

# STATE OF CONNECTICUT

## DEPARTMENT OF PUBLIC HEALTH

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### Environmental Health Section

TO: File

FROM: Sharee Rusnak, Epidemiologist **SR**

SUBJ: PFOS Levels in Fish Evaluation for 11 Waterbodies in Connecticut

DATE: March 29, 2023

This Letter Health Consultation (LHC) was prepared to document our evaluation of per- and poly- fluoroalkyl substances (PFAS) fish tissue analysis data from 11 waterbodies in Connecticut. Fish tissue analysis data in this LHC was obtained from Connecticut Department of Energy and Environmental Protection (CTDEEP).

#### Statement of Issues

The Inland Fisheries Program and the Remediations Program at CTDEEP requested that Connecticut Department of Public Health (CTDPH) re-evaluate PFAS fish tissue analysis data (collected in 2017-2021) from 11 waterbodies: Farmington, Quinebaug, Housatonic, Scantic, Still, Pequabuck, Hockanum, Quinnipiac Connecticut, Natchaug, and Naugatuck Rivers for the Connecticut fish consumption advisory program. This LHC documents the data evaluation process for the 11 rivers.

#### Background

CTDPH was asked by CTDEEP Inland Fisheries to re-evaluate PFAS data in fish tissue from the last 5 years based on recent updated consumption limits due to perfluorooctane sulfonate (PFOS) contamination (Rusnak 2023). Because updated consumption limits are approximately 5 times lower than previous limits, there was a concern that it may be necessary to issue a new or stricter consumption advisory on fish in several waterbodies in order to protect health. Fish tissue from 11 waterbodies are evaluated in this document, which includes all of PFOS data in the past 5 years in Connecticut. The waterbodies are:



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1. Connecticut River
2. Natchaug River
3. Quinebaug River
4. Pequabuck River
5. Scantic River
6. Still River
7. Naugatuck River
8. Hockanum River
9. Housatonic River
10. Quinnipiac River
11. Farmington River

### *Health Comparison Values and Fish Contaminant Levels*

#### 1. Health Comparison Values

In order to determine the number of fish meals that can be safely consumed on a weekly or bimonthly basis, CTDPH developed a Risk Based Consumption Protocol for PFOS in Fish (Appendix A, Table 1).<sup>1</sup> This updated protocol was developed using Connecticut's Reference Dose (RfD) of 0.0029 µg/kg/day for PFOS (CTDPH 2022) and assumptions about fish meal size and body weight. A more detailed explanation can be found in Rusnak (2023).

#### 2. Fish Contaminant Levels

##### Connecticut River

In 2019 and 2021, CTDEEP collected 70 fish (6 species-common carp, smallmouth bass, yellow perch, channel catfish, black crappie and largemouth bass) from two sections of the Connecticut River (Cromwell and Hartford) as part of study to investigate wastewater discharge. As shown in Table 1, average PFOS concentrations in fish tissue samples collected from the Connecticut River ranged from 0.8 ppb in catfish (2019) to 33 ppb in largemouth bass (2021).

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<sup>1</sup> It is important to note that Connecticut's fish consumption advisory cutoff concentrations for PFAS are based only on PFOS concentrations. However, 99% of PFAS found in fish tissue in Connecticut bodies is PFOS and PFOS is the most toxic of the four PFAS compounds referenced in CTDPH (2022).

**Table 1. PFOS Concentrations in Fish Caught in the Connecticut River in 2019 and 2021**

Date	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2019	Channel Catfish	1	5	0.80
2019	Yellow Perch	2	10	20.00
2021	Yellow Perch	3	15	11.67
2021	Common Carp	4	20	7.30
2019	Black Crappie	1	5	25.60
2021	Largemouth Bass	1	5	33.00
2021	Smallmouth Bass	2	10	19.00

\*Parts per billion

#### Natchaug River

In 2019, CTDEEP collected 20 fish (3 species-white sucker, fallfish, and smallmouth bass) from the Natchaug River in Windham as part of a study that evaluated potential contamination from a nearby firefighting academy. As shown in Table 2, average PFOS concentrations in fish tissue samples collected from the Natchaug River in 2019 ranged from 11.04 ppb in fallfish to 48.74 ppb in smallmouth bass.

