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Environmental Media Assessment for 1,2-Dichloroethane

Technical Support Document for the Risk Evaluation

CASRN 107-06-2

April 2026

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

KEY ABBREVIATIONS AND ACRONYMS

30Q5	Lowest 30-day average flow that occurs (on average) once every 5 years
7Q10	Lowest 7-day average flow that occurs (on average) once every 10 years
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AMTIC	Ambient Monitoring Technology Information Center
CASRN	Chemical Abstracts Service Registry Number
CDR	Chemical Data Reporting
CFR	Code of Federal Regulations
COU	Condition of use
DMR	Discharge Monitoring Report
DOT	Department of Transportation
DRAS	Hazardous Waste Delisting Risk Assessment Software
ECHO	Enforcement and Compliance History Online (Database)
E-FAST	Exposure and Fate Assessment Screening Tool
EPA	Environmental Protection Agency (U.S.)
EROM	Enhanced Unit Runoff Method
FOC	Fraction of organic carbon
HAP	Hazardous air pollutant
HERO	Health and Environmental Research Online (Database)
HM	Harmonic mean
IOAC	Integrated Indoor/Outdoor Air Calculator
IUR	Inhalation Unit Risk
KOC	Soil organic carbon: water partition coefficient
KOW	Octanol: water partition coefficient
MDL	Method detection limit
MLD	Million liters per day
MRL	Minimum Reporting Limit
NAICS	North American Industry Classification System
NEI	National Emissions Inventory
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHD	National Hydrography Dataset
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
OCSPP	Office of Chemical Safety and Pollution Prevention (EPA)
OES	Occupational exposure scenario
OPPT	Office of Pollution Prevention and Toxics (EPA)

POTW	Publicly owned treatment works
PSC	Point Source Calculator
PWS	Public water system
RCRA	Resource Conservation and Recovery Act
RTR	Risk and technology review
SCC	Source Classification Code
TRI	Toxics Release Inventory
TSCA	Toxic Substances Control Act
TSD	Technical support document
UCMR3	Third Unregulated Contaminant Monitoring Rule
U.S.	United States
USGS	U.S. Geological Survey
VVWM-PSC	Variable Volume Water Model with Point Source Calculator (Model)
WQP	Water Quality Portal

SUMMARY

This technical support document (TSD) accompanies the *Risk Evaluation for 1,2-Dichloroethane* (also called the "1,2-dichloroethane risk evaluation" or "risk evaluation") (U.S. EPA, 2026k). This assessment describes the use of reasonably available information to evaluate concentrations of 1,2-dichloroethane in various environmental media resulting from releases under conditions of use (COUs).

The U.S. Environmental Protection Agency (EPA or the Agency) quantitatively assessed the concentration of 1,2-dichloroethane in ambient air, water (surface water and drinking water), and land (soil, biosolids, and groundwater) based on 1,2-dichloroethane releases to the environment (U.S. EPA, 2026g). The following are key points from the Agency's evaluation:

- For the air pathway, EPA estimated ambient air concentrations and air deposition from facilities releasing 1,2-dichloroethane resulting from COU activities to air using the Human Exposure Model Open-Source Version 5.0 (HEM5.0). The Agency used release data as reported to the Toxics Release Inventory (TRI) from 2015 to 2024 and the National Emissions Inventory (NEI) for the reporting years of 2014, 2017, and 2020.
    - Annual average ambient air concentrations of 1,2-dichloroethane ranged from 0 to 7.1 $\mu g/m^3$ at a distance of 1,000 m from the release location for releases from NEI and TRI facilities. EPA has high confidence in the modeled results representing 1,2-dichloroethane ambient air concentrations because (1) HEM5.0 directly integrates the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD), which is the Agency's primary regulatory model for ambient air modeling and is peer reviewed, to estimate concentrations in ambient air; (2) EPA used industry-reported TRI and NEI releases as inputs for modeling; and (3) the ranges of the ambient air modeled concentrations from AERMOD are within the ranges of monitored concentrations from Ambient Monitoring Technology Information Center (AMTIC) data.
    - EPA has moderate confidence in the modeled 1,2-dichloroethane air deposition results due to the medium confidence in the input parameter values for AERMOD deposition modeling.
- For the water pathway, 1,2-dichloroethane is reported to be released to surface waters and due to its high-water solubility (8,600 mg/L), it remains in water. Facility releases of 1,2-dichloroethane and the respective receiving water bodies as reported to EPA were used to estimate receiving water concentrations at the point of effluent release.
- For the land pathway, EPA evaluated exposures via land applied biosolids and soil containing 1,2-dichloroethane due to air deposition. Of these pathways, application of biosolids is estimated to result in lower soil concentrations of 1,2-dichloroethane (0.63 mg/kg) compared to ambient air deposition (1.4 mg/kg). Releases from facilities associated with the Manufacturing occupational exposure scenario (OES) resulted in the highest soil concentrations due to air deposition.
- Based on the physical and chemical properties, as well as 1,2-dichloroethane concentrations reported from databases and literature, air and water pathways are expected to be the main pathways contributing to both general population and environmental exposures. Therefore, quantitative assessments were conducted for these pathways.
- Based on reported TRI releases of 1,2-dichloroethane to land (Water Quality Portal [WQP] and scientific literature), land pathways could be a source of exposures to environmental receptors and the general population. Therefore, quantitative estimates were also conducted for the land pathway.

1 INTRODUCTION

Also known as ethylene dichloride, 1,2-dichloroethane is a volatile, synthetic hydrocarbon that is primarily used in the synthesis of vinyl chloride; over 90% of produced 1,2-dichloroethane is converted to vinyl chloride (EPA-HQ-OPPT-2018-0427-0040). It is included on the Toxic Substances Control Act (TSCA) Inventory reported under the Chemical Data Reporting (CDR) rule and had a total production volume in the United States between 30 to 40 billion pounds (lb) from the 2020 CDR reporting period (U.S. EPA, 2026k). A review of 2024 CDR data shows that total production volume for the years 2020 to 2023 are similar to the previously reported range from the 2020 CDR.

This TSD describes the use of reasonably available information to estimate environmental concentrations of 1,2-dichloroethane in different environmental media from releases associated with COUs under TSCA. EPA evaluated the reasonably available information for releases of 1,2-dichloroethane from facilities that use, manufacture, or process 1,2-dichloroethane under industrial and/or commercial COUs as detailed in the *Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g). Table 1-1 provides a crosswalk between COUs and OESs; Table 1-2 shows the types of releases to the environment by OES.

Table 1-1. Crosswalk of 1,2-Dichloroethane Conditions of Use to Occupational Exposure Scenarios Assessed

COU			Occupational Exposure Scenario (OES)
Life Cycle Stage[a]	**Category**[b]	**Subcategory**[c]	
Manufacturing	Domestic manufacture	Domestic manufacture	Manufacturing[d]
			Manufacturing as an Unintended Byproduct
	Import	Import	Repackaging
Processing	Processing – As a reactant	Intermediate in: Petrochemical manufacturing; Plastic material and resin manufacturing; All other basic organic chemical manufacturing; All other basic inorganic chemical manufacturing	Processing as a Reactant
	Processing – Incorporated into formulation, mixture, or reaction product	Fuels and fuel additives: All other petroleum and coal products manufacturing	Processing into Formulation, Mixture, or Reaction Product
		Processing aids: Specific to petroleum production	Processing into Formulation, Mixture, or Reaction Product
		Adhesives and sealants; Lubricants and greases; Process regulators; degreasing and cleaning solvents; Pesticide, fertilizer, and other agricultural chemical manufacturing	Processing into Formulation, Mixture, or Reaction Product
	Repackaging	Repackaging	Repackaging
	Recycling	Recycling	Processing as a Reactant
Distribution in commerce	Distribution in commerce	Distribution in commerce	Distribution in Commerce[e]

COU			Occupational Exposure Scenario (OES)
Life Cycle Stage[a]	Category[b]	Subcategory[c]	
Industrial use	Adhesives and sealants	Adhesives and sealants	Industrial Application of Adhesives and Dealants
	Functional fluids (closed systems)	Heat transferring agent	Heat Transferring Agent[f]
	Lubricants and greases	Solid film lubricants and greases	Industrial Application of Lubricants and greases
	Process regulator	*e.g.,* Catalyst moderator; oxidation inhibitor	Processing as a Reactant
	Solvents (for cleaning and degreasing)	Degreasing and cleaning solvents	Commercial Aerosol Products
			Non-Aerosol Cleaning and Degreasing
	Other use	Process solvent	Processing into Formulation, Mixture, or Reaction Product
Commercial use	Plastic and rubber products	Products such as: Plastic and rubber products	Plastic and Rubber Products[f]
	Fuels and related products	Fuels and related products	Fuels and Related Products[f]
	Other use	Laboratory chemical	Laboratory Use
Consumer use	Plastic and rubber products	Plastic and rubber products	N/A[g]
Disposal	Disposal	Disposal	Waste Handling, Treatment, and Disposal (Landfill)
			Waste Handling, Treatment, and Disposal (POTW)
			Waste Handling, Treatment, and Disposal (Remediation)
			Waste Handling, Treatment, and Disposal (non-POTW WWT)
			Waste Handling, Treatment, and Disposal (incinerator)

COU			Occupational Exposure Scenario (OES)
Life Cycle Stage[a]	**Category**[b]	**Subcategory**[c]	

COU = condition of use; OES = occupational exposure scenario; POTW = publicly owned treatment works; WWT = wastewater treatment

[a] Life Cycle Stage use definitions (40 CFR 711.3)

- "Industrial use" means use at a site at which 1 or more chemicals or mixtures are manufactured (including imported) or processed.
- "Commercial use" means the use of a chemical or a mixture containing a chemical (including as part of an article) in a commercial enterprise providing saleable goods or services.
- "Consumer use" means the use of a chemical or a mixture containing a chemical (including as part of an article, such as furniture or clothing) when sold to or made available to consumers for their use.
- Although EPA has identified both industrial and commercial uses here for purposes of distinguishing scenarios in this document, the Agency interprets the authority over "any manner or method of commercial use" under TSCA section 6(a)(5) to reach both.

[b] These categories of COUs reflect Chemical Data Reporting (CDR) codes and broadly represent COUs for 1,2-dichloroethane in industrial and/or commercial settings.

[c] These subcategories reflect more specific uses of 1,2-dichloroethane.

[d] During the manufacture of 1,2-dichloroethane, the byproducts 1,1-dichloroethane, 1,1,2-trichloroethane, *trans*-1,2-dichloroethylene, trichloroethylene, perchloroethylene, methylene chloride, and carbon tetrachloride are formed, and are assessed in this risk evaluation. See *Byproducts Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026b).

[e] EPA considers the activities of loading and unloading of chemical product part of distribution in commerce; however, these activities were assessed as part of each use's OES. EPA's current approach for quantitatively assessing releases and exposures for the remaining aspects of distribution in commerce consists of searching U.S. Department of Transportation (DOT) and National Response Center (NRC) data for incident reports pertaining to 1,2-dichloroethane distribution.

[f] Although these uses were identified during scoping, upon further investigation, EPA decided to not quantitatively assess the releases and exposures resulting from these uses of 1,2-dichloroethane. The rationale for not performing a quantitative assessment is described in Section 1.2 of both the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g) and *Occupational Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026j).

[g] Consumer uses are not assigned to OESs but are assessed elsewhere in this risk evaluation. See also the *Consumer Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026d).

Table 1-2. Summary of Environmental Releases by Occupational Exposure Scenario for 1,2-Dichloroethane

Occupational Exposure Scenario (OES)	Estimated Annual Release (kg/site-yr) [a]		Type of Discharge,[b] Air Emission,[c] or Transfer for Disposal [d]	Estimated Daily Release (kg/site-day) [e]		Number of Facilities [f]	Source(s)
	Central Tendency [g]	High-End		Central Tendency	High-End		
Manufacturing	1.4	190	Surface water	3.9E−03	0.54	70	2015–2024 TRI/DMR
	3,174	1.7E04	Fugitive air	9.1	48	22	2015–2024 TRI
	1,102	1.2E04	Stack air	3.1	35	23	2015–2024 TRI
	2,665	1.0E04	Fugitive air	7.6	29	21	2014, 2017, and 2020 NEI
	833	6,192	Stack air	2.4	18	23	2014, 2017, and 2020 NEI
	6.8	621	Land	1.9E−02	1.8	18	2015–2024 TRI
Repackaging	4.1E−02	227	Surface water	1.6E−04	0.91	27	2015–2024 TRI/DMR
	113	227	Fugitive air	0.45	0.91	4	2015–2024 TRI
	38	227	Stack air	0.15	0.91	4	2015–2024 TRI
	1.4E−02	105	Fugitive air	5.7E−05	0.42	28	2014, 2017, and 2020 NEI
	2.0	545	Stack air	7.8E−03	2.2	11	2014, 2017, and 2020 NEI
	3.6	5.8	Fugitive or stack air	8.4E−02	0.15	N/A	Environmental release modeling
	275	320	Hazardous waste landfill or incineration [j]	6.5	10	N/A	Environmental release modeling
Processing as a Reactant	0.26	227	Surface water	7.4E−04	0.65	38	2015–2024 TRI/DMR
	37	399	Fugitive air	0.10	1.1	11	2015–2024 TRI
	5.4	445	Stack air	1.6E−02	1.3	10	2015–2024 TRI
	63	4,216	Fugitive air	0.18	12	17	2014, 2017, and 2020 NEI
	14	1,622	Stack air	3.9E−02	4.6	14	2014, 2017, and 2020 NEI
	6.8	621	Land	1.9E−02	1.8	4	2015–2024 TRI
Processing into Formulation, Mixture, or Reaction Product	0.50	18	Surface water	1.7E−03	6.1E−02	40	2015–2024 TRI/DMR
	72	3,012	Fugitive air	0.24	10	11	2015–2024 TRI
	31	2,167	Stack air	0.10	7.2	9	2015–2024 TRI
	113	438	Fugitive air	0.38	1.5	10	2014, 2017, and 2020 NEI
	8.6	1,595	Stack air	2.9E−02	5.3	9	2014, 2017, and 2020 NEI
	227	1.3E04	Land	0.76	42	3	2015–2024 TRI

Occupational Exposure Scenario (OES)	Estimated Annual Release (kg/site-yr) [a]		Type of Discharge,[b] Air Emission,[c] or Transfer for Disposal [d]	Estimated Daily Release (kg/site-day) [e]		Number of Facilities [f]	Source(s)
	Central Tendency [g]	High-End		Central Tendency	High-End		
Industrial Application of Adhesives and Sealants	1.8	261	Fugitive air	6.9E−03	1.0	39	2014, 2017, and 2020 NEI
	4.6	274	Stack air	1.8E−02	1.1	69	2014, 2017, and 2020 NEI
	4.4E03 [h]	4.4E03 [h]	Fugitive or stack air	59	162	N/A	Environmental release modeling
	155	174	Hazardous landfill or incineration [j]	2.1	5.8	N/A	Environmental release modeling
Industrial Application of Lubricants and Greases	7.3E−02	82	Fugitive air	2.9E−04	0.33	2	2014, 2017, and 2020 NEI
	8.8E−03		Stack air	3.5E−05		1	2014, 2017, and 2020 NEI
Industrial and Commercial Non-Aerosol Cleaning/ Degreasing	0.43	13	Surface water	1.7E−03	5.0E−02	4	2015−2024 TRI/DMR
	4.1	1,738	Fugitive air	1.6E−02	7.0	1	2015−2024 TRI
	11	995	Stack air	4.5E−02	4.0	1	2015−2024 TRI
	2.2	42	Fugitive air	8.9E−03	0.17	13	2014, 2017, and 2020 NEI
	3.0	402	Stack air	1.2E−02	1.6	15	2014, 2017, and 2020 NEI
	0.5	9	Land	1.8E−03	3.8E−02	1	2015−2024 TRI
	1.3E04	4.2E04	Fugitive or stack air	42	141	N/A	Environmental release modeling
	662	2,606	Wastewater treatment	2.2	8.8	N/A	Environmental release modeling
	7,152	3.1E04	Hazardous waste incineration	24	103	N/A	Environmental release modeling
	64	255	Hazardous waste landfill [j]	0.24	0.86	N/A	Environmental release modeling
Commercial Aerosol Products	379	382	Fugitive air	1.5	1.5	N/A	Environmental release modeling

Occupational Exposure Scenario (OES)	Estimated Annual Release (kg/site-yr) [a]		Type of Discharge,[b] Air Emission,[c] or Transfer for Disposal [d]	Estimated Daily Release (kg/site-day) [e]		Number of Facilities [f]	Source(s)
	Central Tendency [g]	High-End		Central Tendency	High-End		
Laboratory Use	1.1E−02	0.38	Surface water	4.1E−05	1.4E−03	4	2015−2024 TRI/DMR
	1.3	10	Fugitive air	5.2E−03	3.8E−02	6	2014, 2017, and 2020 NEI
	126	233	Stack air	0.48	0.90	2	2014, 2017, and 2020 NEI
	1.4	12	Fugitive or stack air	6.2E−03	5.0E−02	N/A	Environmental release modeling
	15	812	Hazardous landfill or incineration [j]	6.5E−02	3.5	N/A	Environmental release modeling
Waste Handling, Treatment, and Disposal (Incinerator)	5.8E−03	116	Surface water	2.3E−05	0.46	7	2015−2024 TRI/DMR
	1.2	310	Fugitive air	4.7E−03	1.2	20	2015−2024 TRI
	0.48	263	Stack air	1.9E−03	1.1	22	2015−2024 TRI
	0.49	97	Fugitive air	2.0E−03	0.39	26	2014, 2017, and 2020 NEI
	3.0E−02	39	Stack air	1.2E−04	0.16	61	2014, 2017, and 2020 NEI
	6.4	2.3E04	Land	2.5E−02	91	9	2015−2024 TRI
Waste Handling, Treatment, and Disposal (Landfill)	5.0E−02	11	Surface water	2.0E−04	4.5E−02	8	2015−2024 TRI/DMR
	5.1	33	Fugitive air	2.1E−02	0.13	665	2014, 2017, and 2020 NEI
	0.41	22	Stack air	1.6E−03	8.9E−02	145	2014, 2017, and 2020 NEI
Waste Handling, Treatment and Disposal (Non-POTW WWT)	1.2	272	Surface water	4.7E−03	1.1	8	2015−2024 TRI/DMR
	7.7	329	Fugitive air	3.1E−02	1.3	12	2014, 2017, and 2020 NEI
	1.1	186	Stack air	4.4E−03	0.74	9	2014, 2017, and 2020 NEI
Waste Handling, Disposal and Treatment (POTW)	1.9	134	Surface water	5.1E−03	0.37	122	2015−2024 DMR
	7.0	128	Fugitive air	2.8E−02	0.51	29	2014, 2017, and 2020 NEI
	15	37	Stack air	6.0E−02	0.15	3	2014, 2017, and 2020 NEI
Waste Handling, Disposal and Treatment (Remediation)	4.3E−02	2.0	Surface water	1.2E−04	5.5E−03	29	2015−2024 TRI/DMR
	1.8	29	Fugitive air	4.8E−03	8.0E−02	30	2014, 2017, and 2020 NEI
	18	1,369	Stack air	4.8E−02	3.8	5	2014, 2017, and 2020 NEI
Facilities Not Mapped to an OES	N/A					617[i]	–

Occupational Exposure Scenario (OES)	Estimated Annual Release (kg/site-yr) [a]		Type of Discharge,[b] Air Emission,[c] or Transfer for Disposal [d]	Estimated Daily Release (kg/site-day) [e]		Number of Facilities [f]	Source(s)
	Central Tendency [g]	High-End		Central Tendency	High-End		

DMR = Discharge Monitoring Report; NEI = National Emissions Inventory; POTW = publicly owned treatment works; TRI = Toxics Release Inventory; WWT = wastewater treatment

[a] For modeled results, the presented central tendency and high-end are the 50th and 95th percentile values of the modeled distribution. For programmatic data, the presented central tendency is calculated from the median reported release amounts and high-end from the reported maximum release amounts. The specific central tendency and high-end values presented depends on the number of sites with programmatic data. For databases with 6 or more reporting facilities, EPA estimated central tendency and high-end releases using the 50th and 95th percentile values, respectively. For 3–5 facilities, The Agency estimated the central tendency and high-end releases using the 50th percentile and maximum values, respectively. For 2 sites, EPA presented both the midpoint and the maximum value. Finally, EPA presented sites with only 1 data point as-is from the programmatic database.

[b] Direct discharge to surface water; indirect discharge to non-POTW WWT; indirect discharge to POTW

[c] Emissions via fugitive air; stack air; or treatment via incineration

[d] Transfer to surface impoundment, land application, or landfills

[e] Where available, EPA used peer reviewed literature (*e.g.,* generic scenarios [GSs] or emission scenario documents [ESDs]) to provide a basis to estimate the number of release days of 1,2-dichloroethane within a COU.

[f] Where available, EPA used the 2020 CDR (U.S. EPA, 2020), NEI (U.S. EPA, 2023), DMR (U.S. EPA, 2022b), and TRI databases (U.S. EPA, 2022d), 2020 U.S. County Business Practices (U.S. Census Bureau, 2022), and Monte Carlo models to estimate the number of sites that use 1,2-dichloroethane for each COU. Some modeled OES calculated the number of facilities/sites, presented as 50th and 95th percentiles. Other modeled OESs set the number of facilities deterministically, presented as 1 value.

[g] The central tendency values for NEI air were calculated using the median of the reported releases at each site.

[h] These central tendency and high-end releases appear equivalent in the table due to rounding.

[i] There were 617 facilities not mapped to an OES with 1,2-dichloroethane releases that EPA was unable to map due to the lack of information regarding the activity of 1,2-dichloroethane at the site. These sites do not fit in any of the 1,2-dichloroethane OES because they are mainly hotels, businesses, and various chemical facilities where 1,2-dichloroethane use is unknown.

[j] 1,2-dichloroethane is a U-listed hazardous waste under code U0777 under the Resource Conservation and Recovery Act (RCRA); therefore, discarded, unused pure and commercial grades of 1,2-dichloroethane are regulated as a hazardous waste under RCRA (40 CFR 261.33(f)). Hazardous waste landfill or incineration are grouped together due to uncertainty in modeled release to environmental media.

As detailed in the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g), releases are reported to ambient air, surface water, and landfills. EPA analyzed data from TRI, NEI, and Discharge Monitoring Reports (DMR) to evaluate releases of 1,2-dichloroethane for the 2015 to 2024 reporting years for the final risk evaluation. The Agency used these data to evaluate exposures of 1,2-dichloroethane to the environment and general population that are assessed in other TSDs. This TSD uses data and input from both the *Chemistry and Fate and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026c) as well as the *Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g). In addition, this TSD supports the *Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026e), *General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026h), and *Byproduct Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026b) (see also Appendix C of the risk evaluation for a complete list of TSDs and supplemental files).

2 APPROACH AND METHODOLOGY

A literature search was conducted to identify peer-reviewed or gray sources of 1,2-dichloroethane measured and reported modeled data. Environmental media concentration data from studies and databases identified through systematic review were evaluated according to the process described in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances Version 1.0: A Generic TSCA Systematic Review Protocol with Chemical-Specific Methodologies* (also referred to as the "Draft Systematic Review Protocol") (U.S. EPA, 2021b). A summary of the measured and reported modeled data for the various environmental media is provided in this TSD as well as the (chemical-specific) *Systematic Review Protocol for 1,2-Dichloroethane* (U.S. EPA, 2026o).

The approaches for estimating the concentrations of 1,2-dichloroethane in environmental media rely on facility-specific releases associated with COUs as reported to TRI (air, water, and land), NEI (air), and National Pollutant Discharge Elimination System (NPDES) DMRs (surface water). Where facility-specific releases were not identified for a given COU, releases were estimated, as described in detail in the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g).

