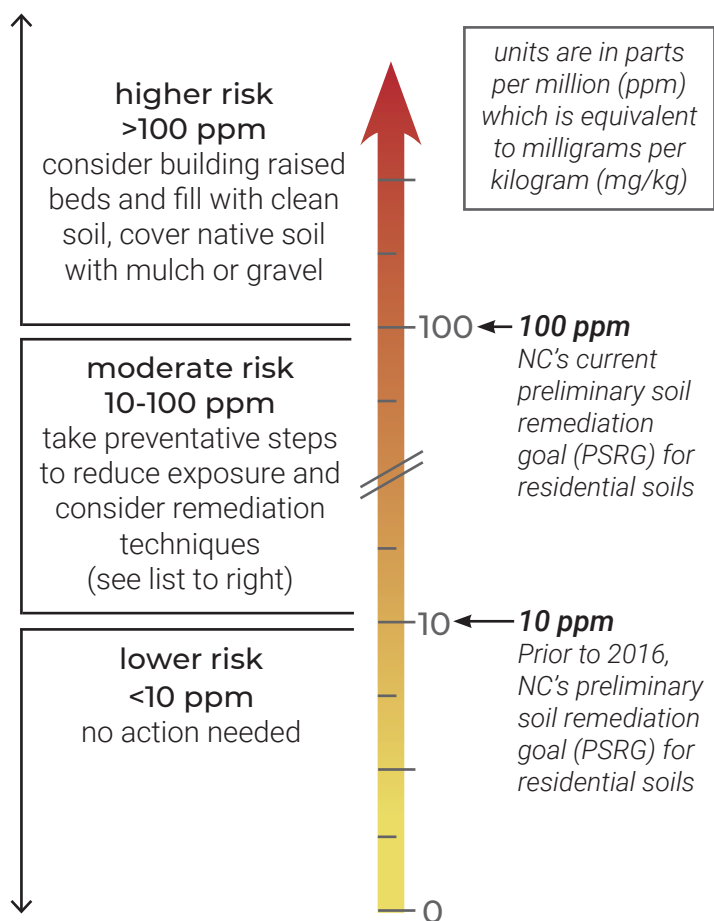
- Small doses matter. Children breathe, eat, and drink more relative to their size than adults
- Their bodies and brains are still developing
- Children spend more time on the ground and often put things (like dirt) into their mouths
- They have more skin surface area than adults, so skin exposure also matters



# DIESEL RANGE ORGANICS in the garden

## Making sense of regulatory standards

No official standards have been established in North Carolina for an acceptable level of DROs in garden soils, specifically. The NC guidelines below (used to clean up old industrial sites) can help you determine whether DRO levels in your garden might need more attention.



Through testing, you may find DRO levels greater than 10 ppm. This does not mean that *all* of your garden soil is contaminated. Contamination "hotspots" can occur, and there are actions you can take. →

## Testing resources



How to test your soil and interpret the results: <https://sites.nicholas.duke.edu/superfundcec/gardens/soil-testing/>



Still have questions about testing soil for DROs? Email us at [superfund@duke.edu](mailto:superfund@duke.edu)

## Health impacts of DROs

Continuous or frequent exposure to DROs or other petroleum-based compounds can increase your risk of health problems. Effects from exposure to DROs depends on their concentration in the soil, the frequency and duration of exposure, as well as the specific types of DROs that are present in the soil.

Some DRO compounds are suspected to cause cancer. Other health effects include respiratory system effects such as lung inflammation or difficulty breathing, decreased liver and kidney function, neurological system effects, and eye damage. DRO-contaminated soil may also irritate skin.

## Reduce DRO exposure in the garden

- Take steps to prevent or limit stormwater from running off into your garden
- Tilling the ground can help to limit DRO hotspots
- Add compost or other organic matter from a contaminant-free source. Check the [NC Composting Council](#) website to find STA or OMRI certified compost
- If you decide to build raised beds in your garden, make sure to place landscape fabric between the ground and the new soil in order to strengthen the separation barrier
- Conduct a soil safety training to teach exposure reduction strategies to all garden users
- Visit our website below for our factsheet on [10 Healthy Garden Habits](#)

For more information visit:

<https://sites.nicholas.duke.edu/superfundcec/gardens/>