**Table 2. PFOS Concentrations in Fish Caught in the Natchaug River in 2019**

Date	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2019	White Sucker	9	9	13.48
2019	Fallfish	6	6	11.04
2019	Smallmouth Bass	5	5	48.74

\*Parts per billion

#### Quinebaug River

In 2018 and 2019, CTDEEP collected 31 fish (5 species-white sucker, fallfish, yellow perch, redbreast sunfish, and white sucker) from the Quinebaug River in Putnam as part of a study that evaluated potential contamination from industrial discharges. As shown in Table 3, average PFOS concentrations in fish tissue samples collected from the Quinebaug River ranged from 3.13 ppb in white sucker (2019) to 16.3 ppb in yellow perch (2019).

**Table 3. PFOS Concentrations in Fish Caught in the Quinebaug River in 2018 and 2019**

Date	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2018	Yellow Perch	1	9	16.3
2019	Yellow Perch	3	3	6.78
2019	Redbreast Sunfish	1	1	8.53
2019	White Sucker	7	7	3.13
2019	Fallfish	10	10	6.59
2019	White Perch	1	1	11.70

\*Parts per billion

Pequabuck River

In 2021, CTDEEP collected 25 fish (2 species-white sucker and American eel) from the Pequabuck River in Bristol as part of a study to investigate wastewater discharge. As shown in Table 4, average PFOS concentrations in fish tissue samples collected from the Pequabuck River in 2021 ranged from 3.87 ppb in white sucker to 11.60 ppb in American eel.

**Table 4. PFOS Concentrations in Fish Caught in the Pequabuck River in 2021**

Date	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2021	White Sucker	3	15	3.87
2021	American Eel	2	10	11.60

\*Parts per billion

Scantic River

In 2019, CTDEEP collected 30 fish (2 species-white sucker and American eel) from the Scantic River in Somers as part of a study to investigate wastewater discharge. As shown in Table 5, average PFOS concentrations in fish tissue samples collected from the Scantic River in 2021 ranged from 4.20 ppb in white sucker (2019) to 10.30 ppb in American eel.

**Table 5. PFOS Concentrations in Fish Caught in the Scantic River in 2021**

Date	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2021	White Sucker	3	15	4.20
2021	American Eel	3	15	10.30

\*Parts per billion

### Still River

In 2021, CTDEEP collected 40 fish (4 species-white sucker, largemouth bass, pumpkinseed, and rock sunfish<sup>2</sup>) from the Still River in Winsted as part of a study to investigate wastewater discharge. As shown in Table 6, average PFOS concentrations in fish tissue samples collected from the Still River in 2021 ranged from 4.0 ppb in white sucker to 13.50 ppb in largemouth bass.

**Table 6. PFOS Concentrations in Fish Caught in the Still River in 2021**

Date	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2021	White Sucker	3	15	4.00
2021	Largemouth Bass	2	10	13.50
2021	Pumpkinseed	2	10	8.85
2021	Rock Sunfish	1	5	7.70

\*Parts per billion

### Naugatuck River

In 2021, CTDEEP collected 30 fish (4 species-white sucker, yellow bullhead, American eel, and smallmouth bass) from the Naugatuck River in Beacon Falls as part of a study to investigate wastewater discharge. As shown in Table 7, average PFOS concentrations in fish tissue samples collected from the Naugatuck River ranged from 2.55 ppb in white sucker (2019) to 15.50 ppb in smallmouth bass (2021).

<sup>2</sup> Also known as rock bass

**Table 7. PFOS Concentrations in Fish Caught in the Naugatuck River in 2021**

Date	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2021	White Sucker	2	10	2.55
2021	Yellow Bullhead	1	5	4.70
2021	American Eel	1	5	4.00
2021	Smallmouth Bass	2	10	15.50

\*Parts per billion

#### Hockanum River

In 2021, CTDEEP collected 30 fish (3 species-white sucker, American eel, and fallfish) from the Hockanum River in Vernon as part of a study to investigate wastewater discharge. As shown in Table 8, average PFOS concentrations in fish tissue samples collected from the Hockanum River in 2021 were higher than any other river sampled and ranged from 86.00 ppb in white sucker to 640.00 ppb in fallfish.