Based on the 1,2-dichloroethane releases, EPA developed a conceptual model for the 1,2-dichloroethane environmental media assessment that defines the pathways and media considered for all COUs/OESs (Figure 2-1). Multiple COUs/OESs can be associated with each pathway, depending on the media of release, as described in the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g). EPA considered the physical and chemical properties, fate and transport mechanisms, as well as monitoring and modeling results, to delineate and assess each pathway/media. For releases to land, the Agency was unable to associate specific media concentrations such as groundwater concentrations with facility-specific releases as reported to TRI. Thus, EPA used models to estimate media concentrations resulting from disposal to landfills and biosolids application to soil.

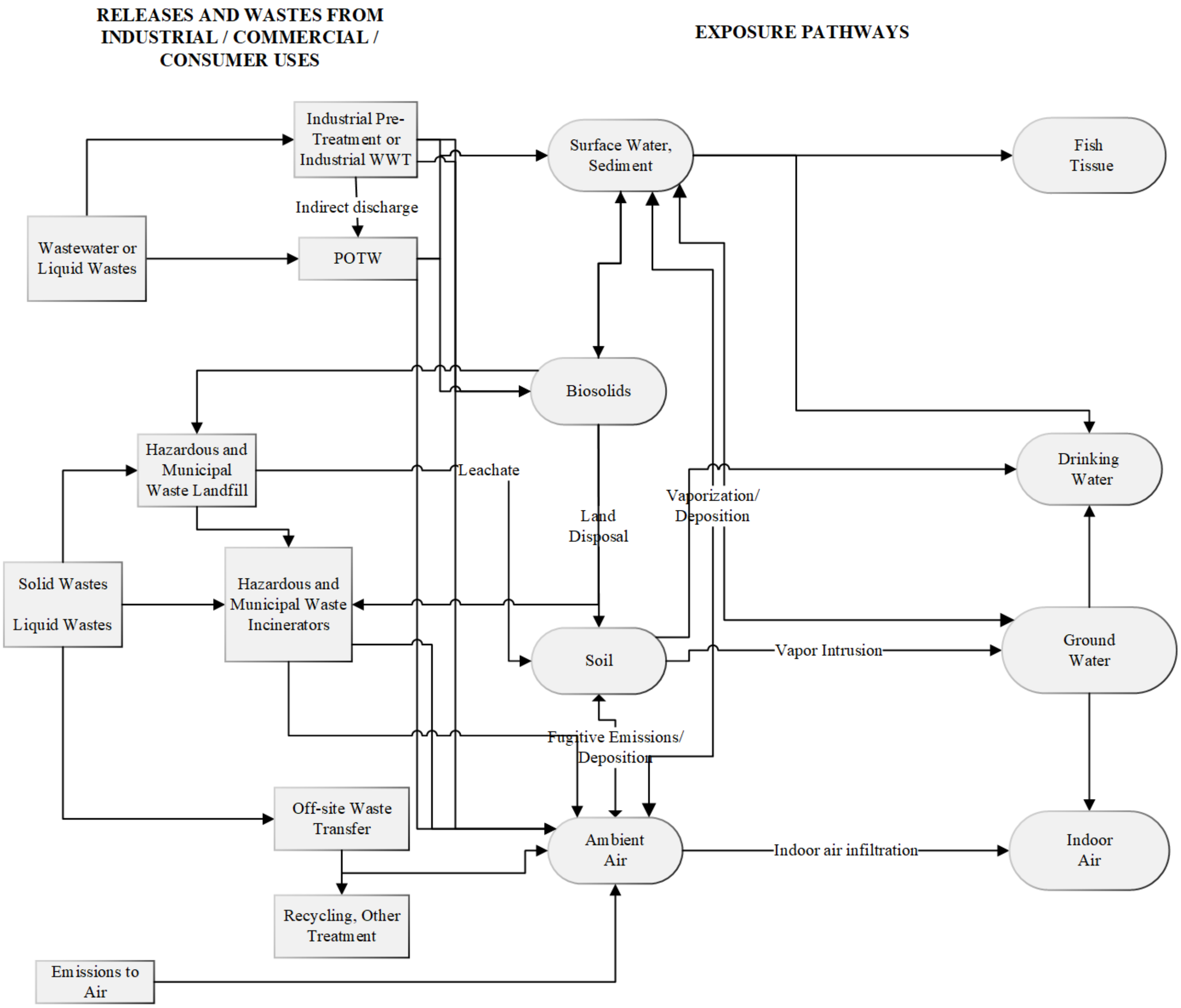

Figure 2-1. Conceptual Model for the 1,2-Dichloroethane Environmental Media Assessment

3 AIR PATHWAY

1,2-dichloroethane is a volatile organic chlorinated solvent and air is expected to be a major exposure pathway. EPA searched peer-reviewed literature, gray literature, and databases to obtain concentrations of 1,2-dichloroethane in ambient air. Section 3.3 shows the results of reported measured concentrations for ambient air found in the peer-reviewed and gray literature from the systematic review as well as from the EPA AMTIC archive. Section 3.4 reports EPA-modeled ambient air concentrations and air deposition of 1,2-dichloroethane from facility releases. Based on the ambient air exposure analysis performed for the *Risk Evaluation for 1,1-Dichloroethane* (U.S. EPA, 2025d), EPA did not conduct a tiering analysis for 1,2-dichloroethane. For 1,1-dichloroethane, the tiering analysis resulted in the Agency using the most refined approach available at the time because cancer risk estimates exceeding 1×10^{-6} were found in the lower-tier analyses. Because 1,1- and 1,2-dichloroethane use the same Inhalation Unit Risk (IUR) value, and because reported releases of 1,2-dichloroethane to ambient air are higher than those of 1,1-dichloroethane, EPA only performed the highest-tier of exposure analysis available. For this analysis, EPA estimated ambient air concentrations of 1,2-dichloroethane using HEM5.0, which is EPA's highest-tier model for estimating ambient air concentrations from industrial point and area sources.

The Agency used AMTIC monitoring data as evidence of presence of 1,2-dichloroethane in ambient air and to compare it with modeled estimates of concentrations of 1,2-dichloroethane from facility-reported releases associated with COUs. Literature data were used to provide context as they did not temporally or spatially align with 1,2-dichloroethane releases from COUs.

3.1 Modeling Approach for Estimating 1,2-Dichloroethane Concentrations in Ambient Air

EPA used HEM5.0 to estimate ambient air concentrations and air deposition of 1,2-dichloroethane from facility releases.[1] This analysis focuses on inhalation exposures to a subset of the general population residing within 50,000-meter buffer of facilities reporting 1,2-dichloroethane releases to TRI and NEI. For this analysis, EPA considered the release years of 2015 to 2024 for TRI and 2014, 2017, and 2020 for NEI. The Agency used the air release estimates obtained using the methodology described in the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g) as direct inputs for HEM5.0 to estimate concentrations at various distances from a releasing facility.

For EPA-estimated releases for OESs where facility-specific data were either not available or limited, the Agency ran the AERMOD using two sets of meteorological data (Lake Charles, Louisiana, for high-end meteorology, and Sioux Falls, South Dakota, for central tendency meteorology) and assuming urban and rural topography (see Sections 3.1.7 and 3.1.8 for more details). The Agency used AERMOD instead of HEM5.0 to estimate ambient air concentrations of 1,2-dichloroethane for OESs that relied on EPA-estimated (modeled) releases from generic facilities/sites (Industrial Application of Adhesives and Sealants; Commercial Aerosol Products; Non-Aerosol Cleaning and Degreasing; and Laboratory Use) because generic facilities/sites do not have actual release locations. Therefore, the population characterization using census data that differentiates AERMOD from HEM5.0 is irrelevant to these OESs. This methodology is similar to what was first presented in the *Draft TSCA Screening Level Approach for Assessing Ambient Air and Water Exposures to Fenceline Communities*, also referred to as the "2022 Fenceline Report."[2] EPA expanded on this methodology by evaluating air deposition from

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[1] See https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models#aermod (accessed August 13, 2025) for more information.

[2] See EPA 2022 Fenceline Report (accessed August 13, 2025).

TRI facility releases and modeled alternative release estimates where facility-specific data were not available. The full details of the methodologies and the full set of inputs used in this assessment/TSD are provided below and in the *HEM Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2026i). For this analysis, 50,000 m was selected based on prior professional knowledge and experience with exposures associated with the ambient air pathway involving other chlorinated solvents where risks were typically found within 1,000 m of a releasing facility.

3.1.1 Description of HEM

HEM5.0 has two components: (1) an atmospheric dispersion model (AERMOD[3]) with included meteorological data; and (2) U.S. Census Bureau population data at the block level. The HEM5.0 version uses 2020 Census data—including all 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands.[4] AERMOD estimates the magnitude and distribution of chemical concentrations in ambient air and deposition in the vicinity of each releasing facility within user-defined radial distances out to 50 km. HEM5.0 also provides chemical concentrations in ambient air and deposition at the centroid of over 8 million census blocks across the United States. The model also combines estimated chemical concentrations with dose-response data to estimate cancer risks and noncancer hazards, as well as population data to inform cancer incidence and other risk measures. HEM5.0 automatically uses meteorological data for each release point, including local topographic information, to inform the release dispersion model. Refer to the HEM5.0 User Guide[5] for more details about these and other capabilities.

3.1.2 Description of AERMOD

The modeling of TRI and NEI data uses EPA's HEM5.0, which incorporates AERMOD to estimate modeled ambient air concentrations to members of the general population at multiple finite distances from a facility releasing a chemical to the ambient air. AERMOD is a steady-state, Gaussian plume dispersion model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources and both simple and complex terrain. AERMOD can incorporate a variety of emission source characteristics, chemical deposition properties, complex terrain, and site-specific, hourly meteorology to estimate air concentrations and deposition amounts at user-specified receptor distances and at a variety of averaging times. Readers can learn more about AERMOD, equations within the model, detailed input and output parameters, and supporting documentation by reviewing the *User's Guide for the AMS/EPA Regulatory Model (AERMOD)* (also called the "AERMOD user's guide") (U.S. EPA, 2018).

3.1.3 Release Data

EPA modeled ambient air concentrations using the release data from the TRI and NEI datasets as described in the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g) and is summarized below.

EPA considered TRI release data from the years 2015 to 2024 for this analysis. For each facility, the Agency used the highest total emissions across the years of 2015 to 2024 as inputs to HEM5.0. Total emissions are the sum of the reported fugitive and stack emissions at each facility. TRI releases to air were categorized into six OESs. Concentrations were modeled for both fugitive and stack emissions. For facilities reporting both stack and fugitive emissions, modeled concentrations from both types of

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[3] See https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models#aermod (accessed April 23, 2026).

[4] The HEM census file for the U.S. Virgin Islands has zero (0) people in each location. Block-level population data may not be currently available from the 2020 census.

[5] HEM 5.0 User Guide: https://www.epa.gov/system/files/documents/2025-05/hem5.0-users-guide.pdf (accessed April 23, 2026).

emissions were added together to determine a total concentration of 1,2-dichloroethane in the ambient air at the distances evaluated specific to OESs. TRI reporters may report either with a Form R or a Form A. To use Form A, reporters must release less than 500 lb/year, and facilities do not need to report release quantities or uses/sub-uses on Form A. Due to uncertainties in the actual amount released by Form A reporting facilities, EPA included only TRI reporting Form R submissions in this analysis. The Agency also modeled monitoring locations in AMTIC archive that were within 50,000 m of a releasing facility as part of the TRI modeling.

For NEI data, EPA used data reported 2014, 2017, and 2020 in this analysis. In the draft risk evaluation, EPA modeled all available data for 2014 and 2017 using AERMOD (U.S. EPA, 2025c). For this evaluation, EPA modeled, in HEM5.0, each facility that showed a risk greater than 1×10^{-6} based on the 95th percentile concentration at 10 m from the release location and the analysis performed in the evaluation. EPA also modeled any releases that were new to the 2020 NEI if they were greater than the lowest release from 2014 and 2017 that resulted in a risk greater than 1×10^{-6} based on the 95th percentile concentration at 10 m from the release location. If a facility reported in multiple years and had total releases greater than the threshold described above, then EPA used the maximum release across all years in this analysis. EPA did not model releases that were assigned to the OES of Fuels and related products or if the SCC level one code was "internal combustion engine" or "external combustion engine", even if they met the previously stated criteria, as they were considered to be part of the OES of Fuels and related products, which was not quantitively evaluated in this evaluation (U.S. EPA, 2026g). 1,2-Dichloroethane was used as a lead scavenger, preventing the buildup of lead deposits within internal combustion engines, in antiknock formulations for automobiles (UNEP, 1988). While the CAA banned the sale of leaded fuel for on-road use beginning January 1, 1996, it was still permitted in specialty uses such as in high performance racing cars. However, this use was discontinued as of 2016, with the industry shifting to use ethylene dibromide (EPA-HQ-OPPT-2018-0427-0043; EPA-HQ-OPPT-2018-0427-0006) (U.S. EPA, 2026g).

NEI provides emissions data for each individual release location at a facility; therefore, there can be multiple releases from one facility. This is in contrast to TRI release data, which aggregates all releases at a facility to one reported release location. NEI also includes source-specific parameter values used in modeling like stack parameters (*e.g.,* stack height, stack temperature, plume velocity) for each individual release. EPA modeled all individual NEI-reported releases separately. In this TSD, for the NEI analysis, the Agency relied on concentrations resulting from individual release points for this assessment and not the combined releases when analyzing concentrations at polar receptors. NEI releases were categorized into a total of 14 OESs. Concentrations and risks reported at the census block level in the risk evaluation (U.S. EPA, 2026k) are aggregated across release points.

For OESs where release data were either not available or limited, EPA used alternative release estimates, as described in the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g), to model ambient air concentrations around a generic facility under a generic exposure scenario.

3.1.4 HEM Settings

Table 3-1 indicates the values and settings used in the HEM "facility list" input file. As shown in Table 3-1, the model automatically matched a meteorology station to each release by proximity. The meteorological dataset contains over 800 stations nationwide—most of which reflect 2019 meteorological conditions. The model automatically determined if the release was in an urban location using 2020 census data. Census block receptors within 3,000 m of each facility were explicitly modeled, with some exceptions noted in Section 3.1.11, while the model interpolated results to other block receptors out to 50,000 m. All modeling scenarios used several rings of non-census receptors. The rings each had 16 receptors placed every 22.5 degrees (starting due north of the facility) for distances ranging from 10 to 50,000 m from the facility (Section 3.1.5).

Table 3-1. Settings for "Facility List" Input File in HEM5.0

Parameter Group	Parameter	Value or Setting	Interpretation
Dispersion Environment	met_station	[blank]	Model chose the meteorology station closest to each facility
	rural_urban	[blank]	Model found the nearest census block to the facility center and determined whether that block was located in an urbanized area as designated by the 2020 Census
	urban_pop	[blank]	Model used a default of 50,000 people for the urban population
Modeling Domain Defined	max_dist	[blank]	Model used a default of 50,000 m to define the modeling domain around each facility
	model_dist	3,000	Model used a default of 3,000 m to define the cutoff distance around each facility for explicitly modeling census block receptors; modeling results for block receptors beyond 3,000 m were interpolated from polar receptors [a]
	radials	16	Model used polar receptors at the default of 16 radials
	circles	11	Model used polar receptors at 11 concentric rings
	overlap_dist	[blank]	Model used a default 30 m to define the facility fenceline, inside which receptors were not considered as a point of maximum exposure/risk
	ring1	10	Model used 10 m for the distance of the first ring of polar receptors
	fac_center	L, [custom for each facility: latitude, longitude]	Model used the facility latitude and longitude from TRI, NEI, or substitutions from additional analysis
	ring_dists	10, 30, 60, 100, 1,000, 2,500, 5,000, 10,000, 15,000, 25,000, 50,000	Model used concentric rings of polar receptors at these distances (in meters)
Acute Options	acute	Y	Model calculated short-term concentrations
	hours	24	Model defined "short-term" as 24 hours (*i.e.,* daily)
	multiplier	1	Model used the hourly emissions as-is, without multiplying them by a factor that would approximate short-term emission rates above baseline
	high_value	18	Model reports the 18th-highest acute concentration at each receptor (this approximates the 95th-percentile daily concentration)
Deposition and Depletion Parameters	dep	Y [for some facilities]	Model estimated wet and dry vapor deposition and plume depletion at some facilities (Section 3.1.15)
	depl	Y [for some facilities]	
	pdep	[blank]	
	pdepl	[blank]	
	vdep	Y [for some facilities]	
	vdepl	Y [for some facilities]	

Parameter Group	Parameter	Value or Setting	Interpretation
Additional Options	elev	Y	Model included the elevation of receptors in the concentration estimates, using data from U.S. Geological Survey servers
	user_rcpt	Y [for some facilities]	For some facilities, model was run using additional receptors representing monitoring locations
	bldg_dw	[blank]	Model did not estimate building downwash, which is the default choice
	fastall	Y	Model used AERMOD's FASTALL option to conserve model run time by simplifying the dispersion algorithms, which is not the default choice
	emiss_var	Y	Model used time-varying emissions, specified in a separate file [b]
	flagpole	Y, 2; Y, 0	Model simulated concentrations at 2 m above ground. Model was also run to simulate air deposition at 0 m.
	period_start	[blank]	Model used the default setting to calculate an annual average as a long-term concentration
	period_end	[blank]	
	annual	[blank]	

[a] For a small number of facilities, because there were no populated block centroids within 3,000 m of the facility, this distance was set to a value needed to capture populated blocks (Section 3.1.11).

[b] Separate file used AERMOD's MHRDOW7 format allowing emission rates to vary by month, hour of day, and 7 days of the week (Section 3.1.12).

3.1.5 Modeled Distances in HEM5.0 for TRI and NEI Releases

The HEM5.0 modeling for TRI and NEI data evaluated exposures to members of the general population by estimated ambient air concentrations at 11 finite distances (10, 30, 60, 100, 1,000, 2,500, 5,000, 10,000, 15,000, 25,000, and 50,000 m) from each TRI and NEI release location for each OES. All exposure points were at 2 m above ground, as an approximation for breathing height for ambient air concentration estimations. A duplicate set of exposure points was at ground level (0 m) for deposition estimations.

3.1.6 Modeled Distances AERMOD for EPA Estimated Releases

For EPA-estimated releases that relied on only AERMOD, ambient air concentrations were evaluated for members of the general population at eight finite distances (10, 30, 60, 100, 1,000, 2,500, 5,000, and 10,000 m) and two area distances (30–60 m and 100–1,000 m) from each TRI or NEI releasing facility for each OES and generic facility for alternative release estimates. Concentrations estimated at area distances are averages across all receptors within the minimum and maximum distances stated and represent a community average. Human populations for each of the eight finite distances were placed in a polar grid every 22.5 degrees around the respective distance ring. This results in a total of 16 modeled exposure points around each finite distance ring for which exposures are modeled. Figure 3-1 provides a visual depiction of the placement of exposure points around a finite distance ring. Although the visual depiction only shows exposure point locations around a single finite distance ring, the same placement occurred for all eight finite distance rings.

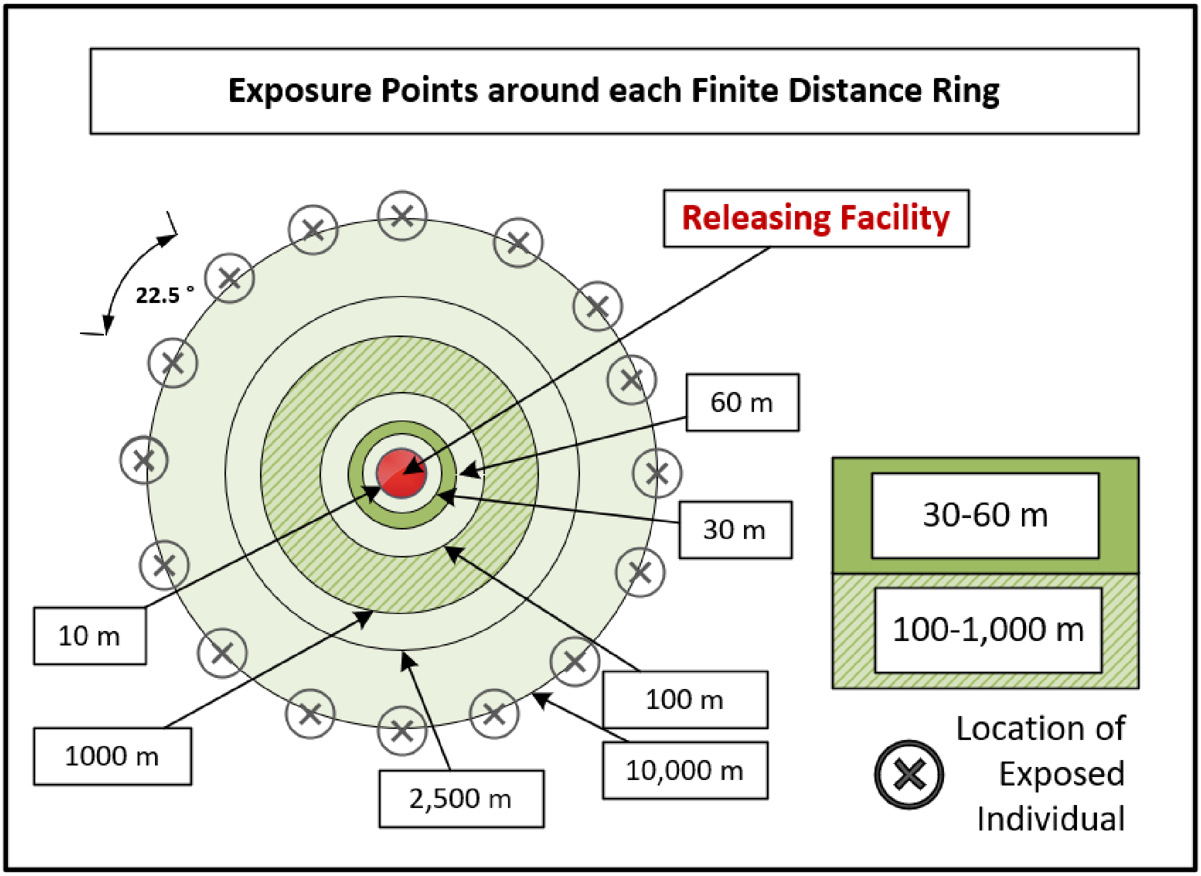

Figure 3-1. Modeled Exposure Points for Finite Distance Rings for Ambient Air Modeling Using AERMOD

Modeled exposure points for the area distance 30 to 60 m evaluated were placed in a cartesian grid at equal distances between 30 and 60 m around each releasing facility. Exposure points were placed at 10-meter increments. This resulted in a total of 80 points for which concentrations were modeled. Modeled exposure points for the area distance 100 to 1,000 m evaluated were placed in a cartesian grid at equal distances between 100 and 1,000 m around each releasing facility. Exposure points were placed at 100-meter increments. This results in a total of 300 points for which concentrations are modeled. Figure 3-2 provides a visual depiction of the placement of exposure points (each dot) around the 100 to 1,000 m area distance ring. All exposure points were at 1.8 m above ground, as an approximation for breathing height for ambient air concentration estimations. A duplicate set of exposure points was at ground level (0 m) for deposition estimations.

