Groundwater Interim Maximum Allowable Concentration (IMAC) Summary Document

Division of Water Resources

Bentazon (CASRN 25057-89-0)

Recommended IMAC

Groundwater standards and IMACs are to be the "lesser of" the criteria in 15A NCAC 02L .0202(d)(1-6):

(1) Systemic threshold concentration
(2) Concentration that corresponds to an incremental lifetime cancer risk of 1x10-6
(3) Taste threshold limit value
(4) Odor threshold limit value
(5) Maximum contaminant level
(6) National secondary drinking water standard

The recommended groundwater IMAC for bentazon is **200 µg/L** based on the calculated noncancer systemic threshold.

Data Evaluated

The following references, in order of preference, are used in establishing concentrations of substances which correspond to the criteria in 15A NCAC 02L .0202(d)(1) and (2):

(1) U.S. EPA Integrated Risk Information System
(2) U.S. EPA Office of Drinking Water Health Advisories
(3) Other health risk assessment data published by the U.S. EPA
(4) Other relevant, published health risk assessment data, and scientifically valid peer-reviewed published toxicological data.

U.S. EPA's Integrated Risk Information System (IRIS) established an oral reference dose (RfD) of 0.03 mg/kg-day for bentazon based on blood loss into the gastrointestinal tract and coagulation defect reported in a 52-week oral toxicity dog feeding study (U.S. EPA, 1998; Allen et al., 1989). The RfD was derived from a NOAEL (no observed adverse effect level) of 3.2 mg/kg-day and total uncertainty factor of 100. A systemic threshold concentration of 210 µg/L (or parts per billion), rounded to 200 µg/L can be calculated for bentazon in accordance with 15A NCAC 02L .0202(d)(1).

U.S. EPA has classified bentazon as not likely to be carcinogenic to humans (U.S. EPA, 1998). A cancer potency factor is not available, and a human exposure concentration associated with an incremental lifetime cancer risk estimate of 1 x 10^{-6} cannot be calculated according to the requirements of 15A NCAC 02L .0202(d)(2). No aqueous odor threshold, aqueous taste threshold, federal maximum contaminant level (MCL), or secondary drinking water standard has been established for bentazon.

Health Effects Summary

Human health effects associated with low, oral environmental exposures to bentazon are unknown. Animals receiving oral doses of bentazon exhibited body weight loss, liver effects, reduction of red blood cells, blood coagulation defects, and prostatitis (U.S. EPA, 1998).

Uses and Occurrence

Bentazon is a postemergent herbicide marketed under the trade name Basagran. It is registered for use on terrestrial food and feed crops, such as alfalfa, beans, corn, peanuts, peas, pepper, peppermint, rice,

sorghum, soybeans, and spearmint. Bentazon is also registered for use on ornamental lawns and turf (U.S. EPA, 1995).

References

Allen, TR; Frei, TH; et al. (1989) 52-week oral toxicity (feeding) study with bentazon technical (ZST No. 86/48) in the dog. Amendment (MRID No. 410549-01, HED Doc. No. 008079).

U.S. EPA. (1998). Integrated Risk Information System (IRIS). National Center for Environmental Assessment, Office of Research and Development. Chemical Assessment Summary for Bentazon: https://iris.epa.gov/static/pdfs/0134_summary.pdf; Toxicological Review of Bentazon: https://iris.epa.gov/static/pdfs/0134tr.pdf

U.S. EPA. (1995). Reregistration Eligibility Decision (RED). Bentazon. Office of Pesticides Program (EPA 738-R-94-029) https://archive.epa.gov/pesticides/reregistration/web/pdf/0182.pdf

North Carolina
Interim Maximum Allowable Concentration (IMAC)