**Table 8. PFOS Concentrations in Fish Caught in the Hockanum River in 2021**

Date	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2021	White Sucker	3	15	86.00
2021	American Eel	1	5	180.72
2021	Fallfish	2	10	640.00

\*Parts per billion

#### Housatonic River (near O'Sullivan's Island and Bull's Bridge)

In 2017 and 2021, DEEP collected 23 fish (4 species-white perch, largemouth bass, yellow perch, and largemouth bass) from 2 areas of the Housatonic River, O'Sullivan's Island (Derby) and Bull's Bridge (Cornwall) as part of a study to investigate PFAS contamination near O'Sullivan's Island and to investigate wastewater discharge near Bull's Bridge.

As shown in Table 9, average PFOS concentrations in fish tissue samples collected from the Housatonic River near O'Sullivan's Island near Derby in 2017 ranged from 8.13 ppb in white perch 11.95 ppb in largemouth bass.

Smallmouth bass sampled near Bull's Bridge (Upper Housatonic River in Cornwall) had average PFOS levels of 4.31 ppb.

**Table 9. PFOS Concentrations in Fish Caught in the Housatonic River in 2017 and 2019**

Date	Sampling Location	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2017	O'Sullivan's Island	Largemouth Bass	5	5	11.95
2017	O'Sullivan's Island	White Perch	3	3	8.13
2017	O'Sullivan's Island	Yellow Perch	2	10	9.55
2019	Near Bull's Bridge (Upper Housatonic)	Smallmouth Bass	1	5	4.31

\*Parts per billion

#### Quinnipiac River

In 2021, CTDEEP collected 30 fish (3 species-white sucker, American eel, and smallmouth bass) from the Quinnipiac River in Wallingford as part of a study to investigate wastewater discharge. As shown in Table 10, average PFOS concentrations in fish tissue samples collected from the Quinnipiac River in 2021 ranged from 8.10 ppb in white sucker to 23.5 ppb in smallmouth bass.

**Table 10. PFOS Concentrations in Fish Caught in the Quinnipiac River in 2021**

Date	Fish Species	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2021	White Sucker	2	10	8.10
2021	American Eel	1	5	12.00
2021	Smallmouth Bass	3	15	23.5

\*Parts per billion

#### Farmington River (Upper and Lower)

In 2018-2021, CTDEEP collected 92 fish (3 species-yellow perch, white sucker, and smallmouth bass) from two sections of the Farmington River as part of study to investigate wastewater discharge. Fish in the Upper Farmington River were also sampled as part of a control area after the Bradley Airport fire resulted in FAAA firefighting foam released in the Lower Farmington River. The border of the Upper versus Lower Farmington River is defined as Poquonock Avenue, Windsor, which is where the Poquonock Waste Facility is located. As shown in Table 11, average PFOS concentrations in fish tissue samples collected from the Upper Farmington River ranged from 2.17 ppb in white sucker (2019) to 31.6 ppb in yellow perch (2020).

In the Lower Farmington River, average PFOS concentrations in fish tissue samples ranged from 2.16 ppb in white sucker (2021) to 28.6 ppb in yellow perch (2018).

**Table 11. PFOS Concentrations in Fish Caught in the Upper and Lower Farmington River from 2018-2021**

Date	Fish Species	Section	Number of Samples	Total Number of Individual Fish	Average PFOS Concentration (ppb)*
2019	White Sucker	Upper	1	5	2.17
2020	White Sucker	Upper	4	20	6.22
2020	Yellow Perch	Upper	4	20	31.6
2018	Yellow Perch	Lower	1	7	28.3
2021	Yellow Perch	Lower	3	15	17.65
2021	White Sucker	Lower	3	15	2.16
2021	Smallmouth Bass	Lower	2	10	10.35

\*Parts per billion

## Discussion

### *Exposure Pathway Analysis*

To determine if community members are exposed to contaminated fish in the 11 Connecticut waterbodies, CTDPH evaluated the environmental and human components that lead to human exposure. CTDPH evaluated the fish tissue data and considered how people may be exposed to contaminants in the fish. The only possible complete pathway of exposure is via ingestion (eating the fish). An exposure pathway consists of five elements (ATSDR 2022):

1. A source of contamination;
2. Transport through an environmental medium;
3. A point of exposure;
4. A route of human exposure; and
5. A receptor population.