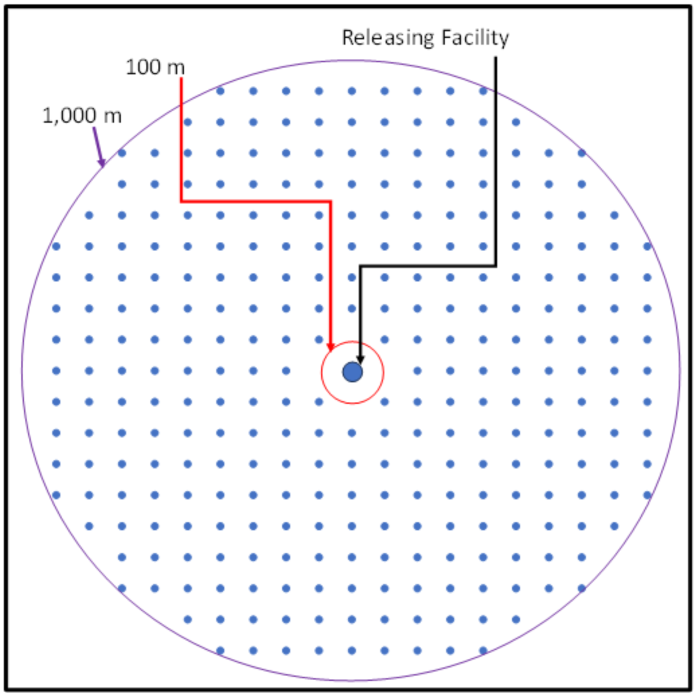

Figure 3-2. Modeled Exposure Point Locations for Area Distance for Ambient Air Modeling Using AERMOD

3.1.7 Meteorological Data

Meteorological data for TRI and NEI reporting facilities were obtained using the same AERMOD-ready meteorological data that EPA's Risk and Technology Review (RTR) program uses for multimedia, multipathway-risk modeling in review of National Emission Standards for Hazardous Air Pollutants (NESHAP). The 2019 meteorological data[6] that the RTR program currently uses includes 838 hourly stations with data mostly from the year 2019. For 47 stations (mainly in Alaska and West Virginia), EPA used data from 2016, 2017, or 2018 to fill notable spatial gaps. The 2016 meteorological data (no longer available for download from the EPA website) covers 824 hourly stations across the 50 states, District of Columbia, and Puerto Rico. The 2019 meteorological data were used to model 2018, 2019, and 2020 air emission releases. The 2016 meteorological data was used to model air emission releases reported from 2014 through 2017. The 2016 meteorologic data was processed with version 16216 of AERMOD's meteorological preprocessor (AERMET), and the 2019 meteorologic data was processed with version 19191 of AERMET. Following EPA guidance,[7] all processing used sub-hourly wind measurements (to calculate hourly-averaged wind speed and wind direction; see Section 8.4.2 of that guidance). The processing for the 2016 and 2019 data also used the "ADJ_U*" option, which adjusts the surface friction velocity to correct for overestimation of ground level concentrations during light-wind, stable conditions. Facility coordinates, in the form of latitude/longitude coordinates, were used to match the facility to the closest available meteorological station. All processing also used automatic substitutions for small gaps in data for cloud cover and temperature. Each facility was matched to its closest surface meteorological station.

Meteorological data for the EPA estimated releases for the generic facilities/sites were modeled with two meteorological stations, Sioux Falls, South Dakota, for central tendency meteorology, and Lake

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[6] 2019 meteorological data: https://www.epa.gov/fera/download-human-exposurE–model-hem (accessed August 13, 2025).
[7] EPA Guideline on Air Quality Models: https://www.epa.gov/sites/default/files/2020-09/documents/appw_17.pdf (accessed August 13, 2025).

Charles, Louisiana, for high-end meteorology. These two meteorological stations represent meteorological datasets that tended to provide high-end and central tendency concentration estimates relative to the other stations within the EPA's Integrated Indoor/Outdoor Air Calculator (IIOAC)[8] based on a sensitivity analysis of the average concentration and deposition predictions conducted in support of IIOAC development. Both meteorological stations are based on 5 years of data (2011–2015) and provide high-end and central tendency exposure concentrations used for risk calculation purposes to identify potential risks. All processing used sub-hourly wind measurements to calculate hourly-averaged wind speed and wind direction. The "ADJ_U*" option, which is used for mitigating modeling issues during light wind, stable conditions, was not used for the 2011 to 2015 data as this could lead to model overpredictions of ambient concentrations.[9] All processing also used automatic substitutions for small gaps in data for cloud cover and temperature.

3.1.8 Urban/Rural Designations

HEM5.0, which was used for facilities with reported release data, automatically determines if a facility is in an urban location using 2020 census data. For EPA-estimated releases from generic facilities/sites that relied on AERMOD, the Agency modeled each such facility once as urban and once as rural.[10] Additionally, for the generic facilities/sites EPA assumed an urban population of 1 million people, which is consistent with the estimated populations used with IIOAC.

3.1.9 Physical Source Specifications for TRI Release Facilities and Alternative Release Estimates

Source-specific physical characteristics (*e.g.,* actual release location, stack height, exit gas temperature) are generally not reported as part of the TRI dataset but can affect the plume characteristics and associated dispersion of the plume. TRI release facilities and EPA estimated releases (where TRI or city data were not available) were modeled centering all emissions on one location and using IIOAC default physical parameters. The Agency assumed a flat terrain for all modeling scenarios. Stack emissions were modeled from a point source at 10 m above ground from a 2-meter inside diameter, with an exit gas temperature of 300 K and an exit gas velocity of 5 m/s (see Table 6 of the IIOAC User Guide). Fugitive emissions were modeled at 3.05 m above ground from a square area source of 10 m on a side (see Table 7 of the IIOAC User Guide). These parameters were selected since they represent a slow-moving, low-to-the-ground plume with limited dispersion that results in a more conservative estimate of concentrations at the distances evaluated.

3.1.10 Physical Source Specifications for NEI Release Facilities

EPA modeled each NEI emission source separately—even for facilities with multiple sources. Site-specific parameter values were used in modeling, when available. When parameter values were not available or were outside of normal bounds, values were replaced based on the procedures used in AirToxScreen (see Section 2.1.3 of the AirToxScreen TSD[11]). Table 3-2 summarizes the replacement procedures that were followed. In some cases, there were several passes used for making decisions on replacing values. For some stack parameters, the first pass for replacing values involved identifying default values based on the Source Classification Code (SCC) of the emission source, and where needed

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[8] See IIOAC website (accessed August 13, 2025) for more information.

[9] EPA Guideline on Air Quality Models: https://www.epa.gov/sites/default/files/2020-09/documents/appw_17.pdf (accessed August 13, 2025).

[10] Although this may be viewed as a potential double counting of these releases, EPA only utilized the highest estimated releases from a single exposure scenario from the suite of exposure scenarios modeled for surrogate/estimated facility releases as exposure estimates and for associated risk calculations.

[11] The EPA 2020 AirToxScreen Technical Support Document: https://www.epa.gov/system/files/documents/2024-05/airtoxscreen_2020-tsd.pdf (accessed August 13, 2025).

(*i.e.,* where there were no defaults for the source's SCC) the second pass procedure implemented global default values. The passes described in this section were not tiers to find more refined values but were used to identify model input parameters required for running HEM5.0.

Table 3-2. Parameters for Replacing Values Missing, Equal to Zero, or Out of Normal Bounds for Physical Source Parameters in HEM5.0 for NEI Sources

Parameter	Bounds	Condition			
		Description of Passes Used When Parameter Value Was Missing or Reported as 0 [b]			Value Out of Normal Bounds
		First Pass	Second Pass (First Pass Unsuccessful)	Third Pass (First 2 Passes Unsuccessful)	
Stack height	1–1,300 ft (0.3048–396 m)	Use default value by SCC (pstk file)	Use global default: 3.048 m	N/A	Use the minimum or maximum in-bound value if below or above bounds, respectively
Stack inside diameter	0.001–300 ft (0.0003048–91.4 m)	Use default value by SCC (pstk file)	Use global default: 0.2 m	N/A	Use the minimum or maximum in-bound value if below or above bounds, respectively
Stack exit gas temperature [a]	>0–4,000 °F (>255.4–2,477.6 K)	Use default value by SCC (pstk file)	Use global default: 295.4 K	N/A	Use the minimum or maximum in-bound value if below or above bounds, respectively
Stack exit gas velocity	0.001–1,000 ft/s (0.0003048–304.8 m/s)	Calculate from existing exit gas flow rate and inside diameter: (4×flow) / (π×diameter^2)	Use default value by SCC (pstk file)	Use global default: 4 m/s	Use the minimum or maximum in-bound value if below or above bounds, respectively
Fugitive height	N/A	0 m if length and width are not missing and are above 0; 3.048 m if length or width are missing or 0	N/A	N/A	N/A
Fugitive length	N/A	10 m	N/A	N/A	N/A
Fugitive width	N/A	10 m	N/A	N/A	N/A
Fugitive angle	N/A	0 deg	N/A	N/A	N/A

AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model; NEI = National Emissions Inventory; SCC = Source Classification Code

[a] For exit gas temperatures, AirToxScreen's bounds were set so that values must exceed 0 °F.

Notes: pstk file = file of default stack parameters by source classification code (SCC) from EPA's SMOKE emissions kernel: pstk_13nov2018_v1.txt, retrieved on 28 September 2022 from https://cmascenter.org/smoke/ (accessed August 13, 2025).

[b] Passes are procedures used to populate required HEM5.0 input parameters when not reported by NEI. The first pass was used when the values for a given parameter were not reported to NEI. If the first pass failed to identify a value for a parameter, then the criteria used in the second pass was used. If the second pass failed, then the third pass was used.

Table 3-3 details the number of modeled sources and the number of sources where values of physical source specifications were replaced following the rules in Table 3-1.

Table 3-3. Details on Where Replacements Were Made for Physical Source Specifications for NEI Facilities

Source Type	Number of Sources	Release Height	Stack Inside Diameter	Stack Exit Gas Velocity	Stack Exit Gas Temperature	Fugitive Length	Fugitive Width	Fugitive Angle
Point	Vertical: 456 Horizontal: 23 Vertical with Rain Cap: 3 Downward Facing Vent: 26 TOTAL: 508	Problem: 29 sources with values above bounds. *Solution: Replaced with upper bound value of 396 m*	No issues	Problem: 112 sources with missing value. *Solution: Replaced with value calculated from exit gas flow rate and inside stack diameter.*	No issues	N/A	N/A	N/A
Fugitive	936	Problem: 428 sources with missing value, while also having missing value for fugitive length or fugitive width. *Solution: Replaced with 3.048 m*	N/A	N/A	N/A	Problem: 561 sources with missing value. *Solution: Replaced with 10 m*	Problem: 555 sources with missing value. *Solution: Replaced with 10 m*	No issues

NEI = National Emissions Inventory

3.1.11 “model_dist” Parameter

The value of “model_dist” indicates which census block receptors have their air concentrations explicitly modeled (*i.e.,* those block centroids within this distance of the facility), while all other blocks (between the values of “model_dist” and “max_dist”) have their concentrations interpolated based on concentrations at the modeled receptors at the polar grids. HEM5.0 gives an error when there are no populated blocks within “model_dist” of a facility. The substitutions made for some facilities’ “model_dist” parameter (Table 3-4 and Table 3-6) were based on geospatial analyses comparing the “fac_center” coordinates and the locations of the centroids of the 2020 census blocks. Because these facilities did not have populated block centroids within the default 3,000-meter default value for “model_dist,” they were set to a value large enough to encompass a populated block.

Table 3-4. Substitutions Made for the Facility List File "model_dist" Parameter for Modeling of Facilities in HEM5.0 for NEI Facilities

Facility ID	"model_dist" (m)
799311	4,000
3908311	7,000
4057611	4,000
4357611	4,000
5617411	5,000
6422011	4,000
7428011	20,000
8422311	4,000
15659311	10,000
TRI = Toxic Release Inventory	

Table 3-5. Substitutions Made for the Facility List File "model_dist" Parameter for Modeling of Facilities in HEM5.0 for TRI Facilities

Facility ID	"model_dist" (m)
77536DSPSL2525B	4,157
77541TXSBR4115E	6,254
77571LPRTC2400M	4,738
77643WSTMNHWY73	4,596
79086DMNDSSTARR	4,666
84029SFTYK11600	20,932
97812CHMCL17629	4,146
NEI = National Emissions Inventory	

3.1.12 Temporal Emission Patterns

3.1.12.1 TRI and NEI Release Facilities

Temporal emission patterns are another factor that can affect the overall modeled concentration estimates. The *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g) included information on temporal emission patterns—release duration (across the hours of a day, or intraday) and release pattern (across the days of a year, or inter-day)—stratified by OES. The number of hours of release were reported for some facilities in NEI. Table 3-6 shows how the number of hours of release were interpreted for modeling. The hours of emission shown conform to AERMOD's notation scheme of using hours 1 to 24, where hour 1 is the hour ending at 1 a.m. and hour 24 is the final hour of the same day ending at midnight. When the intraday release durations were not known for any facility, EPA assumed releases occurred each hour of the day.

Table 3-6. Assumptions for Intraday Emission Release Duration for NEI-Reported Emissions

Hours per Day of Emissions from the Data[a]	Assumed Hours of the Day Emitting for Modeling
1	1: Hour 13 (hour ending at 1 p.m.; *i.e.,* 12–1 p.m.)
2	2: Hours 13–14 (hour ending at 1 p.m. through hour ending at 2 p.m.; *i.e.,* 12–2 p.m.)
3	3: Hours 13–15 (hour ending at 1 p.m. through hour ending at 3 p.m.; *i.e.,* 12–3 p.m.)
4	4: Hours 13–16 (hour ending at 1 p.m. through hour ending at 4 p.m.; *i.e.,* 12–4 p.m.)
5	5: Hours 13–17 (hour ending at 1 p.m. through hour ending at 5 p.m.; *i.e.,* 12–5 p.m.)
8	8: Hours 9–16 (hour ending at 9 a.m. through hour ending at 4 p.m.; *i.e.,* 8 a.m. to 4 p.m.)
9	9: Hours 9–17 (hour ending at 9 a.m. through hour ending at 5 p.m.; *i.e.,* 8 a.m. to 5 p.m.)
10	10: Hours 9–18 (hour ending at 9 a.m. through hour ending at 6 p.m.; *i.e.,* 8 a.m. to 6 p.m.)
12	12: Hours 8–19 (hour ending at 8 a.m. through hour ending at 7 p.m.; *i.e.,* 7 a.m. to 7 p.m.)
13	13: Hours 7–19 (hour ending at 7 a.m. through hour ending at 7 p.m.; *i.e.,* 6 a.m. to 7 p.m.)
14	14: Hours 7–20 (hour ending at 7 a.m. through hour ending at 8 p.m.; *i.e.,* 6 a.m. to 8 p.m.)
24	All hours

NEI = National Emissions Inventory
[a] Shown rounded to the nearest whole number

EPA's assumptions for inter-day release pattern are provided in Table 3-7, which shows how the release pattern was interpreted into specific days of the month across the 12 months of the year. It is not possible to model fewer than about 4 days per year in HEM5.0 because the highest resolution available for days per year is days of the week and months of the year (*i.e.,* not specific dates). The third column of Table 3-7 shows the resulting numbers of days per year, whereas the final column shows the emission factors used to convert a flat hourly emission rate (from the air release information, after converting tons per year to grams per second) into a custom emission rate for when emissions were "on" (shown here rounded to 1 decimal place). When emissions are "on" every hour of every day of the year, then the emission factor is 1.0. When the emissions are "on" for few hours per day and a small number of days per year, then the emission factor is much larger.

Table 3-7. Assumption for Inter-Day Emission Release Pattern for NEI Reporting Facilities

Days per Year of Emissions from the Data[a]	Implemented Release Pattern: Days When Emissions Are On		
	Days	Number of Days per Year[b]	Emission Factor When Emissions On[c]
1, 2, 3, 4	Mondays in January	5	82.3–1974
7, 10	Mondays in January and June	9	40.6–974.7
20, 21, 22	Mondays in January–February, April, July, and October	22	17.1–410
42	Mondays in January–March, May–June, August–September, and November–December	39	9.4–225.1
50	Mondays	52	7–168.7
70, 79, 80	Mondays-Tuesdays in January–April and Mondays in May–December	69	5.3–127.1
91, 102	Mondays–Wednesdays in January–April, Mondays–Tuesdays in May, and Mondays in June–December	91	4–96.4

Days per Year of Emissions from the Data[a]	Implemented Release Pattern: Days When Emissions Are On		
	Days	Number of Days per Year[b]	Emission Factor When Emissions On[c]
116, 134	Mondays–Wednesdays in January–April and Mondays–Tuesdays in May–December	122	3–72.2
154	Mondays–Wednesdays, except no Wednesdays in December	152	2.4–57.7
175, 182, 183	Mondays–Thursdays in January–June and Mondays–Wednesdays in July-December	183	2–48.1
206, 213, 217	Mondays–Thursdays, except no Thursdays in November–December	200	1.8–43.9
235, 239, 246, 249, 250	Mondays–Fridays, except no Fridays in January–March	248	1.5–35.4
257, 260	Mondays–Fridays	261	1.4–33.6
274	Mondays–Fridays, plus Saturdays in January–February	270	1.4–32.6
280, 281, 282	Mondays-Fridays, plus Saturdays in January–April	278	1.3–31.6
287, 290, 293, 295	Mondays–Saturdays in January–July and Mondays–Fridays in August–December	291	1.3–30.1
296, 300, 305	Mondays–Saturdays, except no Saturdays in January–March	300	1.2–29.2
312, 315	Mondays–Saturdays, except no Saturdays in December	309	1.2–28.4
317, 318, 325	Mondays–Saturdays, plus Sundays in January–February	322	1.1–27.3
327, 328, 329, 330, 333	All days in January–April and Mondays–Saturdays in May–December	331	1.1–26.5
336, 340 ,343, 344	All days in January–June and Mondays–Saturdays in July–December	339	1.1–25.9
346, 348, 349, 350, 351, 352	All days, except Sundays in January–April	348	1.1–25.2
357, 358, 360, 362	All days, except Sundays in December	361	1–24.3
364, 365	All days	365	1–24

NEI = National Emissions Inventory

[a] Shown rounded to a whole number.

[b] Number of release days depends on the year.

[c] Emission factor depends on the number of hours per day. Shown rounded to one decimal place.

Table 3-8. Assumption for Inter-Day Emission Release Pattern for TRI Reporting Facilities

Days per Year of Emissions from the Data	Implemented Release Pattern: Days When Emissions Are On		
	Days	Number of Days per Year[a]	Emission Factor When Emissions On
250	Mondays–Fridays, except no Fridays in January–March	248	1.474
300	Mondays–Saturdays, except no Saturdays in January–March	300	1.219
350	All days, except no Sundays in January–April.	348	1.051
42	Mondays in January–March, May–June, August–September, and November–December	39	9.4–225.1

TRI = Toxic Release Inventory
[a] Number of release days depends on the year.

3.1.12.2 Alternative Release Estimates

The Agency's assumptions for intraday release duration for the EPA-estimated releases are provided in Table 3-9. When a release duration was a non-integer value, the duration was rounded down to the nearest integer, except when the release duration was less than 0, in which case the duration was rounded up to 1. The hours shown conform to AERMOD's notation scheme of using hours 1 to 24, where hour 1 is the hour ending at 1 a.m. and hour 24 is the final hour of the same day ending at midnight.

Table 3-9. Assumptions for Intraday Emission Release Duration for Modeling Ambient Air Concentrations of 1,2-Dichloroethane in AERMOD Using Alternative Releases Estimates

Hours per Day of Emissions	Assumed Hours of the Day Emitting (Inclusive)
1	Hour 13 (hour ending at 1 p.m.; *i.e.,* 12–1 p.m.)
2	Hours 13–14 (hour ending at 1 p.m. through hour ending at 2 p.m.; *i.e.,* 12–2 p.m.)
4	Hours 13–16 (hour ending at 1 p.m. through hour ending at 4 p.m.; *i.e.,* 12–4 p.m.)
5	Hours 13–17 (hour ending at 1 p.m. through hour ending at 5 p.m.; *i.e.,* 12–5 p.m.)
8	Hours 9–16 (hour ending at 9 a.m. through hour ending at 4 p.m.; *i.e.,* 8 a.m.to 4 p.m.)
24	All hours

EPA's assumptions for inter-day release frequency are provided in Table 3-10.

Table 3-10. Assumptions for Inter-Day Emission-Release Pattern for Modeling Ambient Air Concentrations of 1,2-Dichloroethane in AERMOD Using Alternative Releases Estimates

Days of Emissions per Year	Implemented Release Pattern: Days When Emissions Are on (Format of Month Number/Day Number)
3	The first day of February, July, and October
12	The first day of each month
24→26 [a]	The 1st and 15th of each month, plus the 25th of June and December
74	The first six days of each month, plus the 7th of January and February
119	The first nine days of each month, plus the 10th of January through November
217→220 [a]	The first 18 days of each month, plus the 19th of January through April
235	Every Monday–Friday, but not the 1st–8th of January, the 1st–7th of April, the 1st–7th of July, the 1st–7th of October, and the 25th–31st of December (and not the 24th of December in 2020)
250	Every Monday–Friday, but not the 1st–4th of January and the 21st–31st of December (and not the 5th of January in 2016 and 2020)
258	Every Monday–Friday, but not the 24th–26th of December (and not the 27th–28th of December in 2015, 2016, and 2020; and not the 29th of December in 2020)
296	The first 25 days of each month, except the 25th of March, June, September, and December

[a] Frequencies of 24 and 217 days per year were modeled as 26 and 220 days per year, respectively. This was done because existing files for release frequencies of 26 and 220 days per year had already been created and the differences in emission patterns were minimal between the 2 scenarios.

3.1.13 Emission Rates

The release assessments included emission rates for each facility in pounds per year for TRI reporting facilities, tons per year for NEI reporting facilities, and kilograms per year for each scenario for the EPA estimated releases for fugitive and stack sources as appropriate. Emission rates included in the release assessments were converted to units needed by AERMOD (g/s for stack sources and g/s/m^2 for fugitive sources). The conversion from per-hour to per-second used the number of emitting hours per year based on the assumed temporal release patterns (see Section 3.1.12). The conversion to per m^2 for fugitive sources used length and width values outlined in Sections 3.1.9 and 3.1.10. Annual emissions were distributed evenly to each hour and day during emissions were assumed to be occurring.

3.1.14 TRI Release Locations

For a subset of facilities reporting to TRI, the Agency determined that the coordinates reported to TRI were not representative of apparent emission sources according to aerial imagery. Therefore, EPA used the coordinates of the emission sources as reported in NEI, when enough data to do the crosswalk were available. The coordinates in the 1,2-dichloroethane TRI inventory were crosswalked with the 1,2-dichloroethane NEI inventory using the EPA Federal Registry Service (FRS) ID. For facilities where that crosswalk failed, the crosswalk was conducted by facility name and city/state location. When both crosswalks failed, EPA used for the coordinates reported to TRI for modeling. For successful crosswalks, the coordinates reported to the NEI for the point source (*i.e.,* stack) with the highest rate of 1,2-dichloroethane emissions were used. If multiple point sources had the same high emission rate, then one was selected randomly. If the NEI contained only fugitive sources, then the same process as the point sources was followed but with fugitive sources; however, the dimensions of the source were not reported, so the coordinates (which are for the southwest corner of the fugitive source) could not be translated into centerpoint coordinates.

3.1.15 Deposition Parameters

AERMOD was used to model daily (g/m^2/day) and annual (g/m^2/year) deposition fluxes from air to land and water for each releasing facility. Concentrations of 1,2-dichloroethane in soil from total (wet and dry) air deposition was estimated to assess exposures of 1,2-dichloroethane to terrestrial species. HEM5.0 can model both gaseous and particle deposition. Based on physical and chemical properties of 1,2-dichloroethane (see *Chemistry and Fate and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026c)), EPA considered only gaseous deposition. Input parameter values for AERMOD deposition modeling are shown in Table 3-11. For deposition, only facilities that were modeled in the draft risk evaluation (U.S. EPA, 2025a, b, c) were modeled in this assessment.