Bentazon CASRN 25057-89-0

North Carolina Ground Water (GW) IMAC = 200 µg/L

GW IMAC based on noncancer endpoint

GWQS = [(RfD x WT x RSC) / WI] * 1000

RfD = reference dose[1]	3.0E-02	mg/kg/day
WT = average adult human body weight[2]	70	kg
RSC= relative source contribution	0.2	unitless value
WI = average daily adult human water intake[3]	2	L/day
1000 = conversion factor	1000	µg/mg
Calculated GW IMAC using noncancer endpoint	**210**	**µg/L (ppb)**

GW IMAC based on cancer endpoint

GWQS = [(RL x WT) / (q1* x WI)] * 1000

RL = risk level	1.0E-06	
WT = average adult human body weight[2]	70	kg
q1* = carcinogenic potency factor (slope factor)[4]	NA	$(mg/kg/day)^{-1}$
WI = average daily adult human water intake[3]	2	L/day
1000 = conversion factor	1000	µg/mg
Calculated GW IMAC using cancer endpoint	**NA**	**µg/L (ppb)**

GW IMAC based on published values

Taste Threshold[5]	**NA**	**µg/L**
Odor Threshold[6]	**NA**	**µg/L**
Maximum Contaminant Level (MCL)[7]	**NA**	**µg/L**
Secondary Drinking Water Standard (SMCL)[8]	**NA**	**µg/L**

References

[1] U.S. EPA Integrated Risk Information System (IRIS) (1998). Chemical Assessment Summary for Bentazon: https://iris.epa.gov/static/pdfs/0134_summary.pdf; Toxicological Review of Bentazon: https://iris.epa.gov/static/pdfs/0134tr.pdf

[2] Average adult body weight from 15A NCAC 02L .0202 (effective date April 1, 2022).

[3] Average water consumption from 15A NCAC 02L .0202 (effective date April 1, 2022).

[4] NA; Bentazon has been classified as not likely to be carcinogenic to humans. U.S. EPA. (1998). Integrated Risk Information System (IRIS) Chemical Assessment Summary for Bentazon: https://iris.epa.gov/static/pdfs/0134_summary.pdf

[5] NA; Contact NC DEQ Groundwater Standards Coordinator for list of taste threshold resources examined

[6] NA; Contact NC DEQ Groundwater Standards Coordinator for list of odor threshold resources examined

[7] NA; MCL: https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

[8] NA; SMCL : https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals

NA = Not available

RSC = 0.1 for nonorganics, 0.2 for organics

Boscalid (CASRN 188425-85-6)

Recommended IMAC

Groundwater standards and IMACs are to be the "lesser of" the criteria in 15A NCAC 02L .0202(d)(1-6):

(1) Systemic threshold concentration
(2) Concentration that corresponds to an incremental lifetime cancer risk of 1x10-6
(3) Taste threshold limit value
(4) Odor threshold limit value
(5) Maximum contaminant level
(6) National secondary drinking water standard

The recommended groundwater IMAC for boscalid is **2,000 µg/L** based on the calculated noncancer systemic threshold.

Data Evaluated

The following references, in order of preference, are used in establishing concentrations of substances which correspond to the criteria in 15A NCAC 02L .0202(d)(1) and (2):

(1) U.S. EPA Integrated Risk Information System
(2) U.S. EPA Office of Drinking Water Health Advisories
(3) Other health risk assessment data published by the U.S. EPA
(4) Other relevant, published health risk assessment data, and scientifically valid peer-reviewed published toxicological data.

U.S. EPA's Office of Chemical Safety and Pollution Prevention identified an oral reference dose (RfD) of 0.22 mg/kg-day for boscalid based on thyroid lesions in co-critical chronic rat and carcinogenicity rat studies (U.S. EPA, 2019). The RfD was derived from a NOAEL (no observed adverse effect level) of 22 mg/kg-day and a total uncertainty factor of 100. A systemic threshold concentration of 1,540 µg/L (or parts per billion), rounded to 2,000 µg/L can be calculated for boscalid in accordance with 15A NCAC 02L .0202(d)(1).