ATSDR categorizes an exposure pathway as either completed, potential, or eliminated. In a completed pathway, all five elements exist and indicate that exposure to a contaminant has occurred in the past, is occurring, or will occur in the future. In a potential exposure pathway, at least one of the five elements has not been confirmed, but it may exist. Exposure to a contaminant may have occurred in the past, may be occurring, or may occur in the future. An exposure pathway can be eliminated if at least one of the five elements is missing and will never be present (ATSDR 2022).

Environmental data showed that all fish species sampled and analyzed from 11 Connecticut waterbodies were contaminated with PFOS. Individuals who catch and eat fish in these water bodies would likely be exposed to PFOS in the fish. In addition, their families and friends would also be exposed to PFOS if they eat the fish.

## *Public Health Implications for Adults and Children and Conclusion*

When determining the public health implications of exposure to hazardous contaminants, CTDPh considers how people might come into contact with contaminants and compares contaminant concentrations with health protective levels. When contaminant levels exceed health-based comparison values, it first prompts CTDPh to consider a consumption advisory to reduce exposure. In this health consultation, CTDPh used a Risk Based Consumption Protocol for PFOS in Fish as comparison levels as described in the Health Contaminant Values and Fish Contaminant Levels section of this document.

Ingestion of several fish species from the 11 waterbodies mentioned above which contain elevated levels of PFAS is a complete exposure pathway and is evaluated in this health consultation, using this Risk Based Consumption Protocol for PFOS in Fish.

Appendix A, Table 1 lists 4 restriction level categories; 'A' being the least restrictive and 'D' being the most restrictive. Appendix A, Table 2 gives the updated fish consumption advisories for all 11 waterbodies. The new consumption limits are more restrictive than previous consumption limits and it is necessary to issue new or more restrictive consumption advisories on 9 of 11 waterbodies evaluated in this document. Fish species in the Hockanum River had the highest PFOS levels by far of all 11 waterbodies and fish species in the Quinebaug River had the lowest PFOS levels. Yellow perch and bass (both small and largemouth) tended to have higher PFOS levels than other fish species and white sucker tended to have the lowest PFOS concentrations in all of the waterbodies which is expected because small and largemouth bass and yellow perch are predator fish and white suckers are bottom feeders. PFOS levels are generally expected to be higher in predator fish and lower in bottom feeders.

It is important to note that there are some data available from other states that show that some fish species, like bluegill sunfish and trout (including stocked), have been known to accumulate PFOS (sometimes at high levels) in some waterbodies. However there is not enough data yet to include them in a fish consumption advisory until these fish species have been sampled and analyzed for PFOS in Connecticut or there are more data available from other states. However, as a risk management decision in Connecticut, they are included in consumption advisories when an 'all fish species' advisory is issued.

### Connecticut River

Environmental data indicated that PFOS levels in all fish species in the Connecticut River except for channel catfish are above concentrations where CTDPh issues a consumption advisory based on CTDPh's updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for black crappie (2019), common carp (2021), largemouth bass (2021) and smallmouth bass (2012) were all approaching category C or D restriction levels. Yellow perch were sampled both years and PFOS levels in these fish were also within the Category C Restriction Level. Average PFOS levels in channel catfish were below levels where a consumption advisory would be recommended.

CTDPh has decided to issue the advisory of '1 meal per month' for all fish species for the entire Connecticut portion of the Connecticut River for the following reasons:

1. The majority of PFOS levels in fish species are consistently within the Category C or D Restriction Level.
2. A consumption advisory is recommended for the entire Connecticut portion of the river because there are no embankments to restrict fish from traveling the entire portion of the river.

3. Restriction Category C rather than D is recommended as a risk management decision to allow for some consumption because of the benefits of eating fish which have Omega 3 fatty acids and to keep the message simpler.
4. Bass (which includes small and largemouth) are included in this advisory as a risk management decision and to keep the message simpler. In addition, it is sometimes difficult to distinguish smallmouth and largemouth bass from each other.
5. Even though they were not sampled, stocked trout are included in this advisory as a risk management decision when all fish species are included in an advisory.
6. Even though channel catfish have low levels of PFOS, they are included in this advisory as a risk management decision and to keep the message simpler.

### Natchaug River

Environmental data indicated that PFOS levels in all fish species in the Natchaug River are above concentrations where CTDPh issues a consumption advisory based on CTDPh's updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for white sucker and fallfish were all within Restriction Category C of '1 meal per month' while average PFOS levels in smallmouth bass exceed the limit for safe consumption (Restriction Category D).