Table 3-11. Settings for Gaseous Deposition for Modeling Ambient Air Concentrations of 1,2-Dichloroethane Using AERMOD

Parameter	Value	Source(s)
Diffusivity in air	8.60E−02 cm^2/s	U.S. EPA (2024b)
Diffusivity in water	1.10E−05 cm^2/s	U.S. EPA (2024b)
Henry's Law constant	211.8 $Pa\cdot m^3/mol$	U.S. EPA (2026c)
r_{cl}: Cuticular resistance to uptake by lipids for individual leaves	1.13E05 s/cm	Wesely et al. (2002); (Welke et al., 1998; Kerler and Schoenherr, 1988)
Seasons	DJF = winter with no snow; MAM = transitional spring with partial green coverage or short annuals; JJA = midsummer with lush vegetation; SON = autumn with unharvested cropland	Assumption
Land cover	Site-specific in 36 directions around the source using the 2019 version of the National Land Cover Database (supplemented with the 2011 version for Hawaii and 2001 version for Puerto Rico) [a]	National Land Cover Database (accessed August 28, 2025)

AERMOD = American Meteorological Society/EPA Regulatory Model; DJF = December–February; JJA = June–August; log = logarithm base 10; MAM = March–May; mol = mole; NEI = National Emissions Inventory; Pa = Pascal; SON = September–November

[a] For the NEI facility that did not have a latitude or longitude (EIS Facility ID 16206511), EPA assumed a default land cover of suburban forest in all directions.

3.1.16 Ambient Air Concentration Outputs

HEM5.0 outputs include ambient air concentrations at each modeled census block centroid and polar receptor for annual and acute (daily) concentrations.

Post-processing scripts were used to extract and summarize the output concentrations for each facility, release, and modeled distance. The following statistics for period-average concentrations were extracted or calculated from the results for each of the modeled polar receptors (*i.e.,* each ring exposure points) (Table 3-10):

- minimum;
- maximum;
- average;
- standard deviation; and
- 10th, 50th, and 95th percentiles.

Table 3-12. Description of Daily or Period Average and Air Concentration Statistics

Statistic	Description
Minimum	The minimum daily or period average concentration estimated across all exposure points at the modeled distance.
Maximum	The maximum daily or period average concentration estimated across all exposure points at the modeled distance.
Average	Arithmetic mean of all daily or period average concentrations estimated across all exposure points at the modeled distance. This incorporates lower values (from days when the receptor location largely was upwind from the facility) and higher values (from days when the receptor location largely was downwind from the facility).
Percentiles	The daily or period average concentration estimate representing the numerical percentile value across the entire distribution of all concentrations across all exposure points at the modeled distance. The 50th percentile represents the median of the daily or period average concentration across all concentration values for all receptor locations on any day at the modeled distance.

For example, at the 60-meter distance for a given facility there is an annual average concentration at each of the 16 receptors at that distance. The average statistic calculated is the average of those 16 values (*i.e.,* the average concentration at 60 m), which incorporates lower values from locations typically upwind from the source and higher values from locations typically downwind. The 50th percentile is the median of those 16 values. The maximum value is the highest period-average concentration from among the 16 values (*i.e.,* the 1 receptor with the highest value). Estimated concentrations at census block centroids represent annual averages. Statistics for annual deposition rates are calculated in the same manner.

HEM5.0 also estimates acute concentrations at each receptor. In this assessment, acute concentrations were calculated using an averaging period of 24 hours. Therefore, there are 365 estimated concentrations at each receptor. In this assessment, the 18th highest of the 365 daily concentrations was the acute concentration that was output by HEM5.0, which represents approximately the 95th percentile concentration at each receptor.

Fugitive sources were modeled low to the ground (0–3.05 m above ground) and with no buoyancy or momentum to their emissions; therefore, in most scenarios, concentrations and deposition from fugitive emissions are expected to be highest close to the source and decrease exponentially at farther distances. Some stack sources emitted at a taller height and with some momentum and buoyancy (*i.e.,* exit gas temperatures warmer than ambient air), and in these situations concentrations and deposition frequently will peak farther away from the source and that peak often will be lower relative to fugitive concentrations. The day-by-day meteorological conditions will control the distance and magnitude of these concentration peaks—for example, low winds will bring the peak closer to the facility and increase its magnitude while unstable conditions or high mixing heights can dilute the pollutant concentrations. For facilities with both stack and fugitive emissions, the local meteorological conditions and the relative magnitudes of the stack and fugitive emissions will control the overall spatial pattern of chemical transport.

3.2 Modeling Approach for Estimating Concentrations in Soil from Air Deposition

Because 1,2-dichloroethane has low potential to sorb to particulates in air, EPA focused on soils concentrations resulting from gaseous deposition. The parameters used to model gaseous deposition in AERMOD were described in Section 3.1.15. Concentrations of 1,2-dichloroethane in soil were calculated using the following equations and the modeled 95th percentile maximum daily deposition fluxes described below in Equation 3-1:

Equation 3-1.

$$Daily_{Dep} = Tot_{Dep} \times Ar \times CF$$

Where:

$Daily_{Dep}$ = Total daily deposition to soil (µg)
Tot_{Dep} = Daily deposition flux to soil (g/m^2)
Ar = Area of soil (m^2)
CF = Conversion of grams to µg

Equation 3-2.

$$Soil_{Conc} = \frac{Daily_{Dep}}{Ar \times Mix \times Dens}$$

Where:

$Soil_{Conc}$ = Daily average concentration in soil (µg/kg)
$Daily_{Dep}$ = Total daily deposition to soil (µg)
Mix = Mixing depth (m); default = 0.1 m from the European Commission Technical Guidance Document (ECB, 2003)
Ar = Area of soil (m^2)
$Dens$ = Density of soil; default = 1,700 kg/m^3 from the European Commission Technical Guidance Document (ECB, 2003)

The above equations assume instantaneous mixing with no degradation or other means of chemical reduction in soil over time and that 1,2-dichloroethane loading in soil is only from direct air-to-surface deposition (*i.e.,* no runoff).

3.3 Measured Concentrations in Ambient Air

Ambient air concentrations of 1,2-dichloroethane were extracted from 15 studies based on the criteria in the *Systematic Review Protocol for 1,2-Dichloroethane* (U.S. EPA, 2026o). Only three of the extracted studies were conducted in the United States. Of the three studies conducted in the United States where concentrations were extracted (U.S. EPA, 2026o): (1) one study was conducted as part of EPA's National-scale Air Toxics Assessment (U.S. EPA, 2015); (2) one study examined the spatial variation of air toxics among industrial, urban, and rural sites in and around Pittsburgh, Pennsylvania (Logue et al., 2010); and (3) one study measured concentrations of volatile organic compounds in the Kanawha Valley of West Virginia (Cohen et al., 1989). The highest reported concentration from these three studies was 7.6 $µg/m^3$ (Cohen et al., 1989); however, this value was the limit of detection and established using a potentially contaminated field blank. Due to uncertainties in the sampling and analytical methods, the results of Cohen (1989) were not considered further for this analysis. Of the two remaining studies conducted in the United States, reported ambient air concentrations of 1,2-dichloroethane ranged from non-detect to 0.04 $µg/m^3$.

Additional ambient air concentrations of 1,2-dichloroethane were obtained from the EPA's AMTIC (accessed August 13, 2025) archive. The AMTIC archive houses data from 2,800 ambient air monitoring sites across the United States from 1990 to 2022. The air toxics program includes the National Air Toxics Trends Sites (NATTS) Network, Community-Scale Air Toxics Ambient Monitoring (CSATAM), and Urban Air Toxics Monitoring Program (UATMP), which monitor hazardous air pollutants (HAPs), including 1,2-dichloroethane. The data are reported from federal, state, local, and tribal monitoring networks. AMTIC HAPs monitoring data are summarized in Table 3-13 for the years 2015 to 2022, which includes the most recent data available. These years were selected to be consistent with the TRI and NEI data used in the modeled ambient air concentrations (Section 3.1.3). As shown in Table 3-13, measured concentrations from the AMTIC archive ranged from non-detect to 237 µg/m^3.

For more information on 1,2-dichloroethane in ambient air monitoring data, see the *Ambient Monitoring Technology Information Center (AMTIC) Monitoring Data 2015 to 2022 for 1,2-Dichloroethane* (U.S. EPA, 2026a).

Table 3-13. Summary of Selected Statistics of 1,2-Dichloroethane Ambient Air Concentrations (µg/m^3) from EPA's Ambient Monitoring Technology Information Center Archive (AMTIC)

Chemical	**Statistics**[b]	**Year**[c]							
		2015	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
1,2-Dichloroethane	Number of samples	10,763	10,880	10,916	10,953	9,689	9,099	9,235	7,028
	Percent ND[d]	58.4	54.8	63.1	56.5	59.0	62.1	65.5	56.9
	Min. (µg/m^3) [e]	2.43E−02	1.62E−02	4.00E−03	4.00E−03	4.00E−04	2.40E−03	4.00E−04	4.00E−04
	Mean (µg/m^3)	0.16	0.16	0.17	0.19	0.17	0.24	0.37	0.26
	Max. (µg/m^3)	25	46	115	123	71	237	192	84

ND = non-detect

[a] Only samples with a sample duration of 24 hours were included in these summary statistics.

[b] For the purposes of this analysis, EPA considered any sample with a concentration below a reported method detection limit (MDL) to be a non-detect. Additionally, for samples with no reported MDL, EPA considered any sample with a concentration ≤0 to be an ND. For calculation of summary statistics, the Agency did not include data points where no concentration was reported. EPA also did not include data points in the summary statistics where no MDL was reported, and the concentration was ≤0. For data points where the concentration was less than the reported MDL, a concentration of ½ the MDL was used for calculating the mean.

[c] 2022 is the most recent AMTIC archive data at the time of this analysis.

[d] Reported method detection limits ranged from 4.00E−03 to 2.27 µg/m^3

[e] Minimum of detected samples. All years contained results that were below the method detection limit.

3.4 Modeled Concentrations in Ambient Air

The TRI and NEI release data were used as direct inputs to AERMOD. Daily and period average outputs were obtained via modeling, and post-processing scripts were used to extract a variety of statistics from the modeled concentration distribution, including the 10th (low-end), 50th (central tendency), and 95th (high-end) percentile 1,2-dichloroethane concentrations at each distance modeled. The 95th percentile concentrations are most representative of concentrations at locations that are predominantly downwind of releasing facilities. The 50th percentile concentrations incorporate lower values from days when the receptor location largely was upwind from the facility and higher values from days when the receptor location largely was downwind from the facility. The 10th percentile concentrations are most representative of locations that predominantly upwind of releasing facilities. Summary statistics for modeled concentrations (maximum, mean, median, and minimum) were calculated for each OES. TRI data provide annual total facility releases. NEI data provide process-specific data. Due to differences in reporting requirements, frequency, and thresholds, not all facilities report to both programs and there can be differences in reported releases among facilities reporting to both NEI and TRI. Ultimately, modeling of both datasets increases confidence that EPA did not miss any releasing facilities and completed a robust modeling analysis. Results of each dataset are treated as two separate lines of evidence, with the results of the modeling effort being compared in the 1,2-dichloroethane risk evaluation (U.S. EPA, 2026k). Strength and limitations of the datasets themselves are described in the risk evaluation (U.S. EPA, 2026g).

The full inputs and results are presented in the *Supplemental Information on HEM TRI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2026n), the *Supplemental Information on AERMOD Generic Releases Exposure and Risk Analysis* (U.S. EPA, 2026l), and the *Supplemental Information on HEM NEI Exposure and Risk Analysis* (U.S. EPA, 2026m) (also called "supplemental files").

3.4.1 Modeled Ambient Air Concentrations for TRI-Reporting Facilities

A summary of the annual average air concentration ranges estimated using AERMOD for reported TRI releases is provided in Table 3-14. The summary includes six OESs and select statistics (maximum, mean, median, and minimum) calculated from the modeled concentration distributions within each OES at each distance modeled based on the maximum 95th percentile annual average concentrations for each distance. Data for the 95th percentile are presented here to show high-end exposure scenarios. Data for the 50th and 10th percentiles are available in the supplemental files. Daily modeled air concentrations for 10th, 50th, and 95th percentile exposure scenarios were also calculated and presented in the *Supplemental Information on AERMOD TRI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2026n).

The highest modeled concentrations occur at 10 m from the release point; however, this distance is generally not relevant for exposures to the general population. Therefore, this discussion focuses mainly on distances exceeding 1,000 m as these are the distances at which the general population is more likely to be exposed. When considering distances of 1,000 m or more, the maximum 95th percentile modeled average annual air concentrations per OES were 7.1 $\mu g/m^3$ for the Manufacturing OES; 2.00×10^{-2} $\mu g/m^3$ for the Repackaging OES; 7.01×10^{-2} $\mu g/m^3$ for the Processing as a reactant OES; 0.61 $\mu g/m^3$ for the Processing into Formulation, Mixture, or Reaction Product OES; 1.32×10^{-3} for the Non-Aerosol Cleaning and Degreasing OES; and 1.19×10^{-1} $\mu g/m^3$ for the Waste Handling, Treatment, and Disposal (Incinerator) OES. The Manufacturing OES had the highest modeled concentrations, with the maximum 95th percentile concentration being approximately one order of magnitude higher than the maximum modeled concentration for the next highest OES of Processing into Formulation, Mixture, or Reaction Product.

For comparison, the second highest facility in the Manufacturing OES had a modeled 95th percentile annual average concentration of 4.00 $\mu g/m^3$ at 1,000 m. Additionally, in total, 11 facilities in the Manufacturing OES had higher 95th percentile modeled annual average concentrations than any other facility in any other OES at 1,000 m from the release location. The highest 95th percentile modeled annual average concentration across all OESs was 341 $\mu g/m^3$ at 100 m from the releasing facility compared to the maximum monitored concentration of 237 $\mu g/m^3$ from the AMTIC archive database (Table 3-13). In comparison, the highest mean and median of the 95th percentile annual average concentrations at 100 m across all OESs for the modeled data were 51 and 25 $\mu g/m^3$, respectively. For the 50th percentile of annual average concentrations at 100 m, the OES of Manufacturing had the highest overall maximum, mean, and median with concentrations of 134, 24, and 10 $\mu g/m^3$, respectively. Although the AMTIC sampling locations may not align exactly with the modeled distances, the similarity of the maximum monitored and modeled concentrations provides evidence that the ambient air modeling approached used in this risk evaluation was appropriate and representative. The highest modeled concentration is more than an order of magnitude higher than the highest value extracted during systematic review from peer-reviewed literature (Table 3-14). The reason for this difference is that the peer-reviewed studies were not conducted near releasing facilities that were modeled in this assessment.

Table 3-14. Summary Statistics for 95th Percentile Annual Average Ambient Air Concentrations for 1,2-Dichloroethane Releases Reported to TRI from 2015–2024 Modeled Using HEM5.0[a] [b]

Occupational Exposure Scenario (OES)	Number of Facilities Evaluated in OES[c]	Statistic	95th Percentile Annual Average Ambient Air Concentrations ($\mu g/m^3$) Estimated for 10–50,000 m from Releasing Facilities										
			10 m	30 m	60 m	100 m	1,000 m	2,500 m	5,000 m	10,000 m	15,000 m	25,000 m	50,000 m
Manufacturing	24	Max.	2,640	2,340	787	341	7.1	1.6	5.0E−02	0.17	9.0E−02	3.8E−02	1.4E−02
		Mean	639	291	108	51	1.3	0.31	0.11	3.7E−02	2.0E−02	9.1E−03	3.2E−03
		Median	385	145	54	25	0.51	0.15	5.3E−02	1.8E−02	9.8E−03	4.5E−03	1.6E−03
Repackaging	4	Max.	9.4	3.4	1.2	0.62	2.0E−02	5.5E−03	2.0E−03	7.4E−04	4.0E−04	1.9E−04	6.4E−05
		Mean	2.4	0.86	0.30	0.16	5.4E−03	1.6E−03	6.3E−04	2.4E−04	1.3E−04	6.7E−05	2.1E−05
		Median	7.3E−02	3.8E−02	1.4E−02	1.0E−02	7.9E−04	3.9E−04	2.4E−04	1.2E−04	5.0E−05	4.1E−05	1.0E−05
Processing as a Reactant	13	Max.	42	15	6.0	2.8	7.0E−02	1.6E−02	5.6E−03	2.0E−03	1.2E−03	5.7E−04	2.2E−04
		Mean	9.9	4.1	1.6	0.72	1.7E−02	4.0E−03	1.4E−03	4.7E−04	2.5E−04	1.2E−04	4.2E−05
		Median	2.8	1.2	0.44	0.22	5.7E−03	1.3E−03	4.0E−04	1.6E−04	5.6E−05	2.5E−05	1.0E−05
Processing into Formulation, Mixture, or Reaction Product	11	Max.	1,140	265	87	37	0.61	0.13	4.1E−02	1.6E−02	9.5E−03	5.0E−03	2.2E−03
		Mean	165	41	14	6.0	0.13	3.1E−02	1.1E−02	3.9E−03	2.2E−03	1.1E−03	4.2E−04
		Median	7.4	3.1	1.1	0.91	1.7E−02	3.3E−03	1.1E−03	3.6E−04	1.9E−04	8.3E−05	3.4E−05
Non-Aerosol Cleaning and Degreasing	1	Max.	9.7E−03	5.5E−03	6.8E−03	9,690	1.3E−03	4.1E−04	1.8E−04	6.4E−05	3.4E−05	1.6E−05	5.1E−06
		Mean	9.7E−03	5.5E−03	6.8E−03	9,690	1.3E−03	4.1E−04	1.8E−04	6.4E−05	3.4E−05	1.6E−05	5.1E−06
		Median	9.7E−03	5.5E−03	6.8E−03	9,690	1.3E−03	4.1E−04	1.8E−04	6.4E−05	3.4E−05	1.6E−05	5.1E−06
Waste Handling, Treatment, and Disposal (Incinerator)	23	Max.	61	21	9.5	4.7	0.12	2.6E−02	8.6E−03	2.8E−03	1.5E−03	6.4E−04	2.2E−04
		Mean	5.0	2.0	0.79	0.39	9.6E−03	2.2E−03	7.1E−04	2.7E−04	1.4E−04	6.4E−05	2.3E−05
		Median	0.28	0.13	4.9E−02	2.2E−02	5.3E−04	1.6E−04	5.8E−05	2.1E−05	1.0E−05	3.3E−06	1.6E−06

HEM5.0 = Human Exposure Model Version 5; TRI = Toxic Release Inventory

[a] The full inputs and results are presented in the *HEM Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2026i) and *Supplemental Information on HEM TRI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2026n).

[b] At each distance there are 16 receptors that form a circle around the release location. HEM5.0 calculates an annual average at each point, giving 16 averages. The 95th percentile was calculated for these 16 averages for each release location and distance separately. The maximum values in this table are the highest of the 95th percentile annual average concentrations for each OES. Similarly, the mean and median are the mean and median of the 95th percentile annual average concentrations of all facilities associated with each OES.

[c] For each OES, EPA modeled the highest total (fugitive + stack) annual Toxic Release Inventory-reported release for each facility from 2015–2024.

3.4.2 Modeled Ambient Air Concentrations for EPA Estimated Releases for Generic Facilities/Sites

Table 3-15 provides a summary of the 95th percentile annual average air concentrations estimated using AERMOD for the four OESs where there were either no or limited site-specific data available for modeling of ambient air concentrations (see *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g) for methods used to estimate releases for OESs where there were either no or limited site-specific data). Data for the 95th percentile are presented here to show high-end exposure scenarios. Data for the 10th and 50th percentiles are available in the supplemental files. Daily modeled air concentrations for 10th, 50th, and 95th percentile exposure scenarios were also calculated and presented in the supplemental file (U.S. EPA, 2026i). The ambient air modeled concentrations values are presented for high-end exposure modeled, high-end meteorology (Lake Charles, Louisiana), and both rural and urban settings. The high-end meteorological station used represents meteorological datasets that tended to provide high-end concentration estimates relative to the other stations within IIOAC. Modeling was also conducted using meteorological data from Sioux Falls, South Dakota, to represent a central tendency exposure scenario, and these data are presented in the supplemental files.

The highest modeled concentrations occur at 10 m from the release point; however, this distance is generally not relevant for exposures to the general population. Therefore, this discussion focuses on distances exceeding 1,000 m, as these are distances at which the general population is more likely to be exposed. When considering distances exceeding 1,000 m or more, the maximum modeled ambient annual average air concentration for each modeled OES was 2.28×10^{-2} $\mu g/m^3$ for Commercial Aerosol Products; 1.66×10^{-4} for Laboratory use; 36 $\mu g/m^3$ for Industrial use of adhesives and sealants; and 0.48 $\mu g/m^3$ for Non-Aerosol Cleaning and Degreasing. The highest modeled concentration of 812 $\mu g/m^3$ at 100 m is the on the same order of magnitude as the maximum monitored concentration of 237 $\mu g/m^3$ from the AMTIC archive database (Table 3-13), though the modeled concentration is over 3-fold higher. In comparison, the highest 50th percentile annual average concentrations at 100 m across all OESs was 572 $\mu g/m^3$. While the AMTIC sampling locations may not align exactly with the modeled distances, the similarity of the maximum monitored and modeled concentrations provides evidence that the ambient air modeling approaches used in this risk evaluation were appropriate and representative.

Table 3-15. Summary Statistics for 95th Percentile Annual Average Ambient Air Concentrations for 1,2-Dichloroethane Using EPA Estimated Releases for Generic Facilities/Sites Modeled Using AERMOD[a][b][c]

Occupational Exposure Scenario (OES)	Meteorology [d]	Land	95th Percentile Annual Average Ambient Air Concentrations (μg/m³) Estimated for 10–10,000 m for Modeled OES Releases									
			10 m	**30 m**	**30–60 m**	**60 m**	**100 m**	**100–1,000 m**	**1,000 m**	**2,500 m**	**5,000 m**	**10,000 m**
Industrial Application of Adhesives and Sealants	High	Rural	5,789	3,003	2,430	1,496	812	165	36	9.0	3.07	1.03
	High	Urban	9,140	2,721	2,146	997	433	56	8.5	1.9	0.60	0.20
Commercial Aerosol Products	High	Rural	21	7.3	4.6	2.7	1.2	0.11	2.28E−02	4.80E−03	1.52E−03	5.07E−04
	High	Urban	23	6.7	4.3	2.3	0.92	7.34E−02	1.21E−02	2.27E−03	7.04E−04	2.39E−04
Non-Aerosol Cleaning and Degreasing	High	Rural	1,931	535	362	173	65	5.4	0.48	7.85E−02	2.69E−02	1.30E−02
	High	Urban	1,941	592	355	169	63	5.2	0.46	6.55E−02	2.35E−02	1.07E−02
Laboratory Use	High	Rural	0.56	1.55E−01	9.95E−02	5.00E−02	1.87E−02	1.57E−03	1.66E−04	2.87E−05	9.92E−06	4.70E−06
	High	Urban	0.56	1.54E−01	9.97E−02	4.97E−02	1.86E−02	1.56E−03	1.57E−04	2.60E−05	8.43E−06	3.49E−06

AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model; OES = occupational exposure scenario

[a] The full inputs and results are presented in the *HEM Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2026i) and *Supplemental Information on AERMOD Generic Releases Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2026l).

[b] See *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g) for the methods used for to estimate releases for OESs where there were either no or limited site-specific data.

[c] At each distance there are 16 receptors that form a circle around the release location. HEM5.0 calculates an annual average at each point, giving 16 averages. The 95th percentile was calculated for these 16 averages for each release location and distance separately. The maximum values in this table are the highest of the 95th percentile annual average concentrations for each OES. Similarly, the mean and median are the mean and median of the 95th percentile annual average concentrations of all facilities associated with each OES.

