

Point Source Discharge

Indicator Names

- *NPDES Permit Count (2019)*
- *NPDES Major Permit Count (2019)*
- *NPDES Effluent Violations, Count in Watershed (WS) (2015-2019)*

Indicator Category | **Stressor**Subcategory | *Hazardous Waste & Wastewater*

Available in RPS Tool files for all lower 48 states

Indicator Description

Background

The National Pollutant Discharge Elimination System (NPDES) Program issues, monitors, and enforces permits that regulate *point sources* of pollution to waters of the United States. Point sources can include sewage treatment plants and industrial facilities or stormwater drainage systems, livestock operations, and other dischargers. Permits for individual point sources are classified as *major* or *minor* based on discharge volume, waste characteristics, and other human and ecosystem health considerations.

NPDES permits regulate point source pollution by placing limits on the concentration or volume of pollutants in discharge, called effluent. *Effluent violations* occur when monitoring data or inspections show that a point source has exceeded its permitted numeric limit.

What the Indicators Measure

These indicators measure the number of NPDES permits and effluent violations in a HUC12 subwatershed:*

- **NPDES Permit Count (2019)** – the number of NPDES permits issued in a HUC12.
- **NPDES Major Permit Count (2019)** – the number of major NPDES permits issued in a HUC12.
- **NPDES Effluent Violations, Count in Watershed (WS) (2015-2019)** – the number of effluent violations that occurred in the HUC12 between 2015 and 2019 (see Figure 1).

Relevance to Water Quality Restoration and Protection

The NPDES program has contributed to significant reduction and prevention of water pollution in the US.¹ However, effluent from point sources still contains pollutants. These pollutants include toxic chemicals, pathogens, nutrients, and other substances that can potentially harm human and ecosystem health.^{2,3} Communities located downstream of point sources can be exposed to harmful pollutants through direct or indirect pathways, including contact through recreation, contaminated drinking water sources, and/or consuming contaminated fish or shellfish.² The risk of harm from point source effluent depends on factors such as the type of

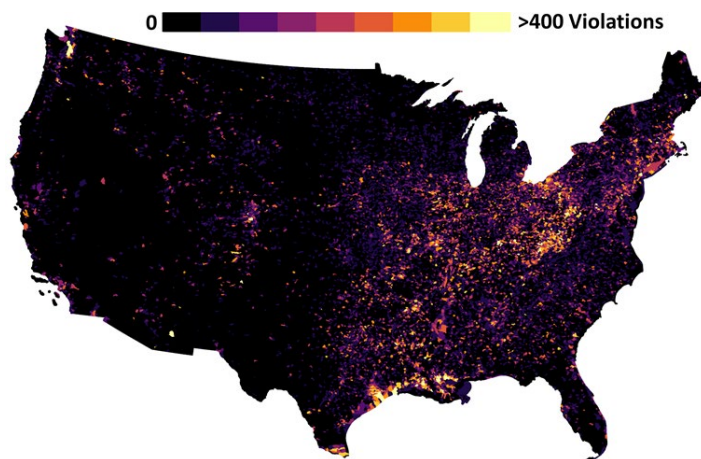


Figure 1. Map of **NPDES Effluent Violations, Count in Watershed (2015-2019)** for HUC12s across the contiguous US.

pollutants discharged, pollutant concentrations, and exposure potential.

Minority and low-income populations tend to be disproportionately located near facilities producing environmental pollution, including NPDES dischargers.⁴⁻⁶ For example, a study of neighborhood demographics found that the presence of NPDES dischargers and other pollutant sources was correlated with race, poverty, and linguistic isolation.⁶ Such patterns contribute to disparate impacts of pollution on potentially disadvantaged communities.⁴⁻⁶

These indicators can be used to evaluate the relative potential for human and ecosystem exposure to point source discharge within a group of HUC12s. They can be used with additional indicators of pollutant exposure and demographics, such as income, race, and education, among others, to identify HUC12s with populations that may face a greater pollution burden and associated health impacts. Such HUC12s may be considered priorities for follow-up restoration or protection efforts.