For the following reasons, CTDPh has decided to strengthen the previous advisory of '1 meal per month' for bass, to '1 meal per month'- all fish species. CTDPh is also further strengthening its previous advice for bass from 1 meal per month, to 'do not eat.'

1. A previous advisory was placed on this waterbody in 2020 based on 2019 fish sampling analysis results.<sup>3</sup> However updated fish consumption limits have deemed it necessary to further restrict consumption limits to protect public health.
2. PFOS levels in fish species are all within the Category C or D Restriction Level.
3. Even though they were not sampled, stocked trout are included in this advisory as a risk management decision when all fish species are included in an advisory.
4. Bass (which includes small and largemouth) are included in this advisory as a risk management decision and to keep the message simple. In addition, it is sometimes difficult to distinguish smallmouth and largemouth bass from each other.

### Quinebaug River

Environmental data indicated that PFOS levels in all fish species except for white perch in the Quinebaug River are above concentrations where CTDPh issues a consumption advisory based on CTDPh's updated fish consumption limits (Appendix, Table 1). The average PFOS levels for yellow perch (2018) and white perch were both within the Restriction Category C of '1 meal per month' while PFOS levels in white sucker did not exceed concentrations where CTDPh would issue a consumption advisory. PFOS levels in yellow perch (2019), fallfish, and redbreast sunfish fall within the Restriction Category B of 1 one fish meal per week.

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<sup>3</sup> It also includes Willimantic River from where it meets the Shetucket and Natchaug Rivers upstream. The advisory extended from the Natchaug River from the dam at the Willimantic Reservoir (northern boundary) downstream to where it forms the Shetucket River. The advisory extends a ½ mile down the Shetucket River to Plains Road. Willimantic River from where it meets the Shetucket and Natchaug Rivers upstream to the dam at Pine Street.

CTDPH has decided not to issue a consumption advisory for this waterbody for the following reasons:

1. While PFOS levels in yellow perch, fallfish, and redbreast sunfish fall within the Restriction Category Level of Category B, there is already a statewide fish consumption advisory of one meal per week (general population, one meal per month (high risk population<sup>4</sup>) on all freshwater bodies in Connecticut based on mercury levels.
2. PFOS levels in yellow perch have decreased from 2018 to 2019 to a level that was within Restriction Category B.
3. There was only one sample for white perch and this sample may be an outlier.

#### Pequabuck River

Environmental data indicated that PFOS levels in American eel in the Pequabuck River are above concentrations where CTDPH issues a consumption advisory based on CTDPH's updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for American eel were within the Restriction Category C of '1 meal per month' while average PFOS levels in white sucker do not exceed concentrations where a fish consumption advisory is necessary.

CTDPH has decided to issue a consumption advisory of '1 meal per month' for American eel for this waterbody for the following reasons:

1. PFOS levels in American eel are at a level where it is necessary to limit some consumption to protect public health.

#### Scantic River

Environmental data indicated that PFOS levels in American eel in the Scantic River are above concentration where CTDPH issues a consumption advisory based on CTDPH's updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for American eel were within the Restriction Category C of '1 meal per month' while average PFOS levels in white sucker barely exceed concentrations where a fish consumption advisory is necessary (Category B, 1 meal per week).

CTDPH has decided to issue a consumption advisory of '1 meal per month' for American eel for this waterbody for the following reasons:

1. PFOS levels in American eel are at a level where it is necessary to restrict some consumption to protect public health.
2. While average PFOS levels in white sucker barely exceed concentrations where a fish consumption advisory is necessary, there is already a statewide advisory of 1 meal per week (general population), one meal per month (high risk population) for all freshwater bodies in Connecticut based on mercury levels that is consistent with the Category B, one meal per week advisory for PFOS.

#### Still River

Environmental data indicated that PFOS levels in largemouth bass in the Still River are above concentrations where CTDPH issues a consumption advisory based on CTDPH's updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for smallmouth bass were within the Restriction Category C of '1 meal

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<sup>4</sup> High Risk Population includes women planning on becoming pregnant within a year, women that are nursing, and children under 12 years old.

per month' while average PFOS levels in pumpkinseed and rock sunfish barely were within or barely exceed the Restriction Category B of '1 fish meal per week.' PFOS levels in white sucker are just at a concentration where a fish consumption advisory would be necessary to protect public health.