[d] High refers to the meteorological conditions for Lake Charles, LA. Because the data in this table are for generic facilities/sites, they were modeled using a meteorological station that tends to provide high-end concentration estimates relative to other stations in the Integrated Indoor/Outdoor Air Calculator (IIOAC). Concentrations were estimated using the Sioux Falls, ND, meteorological station. Those results are available in *Supplemental Information on AERMOD Generic Releases Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2026l).

3.4.3 Modeled Ambient Air Concentrations for NEI Reporting Facilities

1,2-Dichloroethane HEM5.0 NEI modeled annual average concentrations for the 95th percentile exposure scenario ranged from 0 to 1,830 µg/m^3 (Table 3-16) across distances modeled. Data for the 95th percentile are presented herein to show high-end exposure scenarios. Data for the 50th and 10th percentiles are available in the supplemental files. Daily modeled air concentrations for 10th, 50th, and 95th percentile exposure scenarios were also calculated and presented in the supplemental file (U.S. EPA, 2026m). The highest modeled concentrations occur at 10 m from the release point; however, this distance is generally not relevant for exposures to the general population. Therefore, this discussion focuses on distances exceeding 1,000 m as these are the distances at which the general population is more likely to be exposed. When considering distances 1,000 m or above, the highest 95th percentile modeled annual concentration of 5.5 µg/m^3 is approximately the same as the maximum HEM5.0 TRI modeled concentration of 7.1 µg/m^3 (Section 3.4.1). Like the results for TRI reporting facilities, the large range in modeled concentrations occurs because within each OES there are multiple facilities with varying releases.

Table 3-16. Summary Statistics for 95th Percentile Annual Average Ambient Air Concentrations for 1,2-Dichloroethane Releases Reported to NEI for the Reporting Years of 2014, 2017, and 2020 Modeled Using HEM5.0[a b c]

Occupational Exposure Scenario (OES)	Number of Releases[d]	Statistic	95th Percentile Annual Average Ambient Air Concentrations (µg/m^3) Estimated for 10–50,000 m from NEI Releases										
			10 m	30 m	60 m	100 m	1,000 m	2,500 m	5,000 m	10,000 m	15,000 m	25,000 m	50,000 m
Manufacturing	399	Max.	1.83E03	2.38E03	7.21E02	3.03E02	5.53E00	1.19E00	3.58E−01	1.20E−01	6.13E−02	2.69E−02	9.48E−03
		Mean	4.96E00	6.30E00	2.19E00	1.33E00	5.40E−02	1.43E−02	3.67E−03	1.24E−03	6.59E−04	3.02E−04	1.07E−04
		Median	2.67E−03	3.03E−03	3.50E−03	3.81E−03	1.29E−03	4.58E−04	1.45E−04	5.38E−05	2.87E−05	1.35E−05	4.98E−06
Repackaging	13	Max.	1.01E00	2.44E00	3.42E00	1.11E00	9.54E−01	2.78E−02	9.99E−03	3.64E−03	1.99E−03	9.40E−04	3.38E−04
		Mean	1.80E−01	3.23E−01	4.14E−01	2.37E−01	8.76E−02	5.98E−03	1.90E−03	6.49E−04	3.48E−04	1.60E−04	5.64E−05
		Median	1.29E−02	3.17E−02	6.10E−02	5.69E−02	4.12E−03	9.95E−04	3.33E−04	1.11E−04	5.97E−05	2.70E−05	9.05E−06
Processing as a reactant	133	Max.	1.80E02	6.65E01	2.44E01	2.39E01	4.42E−01	2.50E−01	3.22E−02	9.40E−03	5.02E−03	2.29E−03	7.46E−04
		Mean	1.75E00	7.99E−01	4.47E−01	3.33E−01	1.63E−02	5.33E−03	1.34E−03	3.67E−04	1.86E−04	8.22E−05	2.77E−05
		Median	2.61E−04	2.77E−04	3.02E−04	3.41E−04	1.79E−04	7.08E−05	3.82E−05	1.06E−05	4.11E−06	1.81E−06	5.44E−07
Processing into Formulation, Mixture, or Reaction Product	51	Max.	2.77E02	1.88E02	7.96E01	4.17E01	1.23E00	2.75E−01	8.90E−02	2.90E−02	1.51E−02	6.66E−03	2.24E−03
		Mean	6.50E00	4.42E00	1.93E00	1.14E00	3.25E−02	7.66E−03	2.57E−03	8.20E−04	4.49E−04	2.03E−04	6.88E−05
		Median	3.41E−06	1.06E−05	1.22E−04	2.44E−04	1.79E−04	9.17E−05	3.90E−05	1.31E−05	8.46E−06	4.42E−06	1.67E−06
Industrial Application of Adhesives and Sealants	104	Max.	3.35E00	1.19E00	7.85E−01	4.72E−01	3.02E−02	1.32E−02	6.14E−03	2.35E−03	1.21E−03	5.36E−04	1.97E−04
		Mean	1.43E−01	8.12E−02	5.09E−02	3.34E−02	1.75E−03	5.37E−04	2.04E−04	8.19E−05	4.51E−05	2.15E−05	8.63E−06
		Median	4.76E−06	2.21E−05	6.01E−05	9.34E−05	4.84E−05	1.71E−05	1.10E−05	3.66E−06	2.16E−06	1.08E−06	3.85E−07
Industrial Application of Lubricants and Greases	1	Max.	2.59E00	2.35E00	9.45E−01	3.99E−01	7.42E−03	1.32E−03	4.58E−04	1.68E−04	8.41E−05	3.54E−05	1.36E−05
		Mean	2.59E00	2.35E00	9.45E−01	3.99E−01	7.42E−03	1.32E−03	4.58E−04	1.68E−04	8.41E−05	3.54E−05	1.36E−05
		Median	2.59E00	2.35E00	9.45E−01	3.99E−01	7.42E−03	1.32E−03	4.58E−04	1.68E−04	8.41E−05	3.54E−05	1.36E−05
Non-Aerosol Cleaning and Degreasing	27	Max.	2.44E01	6.27E00	2.73E00	1.36E00	3.42E−02	1.35E−02	5.57E−03	2.05E−03	1.20E−03	5.54E−04	1.74E−04
		Mean	1.07E00	2.98E−01	1.33E−01	7.15E−02	3.43E−03	1.08E−03	4.05E−04	1.43E−04	8.10E−05	3.72E−05	1.20E−05
		Median	3.63E−02	8.82E−03	6.37E−03	2.65E−03	6.75E−05	1.80E−05	7.52E−06	2.44E−06	1.31E−06	5.95E−07	2.05E−07
Laboratory Use	4	Max.	1.08E00	3.65E−01	1.18E−01	4.68E−02	9.58E−03	3.92E−03	1.63E−03	6.25E−04	3.44E−04	1.69E−04	5.84E−05
		Mean	5.10E−01	1.50E−01	5.68E−02	2.83E−02	2.82E−03	1.08E−03	4.43E−04	1.69E−04	9.30E−05	4.54E−05	1.57E−05
		Median	4.77E−01	1.18E−01	5.42E−02	3.32E−02	7.62E−04	1.60E−04	5.22E−05	1.66E−05	9.29E−06	4.39E−06	1.54E−06
Waste Handling, Treatment, and Disposal (Incinerator)	21	Max.	1.17E01	7.87E00	2.48E00	1.14E00	2.04E−02	4.25E−03	1.34E−03	5.63E−04	2.96E−04	1.39E−04	5.06E−05
		Mean	1.13E00	7.69E−01	3.19E−01	1.42E−01	2.50E−03	4.83E−04	1.44E−04	6.24E−05	3.24E−05	1.47E−05	5.16E−06
		Median	2.02E−01	1.04E−01	3.24E−02	1.18E−02	2.34E−04	5.63E−05	1.81E−05	6.09E−06	3.11E−06	1.46E−06	5.08E−07

Occupational Exposure Scenario (OES)	Number of Releases[d]	Statistic	95th Percentile Annual Average Ambient Air Concentrations (µg/m³) Estimated for 10–50,000 m from NEI Releases										
			10 m	30 m	60 m	100 m	1,000 m	2,500 m	5,000 m	10,000 m	15,000 m	25,000 m	50,000 m
Waste Handling, Treatment, and Disposal (Landfill)	563	Max	1.10E02	8.54E00	3.47E00	1.77E00	3.62E−02	9.22E−03	2.85E−03	1.01E−03	5.28E−04	2.31E−04	7.90E−05
		Mean	1.66E00	2.74E−01	1.06E−01	4.90E−02	1.22E−03	3.05E−04	1.03E−04	3.63E−05	1.90E−05	8.86E−06	3.10E−06
		Median	1.99E−01	8.09E−02	2.96E−02	1.39E−02	4.87E−04	1.27E−04	4.29E−05	1.45E−05	7.56E−06	3.38E−06	1.18E−06
Waste Handling, Treatment, and Disposal (Non-POTW WWT)	26	Max	8.56E−01	6.36E−01	1.15E00	2.46E00	1.99E−02	3.59E−03	1.09E−03	3.54E−04	2.00E−04	9.20E−05	3.33E−05
		Mean	1.19E−01	1.15E−01	1.91E−01	2.65E−01	3.43E−03	6.97E−04	2.15E−04	6.90E−05	3.75E−05	1.68E−05	5.73E−06
		Median	2.08E−02	2.41E−02	3.08E−02	2.12E−02	4.54E−04	1.12E−04	4.01E−05	1.36E−05	7.28E−06	3.27E−06	1.11E−06
Waste Handling, Treatment, and Disposal (POTW)	61	Max	6.60E01	7.05E00	2.30E00	9.07E−01	1.41E−02	3.32E−03	1.07E−03	3.48E−04	1.84E−04	7.30E−05	2.47E−05
		Mean	2.13E00	4.74E−01	1.50E−01	6.07E−02	1.21E−03	2.72E−04	8.73E−05	2.81E−05	1.46E−05	6.36E−06	2.04E−06
		Median	3.28E−02	1.13E−02	4.37E−03	5.15E−03	1.28E−04	2.44E−05	8.14E−06	2.57E−06	1.36E−06	6.03E−07	2.19E−07
Waste Handling, Treatment, and Disposal (Remediation)	32	Max	8.17E00	7.58E−01	2.79E−01	2.29E−01	1.06E−01	3.59E−02	1.21E−02	5.55E−03	3.01E−03	1.26E−03	4.90E−04
		Mean	5.32E−01	8.77E−02	3.61E−02	2.25E−02	3.79E−03	1.24E−03	4.18E−04	1.86E−04	1.01E−04	4.25E−05	1.64E−05
		Median	4.68E−05	1.37E−03	8.41E−04	7.52E−04	4.73E−05	1.28E−05	5.56E−06	1.94E−06	1.00E−06	4.89E−07	1.97E−07
Facilities Not Mapped to an OES [e]	3	Max	9.87E−01	1.66E−01	5.01E−02	2.02E−02	1.97E−03	6.63E−04	3.91E−04	2.46E−04	1.73E−04	1.05E−04	5.50E−05
		Mean	5.30E−01	8.37E−02	2.71E−02	1.15E−02	8.72E−04	2.67E−04	1.45E−04	8.70E−05	6.01E−05	3.60E−05	1.88E−05
		Median	6.02E−01	8.52E−02	3.13E−02	1.39E−02	3.60E−04	7.85E−05	2.61E−05	8.78E−06	4.67E−06	2.17E−06	8.06E−07

HEM5.0 = Human Exposure Model Version 5; NEI = National Emissions Inventory; OES = occupational exposure scenario; POTW = publicly owned treatment works; WWT = wastewater treatment

[a] The full inputs and results are presented in the *HEM Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2026i) and *Supplemental Information on HEM NEI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2026m)

[b] For NEI data, EPA used data reported 2014, 2017, and 2020 in this analysis. In the draft risk evaluation, EPA modeled all available data for 2014 and 2017 using AERMOD (U.S. EPA, 2025c). For this evaluation, EPA modeled, in HEM5.0, each facility that showed a risk greater than 1E−06 based on the 95th percentile concentration at 10 m from the release location based on the analysis performed in the draft risk evaluation. EPA also modeled any releases that were new to the 2020 NEI if they were greater than the lowest release from 2014 and 2017 that resulted in a risk greater than 1E−06 based on the 95th percentile concentration at 10 m from the release location. If a facility reported in multiple years and had total releases greater than the threshold described above, then EPA used the maximum release across all years in this analysis.

[c] At each distance there are 16 receptors that form a circle around the release location. HEM5.0 calculates an annual average at each point, giving 16 averages. The 95th percentile was calculated for these 16 averages for each release location and distance separately. The max values in this table are the highest of the 95th percentile annual average concentrations for each OES. Similarly, the mean and median are the mean and median of the 95th percentile annual average concentrations of all facilities associated with each OES.

[d] Number of releases associated with each OES, not the total number of facilities assessed, as a single facility can have multiple release points.

[e] Facilities were not mapped to an OES in cases where information on the 1,2-dichloroethane use at the site was not available.

3.5 Modeled Air Deposition Fluxes

Summaries of the air deposition flux ranges estimated using AERMOD for reported TRI releases are provided in Table 3-16 and Table 3-17. The summary includes six OESs and select statistics (maximum, mean, median, and minimum) calculated from the TRI modeled deposition fluxes distributions within each OES at each distance modeled. The estimated annual deposition fluxes are based on the maximum 95th percentile annual (Table 3-17) deposition fluxes for each distance. Data for the 95th percentile are presented herein to show high-end exposure scenarios. Data for the 10th and 50th percentiles are available in the supplemental files. The OES of Manufacturing had the highest 95th percentile annual average depositional flux, with a rate of 87 g/m^2/year.

Table 3-17. Summary Statistics for 95th Percentile Annual Deposition Fluxes for 1,2-Dichloroethane Releases Reported to TRI from 2015–2024 Using HEM5.0 [a]

Occupational Exposure Scenario (OES)	Number of Facilities Evaluated in OES [b]	Statistic	95th Percentile Annual Deposition Flux (g/m^2/year) Estimated Within 10 to 50,000 m of Releasing Facilities										
			10 m	30 m	60 m	100 m	1,000 m	2,500 m	5,000 m	10,000 m	15,000 m	25,000 m	50,000 m
Manufacturing	24	Max.	8.72E01	6.26E01	2.93E01	1.35E01	2.07E−01	3.80E−02	1.09E−02	3.23E−03	1.63E−03	7.18E−04	2.29E−04
		Mean	1.05E01	1.31E01	5.42E00	2.36E00	4.22E−02	8.39E−03	2.60E−03	8.33E−04	4.37E−04	1.98E−04	6.60E−05
		Median	3.78E00	5.91E00	2.28E00	1.20E00	2.02E−02	4.00E−03	1.17E−03	3.48E−04	1.71E−04	7.45E−05	2.64E−05
Repackaging	4	Max.	8.66E−02	1.62E−01	5.78E−02	2.73E−02	6.31E−04	1.22E−04	3.61E−05	1.14E−05	6.06E−06	2.80E−06	1.01E−06
		Mean	2.17E−02	4.05E−02	1.45E−02	6.84E−03	1.58E−04	3.05E−05	9.08E−06	2.87E−06	1.53E−06	7.09E−07	2.55E−07
		Median	1.35E−05	1.83E−05	9.03E−06	1.10E−05	6.20E−07	2.12E−07	1.00E−07	3.86E−08	2.08E−08	1.59E−08	5.15E−09
Processing as a reactant	13	Max.	8.86E−01	7.36E−01	2.89E−01	1.16E−01	1.44E−03	2.60E−04	7.55E−05	2.38E−05	1.27E−05	5.93E−06	2.17E−06
		Mean	1.52E−01	1.51E−01	5.95E−02	2.49E−02	3.58E−04	6.85E−05	2.07E−05	6.67E−06	3.55E−06	1.64E−06	5.74E−07
		Median	3.74E−02	7.28E−02	2.29E−02	9.15E−03	1.47E−04	2.94E−05	9.23E−06	3.17E−06	1.74E−06	8.37E−07	3.19E−07
Processing into formulation, mixture, or reaction product	11	Max.	6.74E00	1.11E01	3.58E00	1.35E00	1.56E−02	2.83E−03	8.06E−04	2.43E−04	1.23E−04	5.38E−05	1.82E−05
		Mean	7.96E−01	1.13E00	3.72E−01	1.43E−01	1.76E−03	3.24E−04	9.43E−05	2.91E−05	1.50E−05	6.73E−06	2.35E−06
		Median	2.23E−03	1.90E−02	8.57E−03	7.14E−03	1.76E−04	3.40E−05	1.17E−05	4.79E−06	2.49E−06	1.16E−06	4.39E−07
Non-aerosol cleaning and degreasing	1	Max.	1.13E−06	1.19E−06	2.30E−06	4.56E−06	2.36E−07	4.54E−08	1.64E−08	6.98E−09	4.41E−09	2.50E−09	1.03E−09
		Mean	1.13E−06	1.19E−06	2.30E−06	4.56E−06	2.36E−07	4.54E−08	1.64E−08	6.98E−09	4.41E−09	2.50E−09	1.03E−09
		Median	1.13E−06	1.19E−06	2.30E−06	4.56E−06	2.36E−07	4.54E−08	1.64E−08	6.98E−09	4.41E−09	2.50E−09	1.03E−09
Waste handling, treatment, and disposal (Incinerator)	23	Max.	2.07E−01	3.34E−01	1.45E−01	5.68E−02	8.47E−04	1.80E−04	5.54E−05	1.84E−05	9.64E−06	4.31E−06	1.40E−06
		Mean	1.81E−02	2.69E−02	1.09E−02	4.88E−03	1.24E−04	2.55E−05	8.23E−06	2.87E−06	1.53E−06	7.09E−07	2.39E−07
		Median	3.53E−04	7.89E−04	6.04E−04	2.40E−04	7.00E−06	1.60E−06	5.49E−07	1.99E−07	1.16E−07	5.95E−08	2.46E−08

HEM5.0 = Human Exposure Model Version 5; OES = occupational exposure scenario; TRI = Toxic Release Inventory

[a] The full inputs and results are presented in the *HEM Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2026i) and *Supplemental Information on HEM TRI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2026n).

[b] For each OES, EPA modeled the highest total (fugitive + stack) annual Toxic Release Inventory-reported release for each facility from 2015–2024.

3.6 Evidence Integration for Ambient Air Pathway

Measured and modeled ambient air concentrations of 1,2-dichloroethane provide evidence that exposure to 1,2-dichloroethane via the ambient air pathway is expected. EPA used data from the AMTIC archive to assess measured concentrations of 1,2-dichloroethane in the ambient air. The Agency modeled releases from the TRI and NEI as well as releases for OESs with no facility data using HEM5.0 and AERMOD to estimate ambient air concentrations near 1,2-dichloroethane releasing facilities and for generic facilities/sites using estimated release. EPA also used modeled ambient air concentrations to quantitatively assess general population exposure to ambient air from facility releases of 1,2-dichloroethane. For more details on environmental releases and general population, see the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g) and the *General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026h).

4 SURFACE WATER PATHWAY

1,2-Dichloroethane is released to surface waters from the direct discharge of wastewater from industrial operations and wastewater treatment plants facilities as covered under COUs. Annual 1,2-dichloroethane discharge data as reported by facilities under NPDES permit requirements and found in the EPA Enforcement and Compliance History Online (ECHO) database was collected by EPA for site-specific analysis in estimating 1,2-dichloroethane concentrations in the respective receiving surface water bodies.

In addition, EPA searched peer-reviewed literature, gray literature, and U.S. government agency databases of environmental monitoring data, such as the Water Quality Portal and EPA's Six-Year Review of Drinking Water Standards[12], to obtain concentrations of 1,2-dichloroethane in ambient surface water, drinking water, and aquatic sediments. Although the available monitoring data were limited, 1,2-dichloroethane was found in detectable concentrations in ambient surface waters and finished drinking water.

In response to public comments, EPA has refined surface water estimates to include effluent plant flow and/or effluent monitoring data. EPA has also updated the facility releases and is using facility-specific data from 2015 to 2024. The Agency conducted modeling of industrial releases to surface water to assess the expected resulting environmental media concentrations from COUs presented in Table 1-1.

4.1 Modeling Approach for Estimating Concentrations in Surface Water

As described in *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g), annual releases of 1,2-dichloroethane to surface waters from regulated facility discharges were retrieved from the TRI and DMR public data records. To the extent possible, modeled hydrologic flow data (*i.e.,* stream flow) associated with the facility's receiving water body was retrieved from the National Hydrography Dataset Plus (NHDPlus) V2.1 dataset (U.S. EPA and USGS, 2016). The receiving water body was identified from NPDES permit information of the releasing facility for the 2015 to 2024 reporting periods.

Estimated concentrations within surface water followed a tiered approach, whereby the specific needs of estimating exposures to environmental biota and the corresponding development of the risk evaluation for 1,2-dichloroethane dictated which tiers are applied. These tiers are described in more detail below but generally require the estimation of screening level risk estimates to inform whether additional, higher-tiered refined analyses and/or refinements are needed.

Tier 1 Approach and Estimates of Surface Water Concentration

Annual releases of 1,2-dichloroethane to surface waters from regulated facility discharges were retrieved from the TRI and DMR public data records for the 2015 to 2024 reporting periods. Annual releases generated for facility specific releases were converted to daily releases based on two release patterns with different numbers of operating days. One release pattern used estimated facility operating days for each OES while the second used a 21-day operating day scenario. The former scenario assumes releases occur during all facility operating days and provides a refined analysis and more realistic surface water concentrations for estimating drinking water exposure, incidental oral and dermal exposure to surface water, and fish ingestion estimates. The latter 21-day release scenario provides an exposure duration more consistent with chronic exposure for aquatic species.

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[12] See https://www.epa.gov/dwsixyearreview (accessed April 23, 2026).

To the extent possible, modeled hydrologic flow data (*i.e.,* stream flow) associated with a facility's receiving water body via NPDES permit information was retrieved from the NHDPlus V2.1 dataset (U.S. EPA and USGS, 2016). In instances where a representative receiving water body was either not identified in the NPDES permit, not found in the NHDPlus dataset, or unable to be identified through professional judgement, EPA used the available facility effluent rate (plant flow) from EPA's ECHO database.

Tier 2 Approach and Estimates of Surface Water Concentration

If flows were not identified through NHDPlus nor plant flow was identified from the ECHO database, EPA then searched for and downloaded facility-specific effluent monitoring information corresponding with the facility's year of release.

In response to public comments, EPA also considered effluent monitoring data as a Tier 2 level of refinement of surface water concentrations if the initial Tier 1 estimates for either the 21 day or facility operating (OES) day release scenarios resulted in higher surface water concentrations than the 1,2-dichloroethane chronic aquatic concentration of concern (480 ug/L) (see *Environmental Hazard Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026f)).

The EPA ECHO database was accessed via the Application Programming Interfaces (API) and queried for the facilities reporting releases of 1,2-dichloroethane. All available NPDES permit IDs were retrieved from the facilities returned by the query. An additional query of the DMR REST service was conducted via the ECHO API to return NHDPlus reach code associated with the receiving water body for each available facility. Modeled flow metrics were then extracted for the retrieved reach codes, from the National Hydrography Dataset (NHD) Plus V2.1 Flowline Network EROM (Enhanced Unit Runoff Method) Flow database. EROM is used to estimate mean annual flow and incremental flow for NHDFlowline Feature in the NHDPlus HR network. The EROM Flow database provides modeled monthly average flows for each month of the year. While the EROM Flow database represents averages across a 30-year time period, the lowest of the monthly average flows was selected as a substitute for the 30Q5 (the lowest 30-day average flow that occurs [on average] once every 5 years) flow used in modeling, as both approximate the lowest observed monthly flow at a given location. The substitute 30Q5 flow was then plugged into the regression equation used by EPA's Exposure and Fate Assessment Screening Tool(E-FAST) General Population and Ecological Exposure from Industrial Releases Module to convert between these flow metrics and solved for the 7Q10 (the lowest 7-day average flow that occurs [on average] once every 10 years) using Equation 4-1. As in previous assessments, EPA selected the 7Q10 flow as a representative low flow scenario for biological impacts due to effluent in streams, while the harmonic mean represents a more average flow for assessing chronic drinking water and fish ingestion exposures.