Processing Method

These indicators were derived from NPDES information in the EPA Facilities Registry Service (FRS) and Enforcement and Compliance History Online (ECHO) database. The FRS is EPA's centralized database that identifies facilities, sites, or places that are subject to environmental regulations. A map layer depicting the location of sites with NPDES permits was downloaded from the FRS and filtered to

* HUC12s are subwatershed delineations in the [National Watershed Boundary Dataset](#). HUC12s are referenced by their 12-digit Hydrologic Unit Code.

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retain permits that were reported to be actively discharging.[†] Duplicate permits were removed from the map layer by removing points with repeated identification numbers (Registry ID and Source ID). The filtered map layer was overlaid with HUC12 boundaries to calculate total NPDES permit counts per HUC12 and major NPDES permit counts per HUC12. Permit counts reflect FRS information as of July 2019.

ECHO is EPA's database for tracking NPDES monitoring and enforcement actions. A spreadsheet of 2015 to 2019 effluent violations by NPDES permit number was downloaded from ECHO in December 2020 and was combined with the FRS map layer of NPDES permit locations and HUC12 boundaries to calculate the total number of effluent violations per HUC12 from 2015 to 2019 (Figure 2).

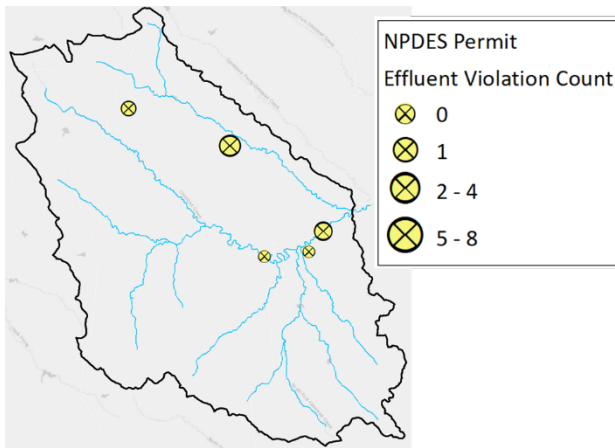


Figure 2. Overlay of the NPDES permit map layer, effluent violations, and HUC12 boundaries for an example HUC12.

Limitations

- Locations of NPDES permits in the FRS are approximate and may not reflect the actual location of point source discharge.
- The effects of point sources on human and ecosystem health, in part, depend on the magnitude of pollutant discharge. These indicators do not measure the magnitude of pollutant discharge from point sources.
- Many US states have received EPA authorization to issue NPDES permits. Permit limits for pollutant discharge can vary due to state-specific permitting protocols and water quality standards.

Links to Access Data and Additional Information

HUC12 indicator data can be accessed within the EPA Restoration and Protection Screening (RPS) Tool, in downloadable data files, or as a web service. Visit the [EPA RPS](#) website for links to access the RPS Tool, HUC12 indicator database, and web service.

The source datasets for this indicator are freely available from EPA. Locations of NPDES permitted facilities are available from the [EPA Facility Registry Service Geospatial Data Download](#) website. Effluent violation data are available from the [EPA ECHO](#) website.

References

- ¹Keiser, D., et al. 2019. [Consequences of the Clean Water Act and the demand for water quality](#). *The Quarterly Journal of Economics*. 134(1): 349-396.
- ²Holeton, C., et al. 2011. [Wastewater release and its impacts on Canadian waters](#). *Canadian Journal of Fisheries and Aquatic Sciences*. 68(10): 1836-1859.
- ³Carey, R., et al. 2009. [Contribution of wastewater treatment plant effluent to nutrient dynamics in aquatic systems: A review](#). *Environmental Management*. 44(2): 205-217.
- ⁴Hill, D., et al. 2018. [The environment and environmental justice: Linking the biophysical and the social using watershed boundaries](#). *Applied Geography*. 95: 54-60.
- ⁵Mohai, P., et al. 2015. [Which came first, people or pollution? Assessing the disparate siting and post-siting demographic change hypotheses of environmental injustice](#). *Environmental Research Letters*. 10(11): 115008.
- ⁶Deganian, D., et al. 2012. [The Patterns of Pollution: A Report on Demographics and Pollution in Metro Atlanta](#).

[†] The following permit status descriptions were used to identify actively discharging permits: "Effective", "Admin Continued", or "Expired" (used for permits that have reached their expiration date but are still actively discharging). Permits with status equal to "Terminated", "Pending", "Not Needed", or "Null" were not counted.