U.S. EPA's 2021 Human Health Benchmarks for Pesticides (HHBPs) Table includes a chronic or lifetime HHBP for boscalid of 1,300 µg/L based on the RfD of 0.22 mg/kg/day (U.S. EPA, 2021a), as stated in the IMAC request. However, this HHBP was calculated using a ratio of drinking water intake to body weight that does not correspond to the exposure factors in 15A NCAC 02L .0202(d)(1) (U.S. EPA, 2021b). Therefore, a groundwater IMAC based on the HHBP would not be in accordance with 15A NCAC 02L .0202(d)(1).

U.S. EPA has classified boscalid as "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential" and concluded that the RfD approach would be protective of both chronic toxicity and carcinogenic potential of boscalid (U.S. EPA, 2019). A cancer potency factor is not available, and a human exposure concentration associated with an incremental lifetime cancer risk estimate of 1 x 10^{-6} cannot be calculated according to the requirements of 15A NCAC 02L .0202(d)(2). No aqueous odor threshold, aqueous taste threshold, federal maximum contaminant level (MCL), or secondary drinking water standard has been established for boscalid.

Health Effects Summary

Human health effects associated with low, oral environmental exposures to boscalid are unknown. In chronic feedings studies in rats, mice, and dogs, animals receiving oral doses of boscalid generally exhibited decreased body weight, liver effects, and thyroid effects (U.S. EPA, 2019).

Uses and Occurrence

Boscalid is a fungicide that inhibits mitochondrial respiration. It is registered for use on agricultural food and orchard crops. Boscalid is also registered for use on golf course turf grass, residential ornamentals, and landscape gardens (U.S. EPA, 2019).

References

U.S. EPA. (2019). Boscalid Human Health Risk Assessment for Registration Review. Office of Chemical Safety and Pollution Prevention. https://www.regulations.gov/document/EPA-HQ-OPP-2014-0199-0020

U.S. EPA. (2021a). 2021 Human Health Benchmarks for Pesticides. https://www.epa.gov/sdwa/2021-human-health-benchmarks-pesticides

U.S. EPA. (2021b). Human Health Benchmarks for Pesticides: Updated 2021 Technical Document https://www.epa.gov/system/files/documents/2021-07/hh-benchmarks-technical-document-2021.pdf

North Carolina
Interim Maximum Allowable Concentration (IMAC)

Boscalid — CASRN 188425-85-6

North Carolina Ground Water (GW) IMAC = 2000 µg/L

GW IMAC based on noncancer endpoint

GWQS = [(RfD x WT x RSC) / WI] * 1000

RfD = reference dose[1]	2.2E-01	mg/kg/day
WT = average adult human body weight[2]	70	kg
RSC= relative source contribution	0.2	unitless value
WI = average daily adult human water intake[3]	2	L/day
1000 = conversion factor	1000	µg/mg
Calculated GW IMAC using noncancer endpoint	**1540**	**µg/L (ppb)**

GW IMAC based on cancer endpoint

GWQS = [(RL x WT) / (q1* x WI)] * 1000

RL = risk level	1.0E-06	
WT = average adult human body weight[2]	70	kg
q1* = carcinogenic potency factor (slope factor)[4]	NA	$(mg/kg/day)^{-1}$
WI = average daily adult human water intake[3]	2	L/day
1000 = conversion factor	1000	µg/mg
Calculated GW IMAC using cancer endpoint	**NA**	**µg/L (ppb)**

GW IMAC based on published values

Taste Threshold[5]	**NA**	**µg/L**
Odor Threshold[6]	**NA**	**µg/L**
Maximum Contaminant Level (MCL)[7]	**NA**	**µg/L**
Secondary Drinking Water Standard (SMCL)[8]	**NA**	**µg/L**

References

[1] U.S. EPA (2019). Boscalid Human Health Risk Assessment for Registration Review. Office of Chemical Safety and Pollution Prevention. https://www.regulations.gov/document/EPA-HQ-OPP-2014-0199-0020

[2] Average adult body weight from 15A NCAC 02L .0202 (effective date April 1, 2022).