CTDPH has decided to issue a consumption advisory of '1 meal per month' for bass in this waterbody for the following reasons:

1. PFOS levels in largemouth bass are at a level where it is necessary to restrict some consumption to protect public health.
2. Bass (which includes small and largemouth) are included in this advisory as a risk management decision and to keep the message simple. In addition, it is sometimes difficult to distinguish smallmouth and largemouth bass from each other.
3. While PFOS levels in pumpkinseed and rock sunfish fall within or barely exceed the Restriction Category Level of Category B, there is already a statewide fish consumption advisory of one meal per week (general population), one meal per month (high risk population) on all freshwater bodies in Connecticut based on mercury levels that is consistent with the Category B, one meal per week advisory for PFOS.

#### Naugatuck River

Environmental data indicated that PFOS levels in smallmouth bass in the Naugatuck River are above concentrations where CTDPH issues a consumption advisory based on CTDPH's updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for smallmouth bass were within the Restriction Category C of '1 meal per month' while average PFOS levels in American eel and yellow bullhead barely exceed concentrations where a fish consumption advisory is necessary. PFOS levels in white sucker do not exceed concentrations where a fish consumption advisory would be necessary to protect public health.

CTDPH has decided to issue a consumption advisory for this waterbody of '1 meal per month' for bass for the following reasons:

1. PFOS levels in smallmouth bass are at a level where it is necessary to restrict some consumption to protect public health.
2. Bass (which includes small and largemouth) are included in this advisory as a risk management decision and to keep the message simple. In addition, it is sometimes difficult to distinguish smallmouth and largemouth bass from each other.

#### Hockanum River

Environmental data indicated that PFOS levels in white sucker, American eel, and fallfish in the Hockanum River are well above concentrations where CTDPH issues a consumption advisory based on CTDPH's updated fish consumption limits (Appendix A, Table 1). The average PFOS levels in all 3 species were within the Restriction Category D of 'do not eat.'

CTDPH has decided to keep the current consumption advisory of 'do not eat'-all fish species, for this waterbody in place for all fish species for the following reasons:

1. The current advisory of 'do not eat' for all fish species, which was issued in Spring 2022 is appropriate to protect public health.

2. Even though they were not sampled, stocked trout are included in this advisory as a risk management decision when all fish species are included in an advisory.
3. Average PFOS levels in all fish species are at least about three times higher than the levels that allows for any consumption of fish.

#### Housatonic River (Near O'Sullivan's Island in Derby) and Bull's Bridge in Cornwall

Environmental data indicated that PFOS levels in all 3 species in the Housatonic River near O'Sullivan's Island are above concentrations where CTDPH issues a consumption advisory based on CTDPH's updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for largemouth bass, white perch, and yellow perch were within the Restriction Category C of '1 meal per month.' PFOS levels in smallmouth bass from the Housatonic River near Bull's Bridge barely exceeded levels where it was necessary to issue a consumption advisory to protect public health.

CTDPH has decided to modify the current consumption advisory for the Housatonic River near O'Sullivan's Island to '1 fish meal per month'-all fish species, for the following reasons:

1. PFOS levels from 3 fish species the Housatonic River near O'Sullivan's Island are at a level where it is necessary to restrict some consumption to protect public health.
2. Even though they were not sampled, stocked trout are included in this advisory as a risk management decision when all fish species are included in an advisory.

CTDPH has decided not to modify the current consumption advisory 'do not eat-(high risk population), 1 meal/2 months, (general population) for bass due to PCB Levels in this fish species for the Housatonic River near Bull's Bridge in Cornwall for the following reasons:

1. While PFOS levels in smallmouth bass barely exceed levels where it is necessary to protect public health, there is already a fish consumption advisory for smallmouth bass on the Upper section of the Housatonic River because of polychlorinated biphenyl (PCB) contamination.

#### Quinnipiac River

Environmental data indicated that PFOS levels in smallmouth bass, American eel and white sucker in the Quinnipiac River are above concentrations where CTDPH issues a consumption advisory based on CTDPH's updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for all 3 species were within the Restriction Category C of '1 meal per month.'