Equation 4-1.

$$7Q10 = \frac{\left(0.409\frac{cfs}{MLD} \times \frac{30Q5}{1.782}\right)^{1.0352}}{0.409\frac{cfs}{MLD}}$$

Where:

7Q10 = Modeled 7Q10 flow, in MLD (millions of liters per day)
30Q5 = Lowest monthly average flow from NHD, in MLD
cfs = Cubic feet per second

Furthermore, the harmonic mean (HM) flow was calculated using Equation 4-2, derived from the relevant E-FAST regression.

Equation 4-2.

$$HM = 1.194 \times \frac{\left(0.409\frac{cfs}{MLD} \times AM\right)^{0.473} \times \left(0.409\frac{cfs}{MLD} \times 7Q10\right)^{0.552}}{0.409\frac{cfs}{MLD}}$$

Where:

HM = Modeled harmonic mean flow, in MLD
AM = Annual average flow from NHD, in MLD
7Q10 = Modeled 7Q10 flow from the previous equation, in MLD

In addition to the hydrologic flow data retrieved from the NHDPlus database, information about the facility effluent rate was collected, as available, from the ECHO Application Programming Interface (API). Where the facility effluent rate exceeded the hydrologic flow, the facility effluent flow rate was applied as the flow in the receiving water body. Where used, the facility plant flow was applied to all three of the flow metrics, that is, the HM, 30Q5 and 7Q10 flows.

The OESs were additionally run under the harmonic mean and 30Q5 flow conditions (Table 4-1). These additional results were selected to screen for risks to human health.

EPA used the equation for free-flowing water bodies within E-FAST 2014 to estimate site-specific surface water concentrations for documented releases. Surface water concentrations are calculated using the following equation:

Equation 4-3.

$$SWC = \frac{WWR \times CF1 \times \left(1 - \frac{WWT}{100}\right)}{SF \times CF2}$$

Where:

SWC = Surface water concentration (parts per billion (ppb) or µg/L)
WWR = Chemical release to wastewater (kg/day)
WWT = Removal from wastewater treatment (%)
SF = Estimated flow of the receiving stream (MLD)
CF1 = Conversion factor (10^9 µg/kg)
CF2 = Conversion factor (10^6 L/day/MLD)

Surface water concentrations were modelled for each facility with the highest release year across the 2019 to 2023 period selected for modeling. That year's release was modeled for both release day scenarios (operating days vs. 21 days) and for all relevant flow metrics for evaluation of exposure pathways (7Q10, 30Q5, and HM). Individual facilities were grouped into their respective OESs. Table 4-1 presents the highest receiving water body concentration across all facilities within each OES.

Table 4-1. Surface Water Estimates per Occupational Exposure Scenario (OES) for Various Flow Metrics

Scenario/OES (NPDES)	Release Days	Release Estimate (kg/day)	7Q10 Flow (MLD)	30Q5 Flow (MLD)	Harmonic Mean Flow (MLD)	7Q10 Conc. (µg/L)	30Q5 Conc. (ug/L)	Harmonic Mean Conc. (µg/L)
Manufacturing (LA0000761)	21	398	876 [a]	876 [a]	876 [a]	454	454	454
	350	24				27	27	27
Processing as a Reactant (IL0000141)	21	0.44	5.7E−02 [a]	5.7E−02 [a]	0.10	7,780	7,780	4,280
	350	2.6E−02				467	467	257
	Effluent Monitoring Data[b]					5	5	5
Processing into formulation, mixture, or reaction product (NJ0002348)	21	3.3	82	129	189	40	26	18
	350	0.20				2.4	1.5	1.1
Laboratory Use (MI0001911)	21	1.2E−02	1.2	2.1	6.0	0.84	0.46	0.16
	260	9.9E−04				10	5.7	2.0
Repackaging (LA0056600)	21	3.8E−03	1.9 [a]	1.9 [a]	1.9 [a]	2.0	2.0	2.0
	250	3.2E−04				0.17	0.17	0.17
Industrial and Commercial Non-Aerosol Cleaning/ Degreasing (NJ0000019)	21	2.8E−02	87	137	208	0.33	0.21	0.14
	350	1.7E−03				2.0E−02	1.2E−02	8.2E−03
Waste Handling, Treatment, And Disposal (POTW) (CA0023671)	21	0.30	0.40	0.75	2.3	757	399	131
	365	1.7E−02				44	23	7.6
	Effluent monitoring data[b]					93	93	93
Waste Handling, Treatment, and Disposal (Non-POTW WWT) (PA0080594)	21	20	0.98	1.8	2.0	2.1E04	1.1E04	1.0E04
	250	1.7				1,730	940	861
	Effluent monitoring data[b]					2,200	2,200	2,200
Waste Handling, Treatment, and Disposal (Incinerator) (AR003780)	21	17	4.4 [a]	4.4 [a]	4.4 [a]	3,860	3,860	3,860
	250	1.4				325	325	325
	Effluent monitoring data[b]					416	416	416
Waste Handling, Treatment, and Disposal (Landfill) (PA0043818)	21	3.3E−03	5.3E−02	0.11	8.1E−02	63	31	41
	250	2.8E−04				5.3	2.7	3.5
Waste Handling, Treatment and Disposal (Remediation) (NV0023621)	21	2.1E−02	1.6	1.8	2.5	13	12	8.4
	250	1.8E−03				1.1	0.99	0.71

Scenario/OES (NPDES)	Release Days	Release Estimate (kg/day)	7Q10 Flow (MLD)	30Q5 Flow (MLD)	Harmonic Mean Flow (MLD)	7Q10 Conc. (µg/L)	30Q5 Conc. (ug/L)	Harmonic Mean Conc. (µg/L)

7Q10 = the modeled 7Q10 flow, in MLD; 30Q5 = the lowest monthly average flow from NHD, in MLD; OES = occupational exposure scenario

[a] Facility reported effluent/plant flow

[b] Facility-specific effluent monitoring data is available for download in EPA's ECHO.

Facility-specific monitoring data was collected for four facilities representing four OESs and the resultant 1,2-dichloroethane effluent concentrations at the point of discharge to receiving water bodies were moved forward to represent exposures to both the general population and aquatic species.

4.1.1 Modeling Surface Water Concentrations from Releases During Storm Events

EPA generally does not include exposures associated with extreme weather events within the scope of the risk evaluation. However, when specific chemical information is available to the Agency and can provide additional characterization of facility operations and associated exposures, EPA considers this as part of a fact- and chemical-specific analysis. The Eagle US 2 LLC – Lake Charles Complex facility submitted 6 years of release data with the largest releases associated with storm events (see Table 4-2). Based on the chemical- and facility-specific data received, EPA considered the exposures associated with these storm events. The Agency is presenting data that are reflective of the range of releases and corresponding conditions, particularly the frequency of storm events in Louisiana. EPA also considered the 2020 releases resulting from extreme storm events separately and considered the 2016 releases as representative of normal operating conditions.

EPA estimated the 1,2-dichloroethane surface water concentration resulting from the releases during the 2020 post Hurricane Laura storm event. The NPDES permit data listed the receiving water body as Bayou Verdine but during a significant storm it is assumed that the Bayou and the Calcasieu River will flood at their confluence so that the Calcasieu River becomes the major flow at the point of discharge. Thus, EPA used Calcasieu River flow from NHDPlus (12,069 MLD) to estimate 1,2-dichloroethane concentrations in the receiving water body resulting from the 6,249 lb (2,834.5 kg) released from September 21 to September 25, 2020. The corresponding 1,2-dichloroethane surface water concentration was estimated to be 58.7 µg/L.

Table 4-2. Six Years of Westlake Facility Release Data in Louisiana[a]

Year		Discharge 1	Discharge 2	Discharge 3	Discharge 4	Discharge 5	TOTAL (lb/yr)
2016	Dates	12/3–4/2016	8/13–14/2016	4/30/2016	5/1/2016	N/A	
	Flow (GPM)	1042	1115	42	2916	N/A	
	1,2-Dichloroethane release (lb)	163.96	11.95	0.45	140.42	N/A	**316.79**
			Power Failure	**200 Year Rain**			
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2017	Dates	3/29/2017	4/28/2017	5/3/2017	6/21/2017	N/A	
	Flow (GPM)	7	76	2,764	208	N/A	
	1,2-Dichloroethane release (lb)	0.1	0.2	5	0.4	N/A	**5.7**
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2018	Date	10/9/2018	10/15/2018	10/16/2018	10/31/2018	N/A	
	Flow (GPM)	1.6	59	144	2	N/A	
	1,2-Dichloroethane release (lb)	0.1	64	157	2	N/A	**223.1**
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2019	Date	4/4/2019	5/10/2019	N/A	N/A	N/A	
	Flow (GPM)	333	729	N/A	N/A	N/A	
	1,2-Dichloroethane release (lb)	1.5	0.6	N/A	N/A	N/A	**4.1**
			Post-Hurricane Laura		**Hurricane Delta**		
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2020	Date	4/29/2020	9/21–25/2020	9/28/2020	10/9/2020	10/20/2020	
	Flow (GPM)	7	1,651	44	2,640	17	
	1,2-Dichloroethane release (lb)	0	6,249	83	86	0	**6418**
		Winter Storm Uri					
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2021	Date	2/16–17/2021	5/19/2021			N/A	
	Flow (GPM)	2,900	430	0	0	N/A	
	1,2-Dichloroethane release (lb)	312	18	0	0	N/A	**330**

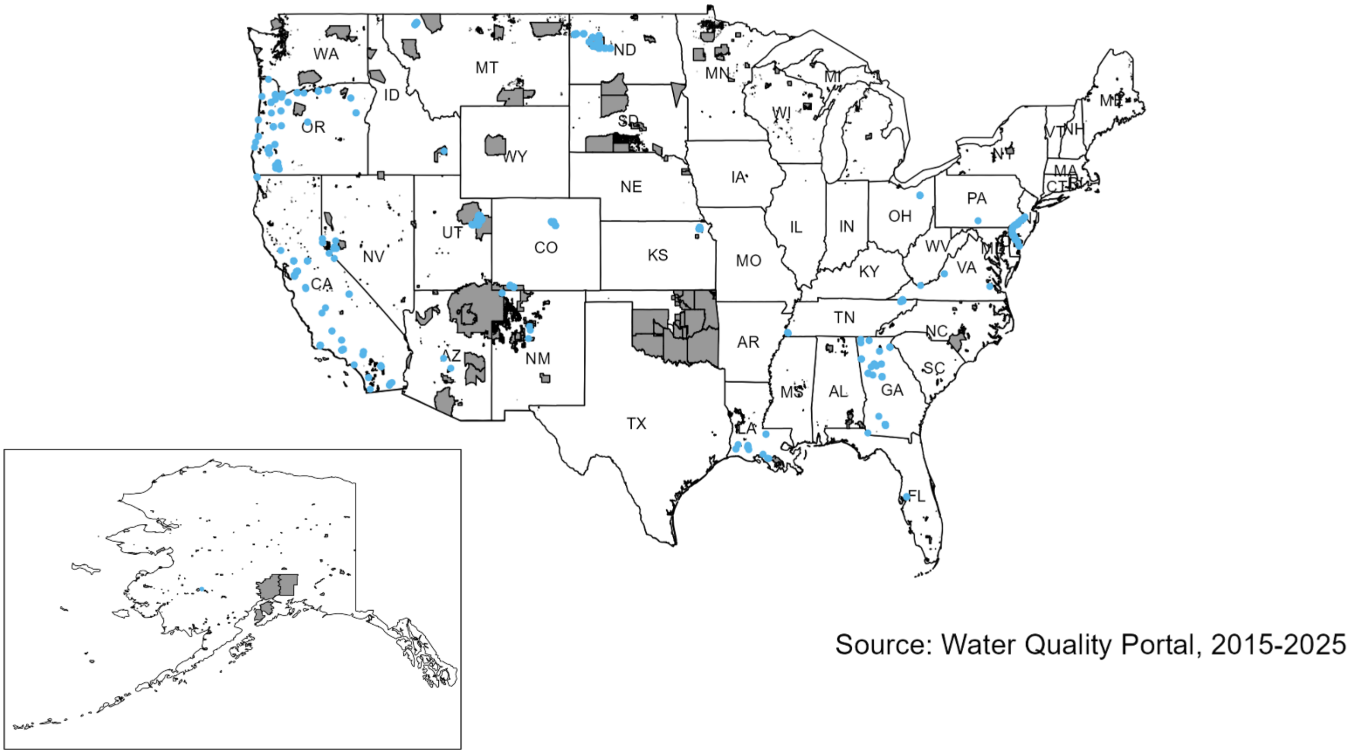
GPM = gallons per minute

[a] Source: EPA communication with Westlake Corporation on April 25, 2023.

4.2 Measured Concentrations in Surface Water

Measured concentrations of 1,2-dichloroethane from surface waters were retrieved from the WQP (NWQMC, 2022) to characterize the distribution of 1,2-dichloroethane levels in ambient surface waters across the nation, and to provide context for the modeled surface water concentrations of 1,2-dichloroethane presented in Section 4.1. Measured data were retrieved irrespective of the reason for sample collection to assess trends in the observed concentrations more broadly. WQP data were accessed in March 2026 for samples collected between 2015 to 2025, resulting in 1,367 data points (Figure 4-1). Full details of the retrieval and data processing steps of ambient surface water monitoring data from the WQP are presented in Appendix A.

Only seven reported measurements of 1,2-dichloroethane from 2015 to 2025 in the WQP were above the detection limit with a maximum concentration of 7.63 µg/L. The overall detection frequency was 0.512%. The detection limits ranged from 0.02 to 250 µg/L. Figure 4-1 shows the national spatial distribution of sampling, with most samples collected from North Dakota, Utah, California, and Oregon. In the absence of a national standardized study of 1,2-dichloroethane in ambient surface water and without greater national coverage and metadata, it is difficult to characterize the national occurrence of 1,2-dichloroethane in surface waters. Over-representation of certain states or regions may reflect targeted sampling campaigns of specific locations expected to have potentially high concentrations of 1,2-dichloroethane. Conclusions about areas without monitoring data cannot be drawn without further exploration through modeling. However, for those areas containing sufficient data coverage, 1,2-dichloroethane is infrequently measured at concentrations above the detection limit in ambient surface waters.



Source: Water Quality Portal, 2015-2025

Figure 4-1. Sampling Locations of 1,2-Dichloroethane in Ambient Surface Waters Obtained from the WQP, 2015–2025

American Indian, Alaska Native and Native Hawaiian (AIANNH) tribal boundaries are shaded gray.

A limited amount of 1,2-dichloroethane concentration data were identified through EPA's systematic review of published literature. Concentrations of 1,2-dichloroethane in surface water were reported in one study (Kingsbury et al., 2008) (Table 4-3). The U.S. Geological Survey (Kingsbury et al., 2008) collected samples from nine streams and eight community water systems throughout the United States during 2002 to 2005. Source water samples were collected from four surface water bodies in undeveloped areas (Cache la Poudre River, CO; Truckee River, NV; Clackamas River, OR; Running Gutter Brook, MA); three rivers in mixed-use areas (Chattahoochee River, GA; Neuse River, NC; Potomac River, MD); and two rivers in agricultural areas (Elm Fork Trinity River, TX; White River, IN). During the first sampling phase, samples were collected monthly during a variety of flow conditions at locations as close as practicable to drinking water intakes or at untreated water taps. In a similar fashion, samples were collected during the second phase in all but one of the locations (Cache la Poudre River) due to few compounds being detected there during the first phase. Of the 147 samples collected in the first phase and 95 samples collected in the second phase, no 1,2-dichloroethane was detected (<LOD of 0.13 µg/L).

Measured concentrations of 1,2-dichloroethane in surface water were extracted from two sources and are summarized below in Table 4-3. The limit of detection was 0.5 µg/l for the Bigsby and Myers (1989) and 5 µg/L for the Roy F. Weston, Inc. (1986) study. Location types were categorized as "Near Facility" and "General Population." Reported detection frequency ranged from 0 to 1.

Table 4-3. Summary of Peer-Reviewed Literature That Measured 1,2-Dichloroethane (µg/L) Levels in Surface Water

Citation	Location Type	Sampling Year	Sample Size (Frequency of Detection)	Number of Non-Detects	Detection Limit (µg/L)	Range of Measured Concentrations (µg/L)	Overall Quality Level
Bigsby and Myers (1989)	General Population	1988	3 (0)	3	0.5	N/A	Medium
Roy F. Weston Inc (1986)	Near Facility	1984	6 (0)	6	5	N/A	Medium
All study sampling locations were in the United States							

4.3 Evidence Integration for Surface Water

EPA reviewed surface water monitoring data from the WQP database and from peer-reviewed literature (Table 4-3) and confirmed the presence of 1,2-dichloroethane in surface waters in the United States (see Section 4.2 for additional details on measured concentrations and sources). However, specific monitoring data was not identified that could align spatially and temporally with the facility releases as reported in the EPA DMR's ECHO database. Using publicly available release data as well as receiving water body characteristics, the Agency quantitatively estimated concentrations of 1,2-dichloroethane in surface waters associated with the COU releases.

4.4 Modeling Approach for Estimating Concentrations in Sediment

EPA used a higher tier model, the U.S. EPA's Variable Volume Water Model with Point Source Calculator tool (VVWM-PSC), to estimate concentrations of 1,2-dichloroethane within water column and sediment for the OES resulting in the highest surface water concentration (Waste Handling, Treatment and Disposal [Incinerator]). PSC considers model inputs of physical and chemical properties of 1,2-dichloroethane (*i.e.,* K_{OC}, water column half-life, photolysis half-life, hydrolysis half-life, and benthic half-life), allowing EPA to model predicted water column concentrations (U.S. EPA, 2019). The organic carbon:water partition coefficient is expressed as follows:

Equation 4-4.

$$K_{OC} = \frac{K_d}{f_{OC}}$$

Where:

K_d = Solids:water partition coefficient
f_{OC} = Fraction of organic carbon

Site-specific parameters influence how partitioning occurs over time. For example, the concentration of suspended sediments, water depth, and weather patterns all influence how a chemical may partition between compartments. Physical and chemical properties of the chemical itself also influence partitioning and half-lives into environmental media.

Physical and chemical and fate properties selected by EPA for this assessment were applied as inputs to the PSC Model (Table 4-4) (U.S. EPA, 2026c).

Table 4-4. PSC Model Inputs (Chemical Parameters)

Parameter	Value
K_{OC}	58.88 mL/g
Water column half-life	51.5 days at 25 °C
Photolysis half-life	51 days at 30N
Hydrolysis half-life	26,280 days at 25 °C
Benthic half-life	10,000 days at 25 °C
Molecular weight	98.95 g/mol
Vapor pressure	78.9 torr at 25 °C
Solubility	8,600 mg/L at 25 °C
Henry's Law constant	0.00154 atm·m^3/mol at 25 °C
Heat of Henry	29,423 J/mol
Reference temperature	25 °C

PSC = Point Source Calculator

A generic setup for the model environment and media parameters was applied consistently across all PSC runs. The standard EPA "farm pond" water body characteristics were used to parameterize the water column and sediment parameters (Table 4-5) and generic PSC-modeled water body parameters were also applied, with a standardized width of 5 m, length of 40 m, and depth of 1 m (U.S. EPA, 2026c).

Table 4-5. PSC Model Inputs (Water Body Characteristics)

Parameter	Value
DFAC	1.19
Water column suspended sediment	30 mg/L
Chlorophyll	0.005 mg/L
Water column foc	0.04

Parameter	Value
Water column DOC	5.0 mg/L
Water column biomass	0.4 mg/L
Benthic depth	0.05 m
Benthic porosity	0.50
Benthic bulk density	1.35 g/cm³
Benthic f_{OC}	0.04
Benthic DOC	5.0 mg/L
Benthic biomass	0.006 g/m²
Mass transfer coefficient	1.00E−08 m/s
DOC = dissolved organic carbon; f_{OC} = fraction of organic carbon	

Release estimates to surface water from Table 4-1 were evaluated with PSC modeling. The total days of release associated with the highest COU release was applied as continuous days of release per year (for example, a scenario with 250 days of release per year was modeled as 250 consecutive days of release, followed by 115 days of no release, per year). For each modeled release, the number of days of release was applied as a custom averaging window for the results (*i.e.,* in the example given in the previous sentence, and 250-day average would be applied to calculate the resulting environmental media concentrations).

Releases were evaluated for resulting environmental media concentrations at the point of release (*i.e.,* in the immediate receiving water body receiving the effluent). Release modeling results are shown in Table 4-6. These values are carried through to the ecological risk assessment for further evaluation as provided in the *Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026e).

Table 4-6. Water and Benthic Sediment Concentrations in the Receiving Water Body, Applying a 7Q10 Flow

Occupational Exposure Scenario	Number of Operating Days Per Year	Daily Release (kg/day)	7Q10 Total Water Column Concentration (µg/L)	7Q10 Benthic Pore Water Concentration (µg/L)	7Q10 Benthic Sediment Concentration (µg/kg)
Waste Handling, Treatment and Disposal (Non-POTW WWT)	250	1.68	1,720	1,590	4,320
30Q5 = lowest 30-day average flow that occurs (on average) once every 5 years; 7Q10 = lowest 7-day average flow that occurs (on average) once every 10 years; POTW = publicly owned treatment works					

4.5 Measured Concentrations in Sediment

No monitoring studies conducted in the United States with data on concentrations of 1,2-dichloroethane in sediment were identified during systematic review.

4.6 Evidence Integration for Sediment

EPA assessed the peer-reviewed literature and confirmed the presence of 1,2-dichloroethane in surface water sediments in the United States. However, specific monitoring data was not identified that could align spatially and temporally with the facility releases as reported in EPA's DMR ECHO database. Using publicly available release data, receiving water body characteristics and 1,2-dichloroethane water solubility, EPA quantitatively estimated concentrations of 1,2-dichloroethane in surface water sediments and benthic pore water associated with the COU releases.

5 DRINKING WATER PATHWAY

EPA considered the impacts of 1,2-dichloroethane COU facility releases to surface water receiving water bodies as sources of drinking water. Surface water concentrations at the point of discharge are presented in Table 4-1; however, EPA considered the dilution of 1,2-dichloroethane concentrations from the point of discharge to drinking water intakes.

5.1 Modeling Approach for Estimating Concentrations in Drinking Water

To provide more robust estimates of 1,2-dichloroethane concentrations in drinking water, known facility releases were mapped to drinking water sources using public water systems (PWS) data stored in EPA's Safe Drinking Water Information System Federal Data Warehouse (SDWIS) (U.S. EPA, 2022c) and the 1st quarter 2026 version was used for this analysis. Following the mapping, the colocation of and proximity of facility release sites to PWS drinking water intake locations were evaluated. These drinking water data are considered sensitive due to national security by EPA's Office of Water and are protected from public release. Geospatial analysis using the NHDPlus V2.1 flowline network was used to determine PWS intake locations within 250 km downstream of facility 1,2-dichloroethane release sites. Provided a PWS may have multiple intake locations, concentrations of 1,2-dichlorethane were estimated at the most upstream intake for a given PWS; therefore, reflecting a more conservative estimate.

For each OES, facility releases were included in the downstream dilution analysis where the surface water concentration at the point of discharge (as described above in Section 4.1) was above 5 ug/L—the EPA drinking water maximum contaminant level (MCL). Results of surface water concentrations of 1,2-dichloroethane modeled from the highest annual facility releases between 2015 and 2024 for the OES specific operating days per year scenario were adjusted by a dilution factor that was calculated from the change in hydrologic flow between the facility release site and receiving water body associated with the identified PWS intake location. It is important to note that multiple facility releases can be upstream of the same PWS intake.