[3] Average water consumption from 15A NCAC 02L .0202 (effective date April 1, 2022).

[4] NA; U.S. EPA has classified boscalid as "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential" (U.S. EPA, 2019. Boscalid Human Health Risk Assessment for Registration Review)

[5] NA; Contact NC DEQ Groundwater Standards Coordinator for list of taste threshold resources examined

[6] NA; Contact NC DEQ Groundwater Standards Coordinator for list of odor threshold resources examined

[7] NA; MCL: https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

[8] NA; SMCL : https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals

NA = Not available

RSC = 0.1 for nonorganics, 0.2 for organics

Fluometuron (CASRN 2164-17-2)

Recommended IMAC

Groundwater standards and IMACs are to be the "lesser of" the criteria in 15A NCAC 02L .0202(d)(1-6):

(1) Systemic threshold concentration
(2) Concentration that corresponds to an incremental lifetime cancer risk of 1x10-6
(3) Taste threshold limit value
(4) Odor threshold limit value
(5) Maximum contaminant level
(6) National secondary drinking water standard

The recommended groundwater IMAC for fluometuron is **90 µg/L (ppb)** based on the calculated noncancer systemic threshold.

Data Evaluated

The following references, in order of preference, are used in establishing concentrations of substances which correspond to the criteria in 15A NCAC 02L .0202(d)(1) and (2):

(1) U.S. EPA Integrated Risk Information System
(2) U.S. EPA Office of Drinking Water Health Advisories
(3) Other health risk assessment data published by the U.S. EPA
(4) Other relevant, published health risk assessment data, and scientifically valid peer-reviewed published toxicological data.

U.S. EPA's Integrated Risk Information System (IRIS) established an oral reference dose (RfD) of 0.013 mg/kg-day for fluometuron based on a NOAEL (no observed adverse effect level) of 12.5 mg/kg/day reported in a 103-week rat feeding study (U.S. EPA, 1987; National Cancer Institute, 1980). The RfD was derived from the NOAEL using a total uncertainty factor of 1,000. U.S. EPA's 2018 Edition of the Drinking Water Standards and Health Advisories Tables also reported a RfD of 0.01 mg/kg-day for fluometuron based on the IRIS assessment (U.S. EPA, 2018). A systemic threshold concentration of 91 µg/L (ppb), rounded to 90 µg/L can be calculated for fluometuron in accordance with 15A NCAC 02L .0202(d)(1).

Fluometuron is undergoing registration review by the U.S. EPA Office of Pesticide Programs. A draft human health risk assessment for fluometuron was published in March 2021 (U.S. EPA, 2021). It is not known when a final human health risk assessment or a final registration review decision will be available.

U.S. EPA has not classified fluometuron for carcinogenicity (U.S. EPA, 1987). A cancer potency factor is not available, and a human exposure concentration associated with an incremental lifetime cancer risk estimate of 1×10^{-6} cannot be calculated according to the requirements of 15A NCAC 02L .0202(d)(2). No aqueous odor threshold, aqueous taste threshold, federal maximum contaminant level (MCL), or secondary drinking water standard has been established for fluometuron.

Health Effects Summary
Human health effects associated with low, oral environmental exposures to fluometuron are unknown. Animals receiving oral doses of fluometuron exhibited decreased body weight and spleen, kidney, and liver effects (U.S. EPA, 1987).

Uses and Occurrence
Fluometuron is an herbicide that controls broadleaf weeds and annual grasses. It is registered for use on cotton crops and wildflowers. No residential uses of fluometuron are registered (U.S. EPA, 2021).