Table 5-1 presents the concentration after downstream dilution for the facilities and corresponding OESs with surface water concentrations above 5 µg/L and downstream intakes. Given the sensitivity of the location of PWS intakes, EPA presents only the downstream 1,2-dichloroethane concentration and is not providing the associated releasing facility location.

Table 5-1. Estimated 1,2-Dichloroethane Drinking Water Concentrations per Occupational Exposure Scenario (OES) at Intakes Downstream of Facility Releases[a]

Occupational Exposure Scenario (OES)	Release Days	Number of Discharging Facilities Considered for Downstream Analysis	Highest Downstream Harmonic Mean Conc. (µg/L)
Manufacturing	350	3	<0.1
Waste Handling, Treatment, And Disposal (POTW)	365	4	N/A
Processing as a Reactant	350	3	0.2
Waste Handling, Treatment, And Disposal (Incineration)	250	1	<0.1
Unknown (250 days)	250	5	<0.1

N/A – not assessed since no downstream intakes identified within 250 km.

[a] Identifying facility location information such as the amount of 1,2-dichloroethane released is not provided to mask the associated downstream PWS intake location that EPA does not disclose due to national security.

5.2 Measured Concentrations in Drinking Water

Measured concentrations of 1,2-dichloroethane in drinking water were extracted from the four sources listed in Table 5-2 . All studies were conducted in the United States and concentrations ranged from 0.04 to 3 µg/L from 241 samples collected between 1983 and 2011. All samples were collected from a drinking water treatment plant or distribution system.

Table 5-2. Summary of Peer-Reviewed Literature That Measured 1,2-Dichloroethane (µg/L) Levels in Drinking Water

Citation	Location Type	Sampling Year(s)	Sample Size (Frequency of Detection)	Number of Non-Detects	Detection Limit (µg/L)	Range of Measured Concentrations (µg/L)	Overall Quality Level
Landmeyer and Campbell (2014)	Drinking water treatment plant or distribution system (groundwater)	2010–2011	17 (0.12)	15	0.08	0.116–0.225	High
Hopple et al. (2009)	Drinking water treatment plant or distribution system (groundwater)	2004–2005	71 (0)	71	0.13	N/A	High
Kingsbury et al. (2008)	Drinking water treatment plant or distribution system (surface water)	2002–2004	147 (0)	147	0.13	N/A	High
Ambrose (1987)	Drinking water treatment plant or distribution system (surface water)	1983	6 (1)	0	1	1.2–3	Medium
All study sampling locations in the United States							

Because 1,2-dichloroethane is a regulated chemical under the National Primary Drinking Water Regulations, concentrations in drinking water are monitored by PWSs. EPA collects voluntary submissions of contaminant occurrence data, including 1,2-dichloroethane, in PWSs at least every 6 years. The latest assessment is the fourth Six-Year Review (SYR4; accessed April 23, 2026) published in February 2024. According to SYR4 data, 0.57% (298) of the 52,209 reporting systems had detected concentrations of 1,2-dichloroethane and only 0.05% (27) of systems had levels detected above the maximum contaminant level (MCL) of 5 µg/L.

5.3 Evidence Integration for Drinking Water

EPA reviewed peer-reviewed literature and confirmed the presence of 1,2-dichloroethane in drinking water in the United States. However, specific monitoring data was not identified that could align spatially and temporally with the facility releases as reported in EPA's DMR ECHO database. Using publicly available release data as well as receiving water body characteristics, EPA quantitatively estimated concentrations of 1,2-dichloroethane in drinking water intake locations downstream of and associated with COU releases. The highest estimate was for the Waste Handling and Disposal OES

(0.091 µg/L), which was well below the highest sampled concentration presented in literature (3 µg/L) as well as below the 95th percentile reported in the PWS occurrence levels in drinking water (2.4 µg/L).

6 LAND (SOIL) PATHWAY

Although air is expected to be the major exposure pathway for 1,2-dichloroethane, its physical and chemical properties indicate that 1,2-dichloroethane can be present and mobile in groundwater and soil (*Chemistry, Fate, and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026c)). Therefore, EPA evaluated concentrations of 1,2-dichloroethane in soil and groundwater.

6.1 Concentrations of 1,2-Dichloroethane in Soil

6.1.1 Measured Concentrations in Soil

No monitoring studies conducted in the United States with data on concentrations of 1,2-dichloroethane in soil were identified during systematic review.

6.1.2 Modeled Concentrations in Soil due to Air Deposition

EPA used HEM5.0 to estimate air deposition fluxes from TRI reporting facilities. The resulting concentrations of 1,2-dichloroethane in soil and soil pore water were then calculated using the methods described in Sections 3.2 and 6.4. The output from HEM5.0 is an annual average deposition flux for each receptor. The daily flux was obtained by dividing the annual flux by 365. The highest daily air deposition fluxes for each OES occurred at 10, 30 or 100 m from the facility (Table 3-12). Table 6-1 presents the resulting calculated highest annual average 1,2-dichloroethane soil concentrations and soil pore water concentrations at 10, 30, or 100 m for each OES. The exposure scenario for the Manufacturing OES resulted in the highest estimated 1,2-dichloroethane concentrations in soil and soil pore water. These calculated soil concentrations were used for determining dietary exposure of terrestrial ecological receptors (see *Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026e) for this analysis).

Table 6-1. Soil Catchment and Soil Catchment Pore Water Concentrations Estimated from 95th Percentile Maximum Daily Air Deposition Fluxes for 1,2-Dichloroethane Releases Reported to TRI

Occupational Exposure Scenario (OES)	Number of Facilities [a]	Maximum Daily Air Deposition ($g/m^2/day$)	Soil Concentrations (µg/kg)	Soil Pore Water Concentrations (µg/L) [b]
Manufacturing	24	0.23[c]	1,352[c]	621[c]
Repackaging	4	4.44E−04[d]	2.6[d]	1.2[d]
Processing as a Reactant	13	2.43E−03[c]	14[c]	6.4[c]
Processing into Formulation, Mixture, or Reaction Product	11	3.04E−02[d]	178[d]	82[d]
Industrial and Commercial Non-Aerosol Cleaning/Degreasing	1	1.25E−08[e]	7.35E−05[e]	3.38E−05[e]
Waste Handling, Treatment, and Disposal (Incinerator)	23	9.15E−04[d]	5.3[d]	2.5[d]

OES = occupational exposure scenario; TRI = Toxic Release Inventory

[a] Maximum daily air deposition represents the highest annual deposition across all pre-defined receptors on the modeled polar grid divided by 365 (see Sections 3.1.5 and 3.1.6 for additional information about the modeled distances and an example of a polar grid).

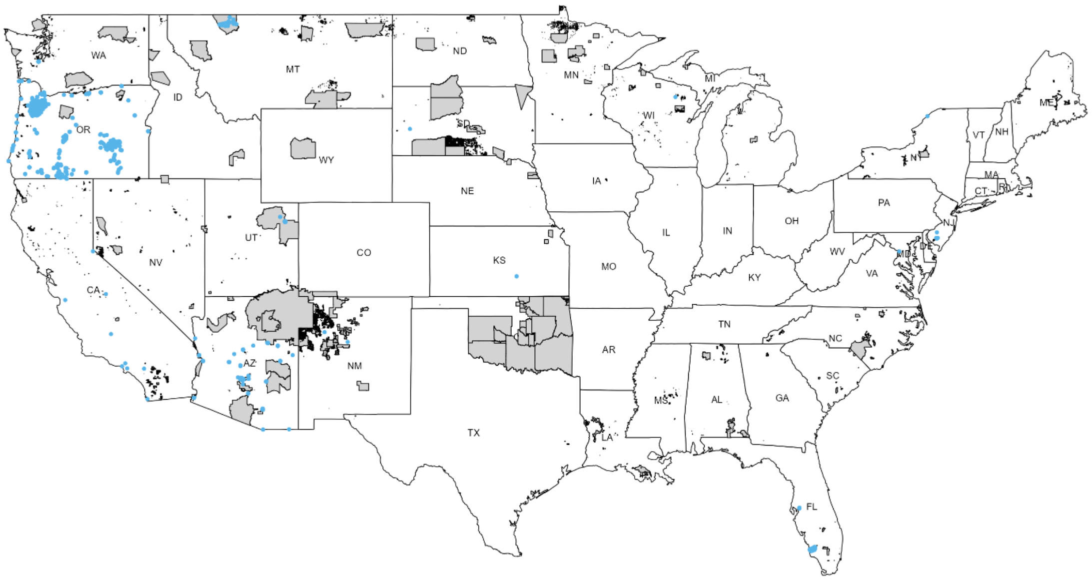
Occupational Exposure Scenario (OES)	Number of Facilities [a]	Maximum Daily Air Deposition ($g/m^2/day$)	Soil Concentrations (µg/kg)	Soil Pore Water Concentrations (µg/L) [b]

[b] See Section 6.4 for soil pore water concentration calculation.
[c] Estimated at 10 m from facility.
[d] Estimated at 30 m from facility.
[e] Estimated at 100 m from facility.

6.2 Concentrations of 1,2-Dichloroethane in Groundwater

6.2.1 Measured Concentrations in Groundwater (µg/L)

Measurements of 1,2-dichloroethane from groundwater are collated by the National Water Quality Monitoring Council and stored in the WQP (NWQMC, 2022). Groundwater 1,2-dichloroethane concentration results were acquired between 2015 to 2025 from the WQP. Figure 6-1 shows the spatial distribution of 1,2-dichloroethane sampling in groundwater across the contiguous United States. Groundwater sampling frequency was higher in Oregon, Arizona, and Washington compared to the rest of the states. WQP data were downloaded in March 2026 for samples collected between 2015 to 2025, resulting in 2,223 data points. Full details of the retrieval and data processing steps of water monitoring data from the WQP are presented in Appendix A. Concentrations of 1,2-dichloroethane in groundwater reported in the WQP ranged from 0.02 to 330 µg/L for samples collected between 2015 and 2025. The overall detection frequency was 48.9%. The detection limits ranged from 0.0047 to 20.5 µg/L. This analysis is intended to characterize the range of 1,2-dichloroethane concentrations in groundwater irrespective of the reasons for sample collection and to provide context for the modeled groundwater concentrations presented in Section 6.2.2.



Source: Water Quality Portal, 2015-2025

Figure 6-1. Sampling Locations of 1,2-Dichloroethane from Groundwater Monitoring Acquired from the WQP, 2015–2025

AIANNH Tribal boundaries are shaded in gray. Note that Alaska, American Samoa, Guam, Hawaii, N. Mariana Islands, Puerto Rico, and the U.S. Virgin Islands are not shown because they do not contain groundwater monitoring data within the WQP.

Measured concentrations of 1,2-dichloroethane in groundwater were extracted from eight sources and are summarized in Table 6-2. Concentrations ranged from not detected to 240 µg/L from 659 samples collected in the United States between 1982 and 2011. The highest reported concentration of 240 µg/L was taken from a groundwater well that was suspected to be contaminated from a nearby landfill. Reported detection frequency across all extracted studies ranged from 0 to 0.23 (Table 6-2).

Table 6-2. Summary of Peer-Reviewed Literature That Measured 1,2-Dichloroethane (µg/L) Levels in Groundwater

Citation	Location Type	Sampling Year(s)	Sample Size (Frequency of Detection)	Number of Non Detects	Detection Limit (µg/L)	Range of Measured Concentrations (µg/L)	Overall Quality Level
Landmeyer and Campbell (2014)	General population	2011	3 (0)	3	0.08	N/A	High
Hopple et al. (2009)	General population	2002–2005	292 (0.02)	287	0.13	N/R–0.2	High
Westinghouse Savannah River Company (1997)	Near facility	1995–1996	308 (0.08)	284	0.052	0.07–1.92	Medium
Heck et al. (1992)	Near facility	1990	13 (0.23)	10	0.2	0.5–4.9	Medium
Bigsby and Myers (1989)	Near facility	1988	7 (0)	7	0.5	N/A	Medium
Sabel and Clark (1984)	General population	1984	20 (0.20)	16	N/R	0.5–240	Medium
Roy F. Weston Inc (1986)	Near facility	1984	8 (0)	8	5	N/A	Medium
Buzska (1987)	Near facility	1982–1984	8 (0)	8	N/R	N/A	Medium

N/R = not reported
All study sampling locations were in the United States

6.2.2 Modeled Concentrations in Groundwater from Landfill Leachate

This section presents a scenario-based estimate of groundwater concentrations in the near-field of a landfill receiving 1,2-dichloroethane (*i.e.,* potential landfill-leachate influence). These modeled results are provided to contextualize and bound possible near-field conditions. The assessment was completed using the Hazardous Waste Delisting Risk Assessment Software (DRAS). DRAS was specifically designed to address the Criteria for Listing Hazardous Waste identified in Title 40 Code of Federal Regulations (40 CFR) 261.11(a)(3), a requirement for evaluating proposed hazardous waste delisting. In this assessment, DRAS was used to determine potential groundwater concentrations of 1,2-dichloroethane after disposal into a non-hazardous waste landfill. The results of this assessment are provided in Table 6-3. This assessment relied on the default waste loading rates for RCRA Subtitle C landfills available in DRAS. Similarly, the assessment relied on the default values for 1,2-dichloroethane as the chemical of concern. Lastly, leachate concentrations were estimated for a range of possibilities at the lower-end of those concentrations. Because DRAS calculates a weight-adjusted dilution attenuation factor (DAF) rather than a groundwater concentration, a back calculation was used to convert the DAF to a potential concentration that receptors located within 1 mile of a landfill might be exposed if the release was not controlled.

Based on 2015 to 2024 TRI data, the largest annual land release of 1,2-dichloroethane to landfills reported by TRI-reporting facilities was 55,924 lb (25,367 kg) in 2023. However, due to uncertainties in the disposal rates to landfills, EPA performed DRAS runs across loading rates that span five orders of magnitude, including one run at 100,000 kg/year, which is approximately one order of magnitude higher than the highest reported land release rate. The resulting possible groundwater concentrations were predicted to be less than 8.2×10^{-3} mg/L when assuming a max leachate concentration of 10 mg/L and a loading rate of 100,000 kg/year (Table 6-3).

Table 6-3. Estimated Groundwater Concentrations (mg/L) of 1,2-Dichloroethane Found in Wells Within 1 Mile of a Disposal Facility Determined by the DRAS Model[a]

Leachate Concentration	Loading Rate				
	10 (kg/year)	**100 (kg/year)**	**1,000 (kg/year)**	**10,000 (kg/year)**	**100,000 (kg/year)**
1.0E−05 mg/L	9.90E−13	9.43E−12	9.01E−11	8.62E−10	8.2E−09
1.0E−04 mg/L	9.90E−12	9.43E−11	9.01E−10	8.62E−09	8.2E−08
1.0E−03 mg/L	9.90E−11	9.43E−10	9.01E−09	8.62E−08	8.2E−07
1.0E−02 mg/L	9.90E−10	9.43E−09	9.01E−08	8.62E−07	8.2E−06
1.0E−01 mg/L	9.90E−09	9.43E−08	9.01E−07	8.62E−06	8.2E−05
1.0 mg/L	9.90E−08	9.43E−07	9.01E−06	8.62E−05	8.2E−04
10 mg/L	9.90E−07	9.43E−06	9.01E−05	8.62E−04	8.2E−03

DRAS = Hazardous Waste Delisting Risk Assessment Software
[a] Concentrations organized by potential loading rates (kg/year) and potential leachate concentrations (mg/L).

6.3 Concentrations of 1,2-Dichloroethane in Wastewater Treatment Plant Biosolids and Soils Receiving Land Applied Biosolids

Biosolids are a primarily organic solid product produced by wastewater treatment processes that can be beneficially recycled via land application. EPA published "The Standards for the Use or Disposal of Sewage Sludge" (40 CFR, part 503) in 1993 to protect public health and the environment from any reasonably anticipated adverse effects of certain pollutants that might be present in sewage sludge biosolids. Municipal wastewater treatment systems mainly treat biosolids to ensure pathogen and vector attraction (*e.g.,* rats) reduction and limits in metals concentrations; however, other chemicals are monitored as well. Biosolids may then be land applied, which may result in exposure of 1,2-dichloroethane to humans and environmental receptors.

6.3.1 Measured Concentrations of 1,2-Dichloroethane in Wastewater Treatment Plant Sludge and Biosolids

Limited data regarding 1,2-dichloroethane measured concentrations in biosolids have been identified in public databases or published literature—particularly for those facilities that treat and report discharges of 1,2-dichloroethane. However, 1,2-dichloroethane was not reported in EPA's National Sewage Sludge Surveys from 1988, 2001, or 2006 (U.S. EPA, 2009). The Agency did identify a 2004 report published by the King County Department of Natural Resources and Parks, Wastewater Treatment Division

(WTD) that characterized 2 municipal wastewater treatment facilities that monitored biosolids for 135 organic compounds, including 1,2-dichloroethane (King County DNRP, 2004). 1,2-Dichloroethane was not detected in these biosolids in the 2004 report. Data on concentrations of 1,2-dichloroethane in biosolids are not available for the 141 POTWs identified in the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g).

6.3.2 Modeled Concentrations in Wastewater Treatment Plant Sludge

Chemical substances in wastewater undergoing biological wastewater treatment may be removed from the wastewater by processes including biodegradation, sorption to wastewater solids, and volatilization. As discussed in the *Chemistry and Fate and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026c), 1,2-dichloroethane is expected to be removed in wastewater treatment—primarily by volatilization with little removal by biodegradation or sorption to solids. Chemicals removed by sorption to sewage sludge can enter the environment when treated biosolids are land applied. The removal of a nonbiodegradable neutral organic chemical present in WWTP influent via sorption to sludge is evaluated by considering its partitioning to sludge organic carbon. Because organic substances predominantly partition to organic carbon present in solids, the measured solid:water partition coefficient is normalized to the fraction of organic carbon (f_{OC}) present in the solids to yield the chemical's soil organic carbon sorption coefficient (K_{OC}).

Generally, as the K_{OC} increases, more of the chemical will be found associated with the sludge. Based on its K_{OC} value of 20 to 58.9, 1,2-dichloroethane is not expected to significantly partition to sewage sludge. Releases of 1,2-dichloroethane to wastewater treatment are expected to be low and disperse across many sites; therefore, land application of biosolids containing 1,2-dichloroethane is not expected to be a significant exposure pathway. To support this conclusion, EPA used the POTW with the highest reported releases of 1,2-dichloroethane based on DMR data to estimate high-end concentrations of 1,2-dichloroethane in soils receiving biosolids and soil pore water concentrations resulting from biosolids application. The effluent loading from the facility were used to calculate the theoretical influent load of 1,2-dichloroethane based wastewater treatment plant removal efficiency 39.6% (*Chemistry and Fate and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026c)). The calculated annual influent load was then divided by 365 to get a daily loading rate and used as input to the SimpleTreat 4.0 Wastewater Treatment Plant Model to estimate concentrations in sludge (RIVM, 2015). It was assumed that the modeled site used activated sludge wastewater treatment and that SimpleTreat 4.0 defaults were a reasonable representation of the activated sludge treatment at the site. Using calculated influent loading data, the model predicted a 1,2-dichloroethane concentration in combined sludge of 213.9 mg/kg.

6.3.3 Modeled Concentrations in Soil Receiving Biosolids

To assess soil concentrations of 1,2-dichloroethane resulting from biosolid applications, EPA used Equation R.16-48 of the *Guidance on Information Requirements and Chemical Safety Assessment Chapter R.16: Environmental Exposure Assessment* (ECHA, 2016). Guidance document default values used are shown in brackets.

Equation R.16-48 is as follows:

$$PEC_{soil} = \frac{C_{sludge} \times AR_{sludge}}{D_{soil} \times BD_{soil}}$$

Where:

PEC_{soil} = Predicted environmental concentration (PEC) for soil (mg/kg)
C_{sludge} = Concentration of 1,2-dichloroethane in sludge (mg/kg)
AR_{sludge} = Application rate to sludge amended soils ($kg/m^2/yr$) [0.5]
D_{soil} = Depth of soil tillage (m) [0.2 m in agricultural soil and 0.1 m in

pastureland]

BD_{soil} = Bulk density of soil (kg/m^3) [1,700 kg/m^3]

The concentration in sludge was set to 213.9 mg/kg dry weight based on the combined sludge concentration estimated by SimpleTreat 4.0 (Section 6.3.2). Using these assumptions, the Predicted environmental concentrations (PEC_{soil}) for soil estimated for 1,2-dichloroethane after the first year of biosolids application were 0.31 mg/kg in tilled agricultural soil and 0.63 mg/kg in pastureland.

The method assumes complete mixing of the chemical in the volume of soil on which it is applied, with no losses from transformation, degradation, volatilization, erosion, or leaching to lower soil layers. Additionally, it is assumed there is no input of 1,2-dichloroethane from atmospheric deposition and no background 1,2-dichloroethane in the soil.

6.4 Modeled Concentrations in Soil Pore Water

To estimate soil pore water concentrations for 1,2-dichloroethane in soil receiving biosolids, EPA used a modified version of the equilibrium partitioning (EqP) equation developed for weakly adsorbing chemicals, such as 1,2-dichloroethane and other volatile organic compounds. The modified equation accounts for the contribution of dissolved chemical to the total chemical concentration in soil or sediment (Fuchsman, 2003). The equation assumes that the adsorption of chemical to the mineral components of sediment particles is negligible:

$$C_{total} = C_{dissolved}\left[(f_{oc} \times K_{OC}) + \frac{1 - f_{solids}}{f_{solids}}\right]$$

Where:

C_{total} = Total chemical concentration in soil (mg/kg) (calculated in Sections 6.1.2 and 6.3.3)

$C_{dissolved}$ = Chemical concentration dissolved in pore water (mg/L)

f_{OC} = Fraction of sediment present as organic carbon (kg organic carbon/kg solid)

K_{OC} = Organic carbon: water partition coefficient (L/kg organic carbon)

f_{solids} = Fraction of soil solids (unitless)

Using this equation and assuming a K_{OC} of 20 L/kg, an f_{OC} of 0.02, and a soil solids fraction of 0.5, the estimated pore water concentrations for soils receiving biosolids, based on the PEC_{soil} calculated in Section 6.3.3, are 0.14 mg/L in tilled agricultural soil and 0.29 mg/L in pastureland. The estimated pore water concentration for the maximum soil deposition scenario, as discussed Section 6.1.2, is 0.91 mg/L.

6.5 Evidence Integration for Land Pathway

EPA identified limited data concentrations of 1,2-dichloroethane in soil; however, physical and chemical properties suggest that 1,2-dichloroethane may be present in soil. Therefore, EPA modeled soil concentrations via ambient air deposition from 1,2-dichloroethane TRI releasing facilities and via land application of biosolids from POTWs. Of these pathways, application of biosolids is estimated to result in lower soil concentrations of 1,2-dichloroethane (0.63 mg/kg) compared to ambient air deposition (2 mg/kg).

Monitoring data from the WQP show that 1,2-dichloroethane is detected in groundwater at numerous locations across the United States. While disposal of 1,2-dichloroethane to landfills could contribute to groundwater via leachate under certain conditions (as indicated by our modeling), 1,2-dichloroethane may also be present as a transformation product formed under anaerobic conditions from higher-chlorinated solvents—particularly 1,1,2-trichloroethane and 1,1,2,2-tetrachloroethane—that are commonly associated with legacy disposal practices. Given the limited geographic scope of contemporary 1,2-dichloroethane releases and the prevalence of legacy chlorinated-solvent sites, observed detections likely reflect a combination of direct disposal and in situ formation from legacy sources.