References
NCI (National Cancer Institute). 1980. Bioassay of Fluometuron for Possible Carcinogenicity, CAS No. 2164-17-2, NCI-CG-TR-195, NTP-80-11, NIH Publ. No. 80-1751. National Institute of Health, Bethesda, MD.

U.S. EPA. (1987). Integrated Risk Information System (IRIS). National Center for Environmental Assessment, Office of Research and Development. Chemical Assessment Summary for Fluometuron: https://iris.epa.gov/static/pdfs/0241_summary.pdf

U.S. EPA. (2018). 2018 Edition of the Drinking Water Standards and Health Advisories. Office of Water (EPA 822-F-18-001) https://www.epa.gov/system/files/documents/2022-01/dwtable2018.pdf

U.S. EPA. (2021). Fluometuron: Draft Human Health Risk Assessment in Support of Registration Review. Office of Chemical Safety and Pollution Prevention (EPA-HQ-OPP-2015-0746-0018) https://www.regulations.gov/document/EPA-HQ-OPP-2015-0746-0018

North Carolina
Interim Maximum Allowable Concentration (IMAC)

Fluometuron CASRN 2164-17-2

North Carolina Ground Water (GW) IMAC = 90 µg/L

GW IMAC based on noncancer endpoint

GWQS = [(RfD x WT x RSC) / WI] * 1000

RfD = reference dose[1]	1.3E-02	mg/kg/day
WT = average adult human body weight[2]	70	kg
RSC= relative source contribution	0.2	unitless value
WI = average daily adult human water intake[3]	2	L/day
1000 = conversion factor	1000	µg/mg
Calculated GW IMAC using noncancer endpoint	**91**	**µg/L (ppb)**

GW IMAC based on cancer endpoint

GWQS = [(RL x WT) / (q1* x WI)] * 1000

RL = risk level	1.0E-06	
WT = average adult human body weight[2]	70	kg
q1* = carcinogenic potency factor (slope factor)[4]	NA	$(mg/kg/day)^{-1}$
WI = average daily adult human water intake[3]	2	L/day
1000 = conversion factor	1000	µg/mg
Calculated GW IMAC using cancer endpoint	**NA**	**µg/L (ppb)**

GW IMAC based on published values

Taste Threshold[5]	**NA**	**µg/L**
Odor Threshold[6]	**NA**	**µg/L**
Maximum Contaminant Level (MCL)[7]	**NA**	**µg/L**
Secondary Drinking Water Standard (SMCL)[8]	**NA**	**µg/L**

References

[1] U.S. EPA. Integrated Risk Information System (IRIS). 1987. National Center for Environmental Assessment, Office of Research and Development. Chemical Assessment Summary for Fluometuron: https://iris.epa.gov/static/pdfs/0241_summary.pdf

[2] Average adult body weight from 15A NCAC 02L .0202 (effective date April 1, 2022).

[3] Average water consumption from 15A NCAC 02L .0202 (effective date April 1, 2022).

[4] NA; Fluometuron has not been classified for carcinogenicity. U.S. EPA. Integrated Risk Information System (IRIS). 1987. Chemical Assessment Summary for Fluometuron: https://iris.epa.gov/static/pdfs/0241_summary.pdf

[5] NA; Contact NC DEQ Groundwater Standards Coordinator for list of taste threshold resources examined

[6] NA; Contact NC DEQ Groundwater Standards Coordinator for list of odor threshold resources examined

[7] NA; MCL: https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

[8] NA; SMCL : https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals

NA = Not available

RSC = 0.1 for nonorganics, 0.2 for organics

Metolachlor (CASRN 51218-45-2)

Recommended IMAC

Groundwater standards and IMACs are to be the "lesser of" the criteria in 15A NCAC 02L .0202(d)(1-6):

(1) Systemic threshold concentration
(2) Concentration that corresponds to an incremental lifetime cancer risk of 1x10-6
(3) Taste threshold limit value
(4) Odor threshold limit value
(5) Maximum contaminant level
(6) National secondary drinking water standard

The recommended groundwater IMAC for metolachlor is **700 µg/L** based on the calculated noncancer systemic threshold.

Data Evaluated

The following references, in order of preference, are used in establishing concentrations of substances which correspond to the criteria in 15A NCAC 02L .0202(d)(1) and (2):

(1) U.S. EPA Integrated Risk Information System
(2) U.S. EPA Office of Drinking Water Health Advisories
(3) Other health risk assessment data published by the U.S. EPA
(4) Other relevant, published health risk assessment data, and scientifically valid peer-reviewed published toxicological data.

U.S. EPA's Integrated Risk Information System (IRIS) established an oral reference dose (RfD) of 0.15 mg/kg-day for metolachlor based on decreased body weight gain reported in a 2-year rat feeding study and decreased pup weights and parental food consumption reported in a 2-generation rat reproduction study (U.S. EPA, 1990).

U.S. EPA's 2018 Edition of the Drinking Water Standards and Health Advisories Tables published a RfD of 0.1 mg/kg-day for metolachlor obtained from the EPA Office of Pesticide Program's Registration Eligibility Decision (RED) for metolachlor (U.S. EPA, 1995). The RfD of 0.1 mg/kg-day was derived from a NOEL (no-observed-effect-level) of 9.7 mg/kg-day for decreased body weight gain from a long-term toxicity study in dogs (Hazellete and Arthur, 1989) and total uncertainty factor of 100. This chronic oral toxicity study was not reviewed by the IRIS program during the metolachlor assessment (U.S. EPA, 1993). A systemic threshold concentration of 700 µg/L (or parts per billion) can be calculated using the oral reference dose of 0.1 mg/kg-day for metolachlor in accordance with 15A NCAC 02L .0202(d)(1).

Metolachlor is undergoing registration review by the EPA Office of Pesticide Programs. A draft human health risk assessment for metolachlor was published in November 2019 (U.S. EPA, 2019) and an interim registration review decision was announced and published in the Federal Register in March 2021 (Federal Register, 2021). EPA issues, when appropriate, interim registration review decisions before completing a final registration review decision (U.S. EPA, 2022). It is not known when a final registration review decision will be available.

U.S. EPA has classified metolachlor as a possible human carcinogen but has not quantitatively estimated its carcinogenic risk (U.S. EPA, 1990). Therefore, a cancer potency factor is not available, and a human exposure concentration associated with an incremental lifetime cancer risk estimate of 1 x 10^{-6} cannot be calculated according to the requirements of 15A NCAC 02L .0202(d)(2). No aqueous odor threshold, aqueous taste threshold, federal maximum contaminant level (MCL), or secondary drinking water standard has been established for metolachlor.

Health Effects Summary

Human health effects associated with low, oral environmental exposures to metolachlor are unknown. Dermal exposures to metolachlor resulted in increased bilirubin in rabbits. Animals receiving oral doses of metolachlor showed decreased body weight gains (U.S. EPA, 1995).

Uses and Occurrence

Metolachlor is a broad-spectrum herbicide first registered for use in the U.S. in 1976. It is used on food and feed crops, non-food crops, forests, and residential lawns, with its major usage occurring on corn, soybeans, and sorghum crop sites. Metolachlor inhibits seedling development in grass, grass-like weeds, and broadleaf weeds (U.S. EPA, 1995).