7 WEIGHT OF SCIENTIFIC EVIDENCE

According to the *Draft Systematic Review Protocol for 1,2-Dichloroethane* (U.S. EPA, 2026o), the selection of data and information are informed by the hierarchy of preferences, which considers the use of both measured (monitoring) and estimated (modeled) data. Monitoring data from both published literature and sampling databases provides strong evidence for the presence of 1,2-dichloroethane in ambient air, surface water, and groundwater—though sampling has often been done in areas associated with a known or potential source of release. EPA modeling of TSCA releases also predicts presence in ambient air and surface water. Fate and physical and chemical properties provide additional context; that is, high water solubility of 1,2-dichloroethane and low potential for hydrolysis are factors that strengthen the evidence of 1,2-dichloroethane presence in water and the volatility of 1,2-dichloroethane and low potential for photolysis provides evidence of its presence in air.

7.1 Strengths, Limitations, Assumptions, and Key Sources of Uncertainty for Ambient Air Pathway

AMTIC data were previously reviewed and verified by the AMTICs Ambient Air Monitoring Group, which has taken various quality assurance steps to ensure data quality and has been certified in accordance with 40 CFR Part 58.15. Due to strictly regulated monitoring requirements, EPA has high confidence in the AMTIC ambient air dataset (U.S. EPA, 2022a), which also received a high quality rating from the Agency's systematic review process (U.S. EPA, 2021a). One limitation of the AMTIC archive data is that because monitored data represent a total aggregate concentration from all sources of 1,2-dichloroethane contributing to ambient air concentrations, the AMTIC data cannot be used to characterize exposures exclusively from COUs under TSCA.

EPA also evaluated three studies from systematic review that were conducted in the United States and received data quality rankings of high (see Section 3.3). Limitations of measured data from systematic review are that the data vary temporally and geospatially. Methodology for sample collection and analysis are specific to each peer-reviewed literature and vary in instrumentation and analysis. Additionally, it can be difficult to identify a specific COU that is directly tied to data collected through systematic review.

EPA modeled air concentrations from reported TRI and NEI releases. TRI and NEI data are reported by both facilities and state/county government entities and provide data on the levels of 1,2-dichloroethane being emitted into ambient air. The Agency has high confidence in the air concentrations and deposition fluxes estimated from TRI and NEI release data using HEM5.0.

AERMOD, which is directly integrated into HEM5.0, is an EPA regulatory model and has been peer reviewed; therefore, the general confidence in results from the model is high but relies on the integrity and quality of the inputs used and interpretation of the results. For this analysis, the Agency used releases reported to the TRI and NEI as direct inputs to AERMOD. EPA considered TRI release data from the years 2015 to 2024 for this analysis. For each facility, the Agency used the highest total emissions across the years of 2015 to 2024 as inputs to HEM5.0. Concentrations were modeled for both fugitive and stack emissions. EPA included only TRI reporting Form R submissions in this analysis.

For NEI data, EPA considered releases from the years 2014, 2017, and 2020. In the draft risk evaluation, EPA modeled all available data in NEI for 2014 and 2017 (U.S. EPA, 2025c). For this evaluation, EPA modeled each facility that showed a risk greater than 1×10^{-6} based on the 95th percentile concentration at 10 m from the release location. EPA also modeled any releases that were new to the 2020 NEI if they were greater than the lowest release from 2014 and 2017, which resulted in a risk greater than 1×10^{-6}

based on the 95th percentile concentration at 10 m from the release location. If a release location was reported in multiple years, EPA used the highest release in this assessment.

HEM5.0 uses the latitude/longitude information reported by each facility to TRI as the location for the point of release. Although this may generally be a close approximation of the release point for a small facility (*e.g.,* a single building), it may not represent the release point within a much larger facility. Therefore, there is some uncertainty associated with the modeled distances from each release point and the associated concentrations—especially for communities that may live near release sites. The TRI reported data used for HEM5.0 do not include source-specific stack parameters that can affect plume characteristics and associated dispersion of the plume. Thus, EPA used pre-defined stack parameters within IIOAC to represent stack parameters of all facilities modeled using each of these methodologies. Those stack parameters include a stack height 10 m above ground with a 2-meter inside diameter, an exit gas temperature of 300 K, and an exit gas velocity of 5 m/s (see Table 6 of the IIOAC User Guide). These parameters were selected because they represent a slow-moving, low-to-the-ground plume with limited dispersion that results in a more conservative estimate of concentrations at the distances evaluated. As such, these parameters may result in some overestimation of emissions for certain facilities modeled. Additionally, the assumption of a 10 × 10 m area source for fugitive releases may impact the concentration estimates very near a releasing facility (*i.e.,* 10 m from a fugitive release). This assumption places the 10-meter exposure point just off the release point that may result in either an over or underestimation of concentration depending on other factors like meteorological data, release heights, and plume characteristics. Contrary to the TRI-reported data, some of the data reported to the NEI that was used for modeling with HEM5.0 include source-specific stack parameters. Therefore, specific parameter values were used in modeling, when available. When parameters were not available or values were reported outside of normal bounds, reported values were replaced as outlined in Section 3.1.10.

HEM5.0-modeled annual average concentrations of releases from TRI reporting facilities ranged from 0 to 2,639 $\mu g/m^3$ (Table 3-14) across all distances modeled, with the maximum modeled concentration being one order of magnitude higher than the maximum monitored concentration of 237 $\mu g/m^3$ from AMTIC for samples with a reported sample duration of 24 hours (Table 3-13). As an additional comparison of modeled and monitored data, Table 7-1 shows the 10 monitoring locations in the AMTIC archive with the highest modeled 1,2-dichloroethane for the years associated with the TRI releases used in this assessment. The comparison shows that annual average and 95th percentile daily modeled concentrations are within approximately an order of magnitude of the mean and 90th percentile monitored 1,2-dichloroethane concentrations at 10 monitoring stations with the highest modeled concentrations.

Additional monitoring was conducted by EPA's Office of Air at three sampling locations near the same facility from October 2020 to December 2021 (U.S. EPA, 2024a). The site with the highest measured 1,2-dichloroethane concentrations was located 370 m from the facility and reported concentrations ranging from 4.29×10^{-2} to 221 $\mu g/m^3$ with a detection frequency of 99%. The two other sampling sites were located approximately 1,900 and 2,500 m from the facility and had reported concentrations of 5.91×10^{-2} to 15.4 $\mu g/m^3$ (detection frequency of 93%) and 2.83×10^{-2} to 11.2 $\mu g/m^3$ (detection frequency of 96%), respectively. The modeled 95th percentile concentrations for this facility of 7.1 and 1.6 $\mu g/m^3$ at 1,000 and 2,500 m were on the same order of magnitude as the monitored concentrations at approximately the same distances. Based on the comparative analysis in this section, the 95th percentile ambient air concentrations are likely representative of actual concentrations near releasing facilities. Further based on the overall confidence in the use and applicability of HEM5.0 for modeling of 1,2-dichloroethane in addition to the comparative analysis, EPA has robust confidence in the modeled results from reported TRI and NEI releases.

Table 7-1. Comparison of 1,2-Dichloroethane HEM5.0-Modeled Concentrations for TRI Facilities with 1,2-Dichloroethane Ambient Air Monitoring Data from Highest 10 AMTIC Monitoring Sites Within 10 km of the Closest Facility from 2015–2024[a]

AMA Site Code	TRI ID of Facilities within 50,000 m of Monitoring Station	Monitoring Year and Release Year for Associated Facilities	Modeled Annual Average Concentration from HEM5.0 (µg/m^3)	Modeled 95th Daily Concentration (µg/m^3)	Maximum Monitored Concentration (µg/m^3)	90th Monitored Concentration (µg/m^3)	Mean Monitored Concentration (µg/m^3)
211570014	42029WSTLK2468I	2018	4.4	24	123	13	6.2
220190008 [b]	70669GRGGL1600V, 70669PPGNDCOLUM	2021, 2022	2.3	11	26 17	8.2 7.6	2.7 2.5
211390004	42029WSTLK2468I	2018	1.3	7.6	14	4.4	1.4
22019SPE3	70669GRGGL1600V	2021	1.1	5.3	13	7.2	2.4
221210001 [b]	7076WDDPSP21255, 70764LLMNXHWY40, 70734VLCNMASHLA, 70765GRGGLHIGHW, 70805LLDSGCORNE, 70765THDWCHIGHW, 7076WBLCBP21255	2018, 2017, 2017, 2015, 2015, 2015, 2020	0.37	1.9	34 21 21 11 11 11 3.2	2.0 2.3 2.3 2.5 2.5 2.5 1.6	1.5 1.0 1.0 0.92 0.92 0.92 0.54
220330009 [b]	7076WDDPSP21255, 70805LLDSGCORNE, 70765GRGGLHIGHW, 70765THDWCHIGHW, 70764LLMNXHWY40, 70734VLCNMASHLA, 7076WBLCBP21255	2018, 2015, 2015, 2015, 2017, 2017, 2020	0.31	1.9	2.0 1.0 1.0 1.0 1.4 1.4 1.4	1.2 0.72 0.72 0.72 0.69 0.69 0.81	0.43 0.29 0.29 0.29 0.26 0.26 0.24
480391003 [b]	77541THDWCBUILD, 77541TXSBR4115E, 7751WNSLGM15916	2017, 2019, 2020	0.22	1.1	8.5 2.4 1.5	0.47 0.43 0.36	0.34 0.22 0.17
220050004 [b]	70765GRGGLHIGHW, 70765THDWCHIGHW, 70805LLDSGCORNE, 70734VLCNMASHLA, 70764LLMNXHWY40, 7076WDDPSP21255, 7076WBLCBP21255, 70391DWCHMLOUIS	2015, 2015, 2015, 2017, 2017, 2018, 2020, 2016	0.17	1.2	10 10 10 3.7 3.7 3.3 5.7 3.8	1.0 1.0 1.0 1.3 1.3 1.4 0.59 0.91	0.60 0.60 0.60 0.54 0.54 0.45 0.36 0.36
220470009 [b]	70764LLMNXHWY40, 70734VLCNMASHLA, 7076WDDPSP21255, 70391DWCHMLOUIS,	2017, 2017, 2018, 2016, 2015, 2015,	0.11	0.54	4.3 4.3 1.6	0.81 0.81 0.63	0.34 0.34 0.26

AMA Site Code	TRI ID of Facilities within 50,000 m of Monitoring Station	Monitoring Year and Release Year for Associated Facilities	Modeled Annual Average Concentration from HEM5.0 (µg/m^{3})	Modeled 95th Daily Concentration (µg/m^{3})	Maximum Monitored Concentration (µg/m^{3})	90th Monitored Concentration (µg/m^{3})	Mean Monitored Concentration (µg/m^{3})
	70765GRGGLHIGHW, 70765THDWCHIGHW, 70805LLDSGCORNE, 7076WBLCBP21255	2015, 2020			1.5 0.85 0.85 0.85 0.84	0.54 0.52 0.52 0.52 0.51	0.25 0.23 0.23 0.23 0.20
220470012 [b]	7076WDDPSP21255, 70391DWCHMLOUIS, 70764LLMNXHWY40, 70734VLCNMASHLA, 70765GRGGLHIGHW, 70765THDWCHIGHW, 70805LLDSGCORNE, 7076WBLCBP21255	2018, 2016, 2017, 2017, 2015, 2015, 2015, 2020	0.11	0.71	4.4 6.5 5.6 5.6 1.3 1.3 1.3 4.2	0.95 0.81 0.82 0.82 0.77 0.77 0.77 0.94	0.47 0.43 0.40 0.40 0.35 0.35 0.35 0.33

AMTIC = Ambient Monitoring Technology Information Center; HEM5.0 = Human Exposure Model Version 5.0; TRI = Toxic Release Inventory

[a] AMTIC archive summary data were downloaded directly from the AMTIC archive website (https://www.epa.gov/amtic/amtic-ambient-monitoring-archive-haps, accessed April 23. 2026), which contains documentation on the statistical methods used to calculate the summary statistics.

[b] There were multiple TRI-reporting facilities within 50,000 m for these monitoring sites. The associated facilities and year of release for that facility are in the following columns. The monitored concentrations are the concentrations for the release years of each associated facility. Since HEM5.0 was run with releases from multiple years, there is only 1 modeled annual and 95th percentile daily concentration for each monitoring site. The modeled concentrations are aggregated across all facilities.

[c] In this analysis, the 18th highest of the 365 daily concentrations was output by HEM5.0, which equates to approximately the 95th percentile.

[d] The maximum monitored concentration is based on the “MAX_UG_M3” column as extracted from the AMTIC archive website (U.S. EPA, 2026a).

[e] The 90th percentile monitored concentration is based on the “P90_UG_M3” column as extracted from the AMTIC archive website (U.S. EPA, 2026a).

[f] The mean monitored concentration is based on the “MEAN_UG_M3” column as extracted from the AMTIC archive website (U.S. EPA, 2026a).

HEM5.0 was used to model daily ($g/m^2/day$) and annual ($g/m^2/year$) deposition fluxes from air to land and water from each TRI and NEI releasing facility. Based on physical and chemical properties of 1,2-dichloroethane (*Chemistry and Fate and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026c)), EPA considered only gaseous deposition. The Agency used chemical-specific parameters as input values for HEM5.0 deposition modeling. EPA has moderate confidence in the deposition fluxes estimated from TRI release data using HEM5.0.

7.2 Strengths, Limitations, Assumptions, and Key Sources of Uncertainty for Surface Water Pathway

Unlike the example given above correlating ambient air modeling/monitoring, the available measured surface water concentration data are poorly co-located with 1,2-dichloroethane facility release sites. EPA relied primarily on modeling to estimate aqueous concentrations resulting from releases to surface waters as reported in the EPA Pollutant Loading Tool. The tool compiles and makes public discharges as reported in DMRs required in NPDES permits and provides data on the amount of 1,2-dichloroethane in discharged effluent and the receiving water body. For four OESs (Processing as a Reactant, Waste Handling and Disposal [POTWs], and Waste Handling and Disposal [Incineration]) the effluent monitoring data was incorporated into the surface water analysis and represents the highest tier estimates. For those OESs releasing to surface water, confidence is rated as moderate to robust depending on the individual OES.

The modeling used, and the associated default and user-selected inputs can affect the overall strength in evaluating concentrations in surface waters. The facility-specific releases methodology described in Section 2.3.3 of *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g) and the results in Section 4.1 rely on a modeling framework that does not consider downstream fate. To reduce uncertainties, EPA incorporated an updated hydrologic flow network and flow data into this assessment that allowed a more site-specific consideration of release location and associated receiving water body flows. However, these releases are evaluated on a per facility basis that do not account for additional sources of 1,2-dichloroethane that may be present in the evaluated waterways. EPA did a screening assessment of facility water body concentrations at the point of discharge within a state or across several states where there was a concentration of facility releases to gauge the levels of aggregated 1,2-dichloroethane (see *1,2-Dichloroethane Surface Water Exposures* supplemental file). These concentrations were still below the ecological chronic hazard levels. This type of aggregation would be an overestimate as fate properties and dilution would become important factors in decreasing downstream 1,2-dichloroethane concentrations.

For ambient surface water, data are limited geographically and temporally, with many states having no reported data and even those areas reporting measured values having limited samples over time. Monitored concentrations near modeled releases were rare, often making direct comparisons of modeled results unavailable. In most cases, monitoring data represented water bodies without identified releases of 1,2-dichloroethane nearby (thus relying only on reported facility-specific release).

7.3 Strengths, Limitations, Assumptions, and Key Sources of Uncertainty for Drinking Water Pathway

Due to the lack of measured concentrations of 1,2-dichloroethane in finished drinking water from the Office of Water databases, comparisons to 30Q5-based model estimates for individual PWSs where co-located data were not available. However, a comparison of published literature data of 225 µg/L and the highest drinking water estimate of 0.09 µg/L is available—though not comparable either spatially or temporally. That is, both the timing and location of release and sample collection must align to make a true comparison of the modeled versus measured results.

Drinking water exposures are not likely to occur from the receiving water body at the point of facility-specific releases. Specifically, the direct receiving water bodies may or may not be used as drinking water sources. To address this limitation, EPA evaluated the proximity of known 1,2-dichloroethane releases to known drinking water sources as well as known drinking water intakes as described in Section 5.1. Given EPA's high confidence in the release locations and the drinking water intake locations, the Agency has robust confidence in estimates of 1,2-dichloroethane drinking water concentrations at the point of drinking water intakes and prior to drinking water treatment do not exceed 0.2 µg/L.

7.4 Strengths, Limitations, Assumptions, and Key Sources of Uncertainty for Land Pathway

Because 1,2-dichloroethane is a chlorinated solvent with decades of use in U.S. chemical manufacturing, there is evidence that previous releases or disposal resulted in concentrations of 1,2-dichloroethane in groundwater. Uncertainties and limitations are inherent in the modeling of groundwater concentrations from disposing chemical substances into poorly managed RCRA Subtitle D landfills as well as those that are not regulated as closely. These uncertainties include but are not limited to (1) determining the total and leachable concentrations of waste constituents, (2) estimating the release of pollutants from the waste management units to the environment, and (3) estimating the transport of pollutants in a range of variable environments by process that often are not completely understood or are too complex to quantify accurately. To address some of these uncertainties and add strength to the assessment, EPA considered multiple loading rates and multiple leachate concentrations. These considerations add value to estimate exposure that falls at an unknown percentile of the full distribution of exposures. The DRAS Model is based on a survey of drinking water wells located downgradient from a waste management unit (U.S. EPA, 1988). Due to the age of the survey, it is unclear how the survey represents current conditions and proximity of drinking water wells to disposal units. Similarly, it is not clear whether the surveyed waste management units are representative of current waste management practices. EPA therefore has moderate confidence in the modeled estimates of 1,2-dichloroethane in groundwater from TSCA releases.

Monitoring data from the WQP shows that low levels of 1,2-dichloroethane are widespread in wells across the United States. Given that releases are not as geographically widespread, it is likely that the 1,2-dichloroethane detected in groundwater is resulting from a combination of direct disposal and in situ formation from legacy sources.

7.5 Conclusions

Based on the environmental release assessment presented in the *Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026g)*,* 1,2-dichloroethane is expected to be released to the environment via air, water, biosolids, and landfills. Environmental media concentrations were quantified in ambient air, soil from ambient air deposition, surface water, and sediment. In addition, concentrations of 1,2-dichloroethane in soil and groundwater from releases to biosolids and landfills were also quantitatively assessed.

Concentrations of 1,2-dichloroethane in ambient air are a major source of 1,2-dichloroethane in environmental media resulting from COU releases. The general population will be exposed to 1,2-dichloroethane in ambient air, but levels of exposure will depend on the proximity to the sources of releases as concentrations decrease with increasing distance from the source. Exposures to the general population and environmental receptors are quantified in the *General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026h) and *Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026e), respectively. The *Risk Evaluation for 1,2-Dichloroethane* (U.S. EPA, 2026k) estimates the corresponding risks to general population and environmental receptors.

Concentrations of 1,2-dichloroethane in surface water is another source of 1,2-dichloroethane in environmental media resulting from COUs releases. Environmental receptors may be exposed and the subsequent *Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026e) will quantify the levels of exposures and the *Risk Evaluation for 1,2-Dichloroethane* (U.S. EPA, 2026k) to estimate the corresponding risks to aquatic species. 1,2-Dichloroethane in surface water may also be a source of exposure to the general population through drinking water and other surface water exposure scenarios that are quantified in the *General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026h).

Concentrations of 1,2-dichloroethane in soil and groundwater resulting from COU releases were estimated to be low. These media concentrations are not significant sources of 1,2-dichloroethane environmental nor general population exposures. EPA will qualitatively describe these media exposures and risks to environmental receptors and to the general population in the subsequent *Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026e), *General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2026h), and *Risk Evaluation for 1,2-Dichloroethane* (U.S. EPA, 2026k).

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APPENDICES

Appendix A SURFACE WATER MONITORING DATA RETRIEVAL AND PROCESSING

The complete set of 1,2-dichloroethane monitoring results stored in the WQP was accessed in March 2026 (NWQMC, 2022) using the *dataRetrieval* package in R (R Core Team, 2022) and imported directly into the R computing platform console. Specifically, the *readWQPdata* and *whatWQPsites* functions were used to acquire all WQP sample results and site data with a "1,2-Dichloroethane" characteristic name. No additional arguments were used with both functions. The downloaded dataset is large and comprehensive where only certain data fields were desired for EPA's intended use in the 1,2-dichloroethane risk evaluation. The WQP dataset was subsequently filtered for surface water samples by excluding samples with the following "ActivityMediaSubdivisionName":

- Groundwater
- Drinking Water

Additional filtering removed sample results identified as "Well" or "Other-Ground Water." Sample results identified as below the detection limit or non-detects (*i.e.,* "ResultMeasureValue" indicated with an N/A) were replaced with values at one-half the quantitation limit ("DetectionQuantitationLimitMeasure.MeasureValue" ÷ 2). All rows without a sample result value or reported detection quantitation limit were subsequently removed. Rows with an "ActivityYear" between 2015 and 2025 were kept. Samples flagged as QC (quality control) blanks in the "ActivityTypeCode" column were removed. Only dissolved aqueous samples were kept as indicated by a "µg/L" or "mg/L" unit identifier in the "ResultMeasure.MeasureUnitCode" column. Sample units were adjusted to µg/L if needed. All sample results less than zero were removed. Sample results identified as "Well" or "Other-Ground Water" were removed

Monitoring data from drinking water systems were acquired from the Third Unregulated Contaminant Monitoring Rule (UCMR3) database (U.S. EPA, 2017). The UCMR3 dataset includes PWSs serving more than 10,000 people and a sample of 800 of the nation's PWSs that serve 10,000 or fewer people. The complete history of 1,2-dichloroethane measurements in the UCMR3 finished drinking water dataset was acquired. Sample result values below the Minimum Reporting Limit (MRL), as indicated by a "<" sign in the "AnalyticalResultsSign" column, were replaced with the MRL. In this case, the highest reported MRL for all 1,2-dichloroethane drinking water measurements is 0.03 $\mu g\text{-}L^{-1}$, which is low enough where the full MRL as opposed to one-half of the MRL can be used. Sample details were reviewed and screened to remove those indicating that they were collected from groundwater (*i.e.,* those including "Well" in the "SamplePointName" column) and select for those only including surface water source types (*i.e.,* those including "SW" in the "FacilityWaterType").

Appendix B GROUNDWATER MONITORING DATA RETRIEVAL AND PROCESSING

The complete set of 1,2-dichloroethane monitoring results stored in the WQP was accessed in March 2026 (NWQMC, 2022) using the *dataRetrieval* package in R (R Core Team, 2022) and imported directly into the R computing platform console. Specifically, the *readWQPdata* and *whatWQPsites* functions were used to acquire all WQP sample results and site data with a "1,2-Dichloroethane" characteristic name. No additional arguments were used with both functions. The downloaded dataset is large and comprehensive, where only certain data fields were desired for EPA's intended use in the 1,2-dichloroethane risk evaluation. The WQP dataset was subsequently filtered for groundwater samples with the following "ActivityMediaSubdivisionName":

- Groundwater

Sample results identified as below the detection limit or non-detects (*i.e.,* "ResultMeasureValue" indicated with an N/A) were replaced with values at one-half the quantitation limit ("DetectionQuantitationLimitMeasure.MeasureValue" ÷ 2). All rows without a sample result value or reported detection quantitation limit were subsequently removed. Rows with an "ActivityYear" between 2015 and 2025 were kept. Samples flagged as QC blanks in the "ActivityTypeCode" column were removed. Only dissolved aqueous samples were kept as indicated by a "µg/L" or "mg/L " unit identifier in the "ResultMeasure.MeasureUnitCode" column. Sample units were adjusted to µg/L if needed. All sample results less than zero were removed.