References

Hazellete, J.R. and Arthur, A.T. (1989). Metolachlor technical: 52-week oral toxicity study in dogs. MRID No. 40980701

Federal Register. (2021). Pesticide Registration Review; Interim Decisions and Case Closures for Several Pesticides; Notice of Availability; A Notice by the Environmental Protection Agency on 03/18/2021. https://www.federalregister.gov/documents/2021/03/18/2021-05622/pesticide-registration-review-interim-decisions-and-case-closures-for-several-pesticides-notice-of

U.S. EPA. (1990). Integrated Risk Information System (IRIS) Chemical Assessment Summary for Metolachlor. National Center for Environmental Assessment, Office of Research and Development. https://iris.epa.gov/static/pdfs/0074_summary.pdf

U.S. EPA. (1993). RfD/Peer Review Report of Metolachlor. Office of Pesticides Program. https://archive.epa.gov/pesticides/chemicalsearch/chemical/foia/web/pdf/108801/108801-202.pdf

U.S. EPA. (1995). Reregistration Eligibility Decision (RED). Metolachlor. Office of Pesticides Program (EPA 738-R-95-006) https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-108801_1-Dec-94.pdf

U.S. EPA. (2018). 2018 Edition of the Drinking Water Standards and Health Advisories. Office of Water (EPA 822-F-18-001) https://www.epa.gov/system/files/documents/2022-01/dwtable2018.pdf

U.S. EPA. (2019). Metolachlor and S-Metolachlor: Draft Human Health Risk Assessment for Registration Review. Office of Chemical Safety and Pollution Prevention (EPA-HQ-OPP-2014-0772-0030) https://www.regulations.gov/document/EPA-HQ-OPP-2014-0772-0030

U.S. EPA. (2022). Registration Review Process https://www.epa.gov/pesticide-reevaluation/registration-review-process

North Carolina
Interim Maximum Allowable Concentration (IMAC)

Metolachlor CASRN 51218-45-2

North Carolina Ground Water (GW) IMAC = 700 µg/L

GW IMAC based on noncancer endpoint

GWQS = [(RfD x WT x RSC) / WI] * 1000

RfD = reference dose[1]	1.0E-01	mg/kg/day
WT = average adult human body weight[2]	70	kg
RSC= relative source contribution	0.2	unitless value
WI = average daily adult human water intake[3]	2	L/day
1000 = conversion factor	1000	µg/mg
Calculated GW IMAC using noncancer endpoint	**700**	**µg/L (ppb)**

GW IMAC based on cancer endpoint

GWQS = [(RL x WT) / (q1* x WI)] * 1000

RL = risk level	1.0E-06	
WT = average adult human body weight[2]	70	kg
q1* = carcinogenic potency factor (slope factor)[4]	NA	$(mg/kg/day)^{-1}$
WI = average daily adult human water intake[3]	2	L/day
1000 = conversion factor	1000	µg/mg
Calculated GW IMAC using cancer endpoint	**NA**	**µg/L (ppb)**

GW IMAC based on published values

Taste Threshold[5]	**NA**	**µg/L**
Odor Threshold[6]	**NA**	**µg/L**
Maximum Contaminant Level (MCL)[7]	**NA**	**µg/L**
Secondary Drinking Water Standard (SMCL)[8]	**NA**	**µg/L**

References

[1] U.S. EPA. (2018). 2018 Edition of the Drinking Water Standards and Health Advisories. Office of Water (EPA 822-F-18-001) https://www.epa.gov/system/files/documents/2022-01/dwtable2018.pdf

[2] Average adult body weight from 15A NCAC 02L .0202 (effective date April 1, 2022).

[3] Average water consumption from 15A NCAC 02L .0202 (effective date April 1, 2022).

[4] NA; Metolachlor has been classified as a possible human carcinogen but has not been quantitatively assessed. U.S. EPA. (1990). Integrated Risk Information System (IRIS) Chemical Assessment Summary for Metolachlor. https://iris.epa.gov/static/pdfs/0074_summary.pdf

[5] NA; Contact NC DEQ Groundwater Standards Coordinator for list of taste threshold resources examined

[6] NA; Contact NC DEQ Groundwater Standards Coordinator for list of odor threshold resources examined

[7] NA; MCL: https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

[8] NA; SMCL : https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals

NA = Not available

RSC = 0.1 for nonorganics, 0.2 for organics