CTDPH has decided to issue a consumption advisory for the Quinnipiac River (From the Gorge south extending past Hanover Pond in Meriden) through Wallingford to Long Island Sound for all fish species of '1 meal per month' for the following reasons:

1. PFOS levels from 3 fish species from the Quinnipiac River are at a level where it is necessary to restrict consumption to protect public health.
2. Even though they were not sampled, stocked trout are included in this advisory as a risk management decision when all fish species are included in an advisory.

3. Since there is already a consumption advisory for all fish species of ‘1 meal per month’ for this waterbody from the Gorge to Hanover Pond due to PCB contamination in fish, we have made a risk management decision to extend the advisory south of Meriden through Wallingford to Long Island Sound.

### Farmington River (Upper and Lower)

Environmental data indicated that PFOS levels in yellow perch in the Upper Farmington River are above concentrations where CTDPh issues a consumption advisory based on CTDPh’s updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for yellow perch were barely within Restriction Category D of ‘do not eat’ while average PFOS levels in white sucker in 2019 and 2020 either do not exceed (2019) or just exceed concentrations where a fish consumption advisory is necessary (2020).

Environmental data indicated that PFOS levels in yellow perch in the Lower Farmington River are above concentrations where CTDPh issues a consumption advisory based on CTDPh’s updated fish consumption limits (Appendix A, Table 1). The average PFOS levels for yellow perch were within the Restriction Category C of ‘1 fish meal per month’ while average PFOS levels in white sucker do not exceed concentrations where a fish consumption advisory is necessary. PFOS levels in smallmouth bass from the Lower Farmington River fall within the Category C Restriction Level of ‘1 fish meal per month.’

CTDPh has decided to issue a consumption advisory of ‘1 fish meal per month-yellow perch’ for the Upper Farmington River for the following reasons:

1. PFOS levels in yellow perch in the Upper Farmington River barely exceed the limit where consumption isn’t recommended.
2. PFOS levels in yellow perch in the Upper Farmington River are elevated enough that a ‘1 meal per month’ advisory is necessary to protect public health.
3. While PFOS levels in white sucker in 2020 from the Upper Farmington River exceed a concentration where an advisory is necessary to protect public health, there is already a statewide mercury fish consumption advisory of one meal per week (general population, one meal per month (high risk population) on all freshwater bodies in Connecticut.

CTDPh has decided to issue a consumption advisory for the Lower Farmington River for yellow perch and bass of ‘1 meal per month’ for the following reasons:

1. PFOS levels in yellow perch and smallmouth bass in the Lower Farmington River are elevated enough that a ‘1 meal per month’ advisory is necessary to protect public health.
2. Bass (which includes small and largemouth) are included in this advisory as a risk management decision and to keep the message simple. In addition, it is difficult to distinguish smallmouth and largemouth bass from each other.

### **Conclusion**

Upon evaluating PFOS fish tissue data from 11 waterbodies, using updated consumption limits for PFOS levels, CTDPh has updated or issued new consumption advisories in 9 waterbodies as shown in Appendix A, Table 2. New or modified consumption advisories are recommended for the Connecticut, Upper and Lower Farmington, Housatonic (near O’Sullivan’s Island in Derby), Natchaug, Naugatuck, Pequabuck, Still, Scantic, and Quinnipiac Rivers based on an updated reference dose for PFOS. These consumption advisories are necessary to protect public health while allowing for community members to benefit from the nutritional benefits of eating fish. It

was not necessary to modify the current advisory for the Hockanum and the Upper Housatonic Rivers and it was not necessary to issue an advisory for the Quinebaug River. It is also important to reiterate that there is already a statewide consumption advisory for all freshwater bodies in the state of Connecticut of '1 meal per week' for the general population and '1 meal per month' for high risk populations due to mercury contamination in fish. These consumption advisories are necessary to protect public health from contamination in fish.

## **Recommendations**

1. CTDEEP Inland Fisheries Division should continue to work with CTDPH to educate fishing populations about all of the Connecticut fish consumption advisories.
2. CTDEEP Inland Fisheries Division should continue to share fish contaminant data with CTDPH so that fish consumption advisories can be updated as necessary when new data are available.
3. CTDEEP and local health departments should work with CTDPH to get signs posted on these waterbodies to notify the public of the new or modified advisories.
4. CTDEEP should work with CTDPH to identify data gaps in these 11 waterbodies and work with CTDPH to prioritize waterbodies for PFAS fish sampling and analysis that have never been sampled before.

## **References**

ATSDR 2022. Public Health Assessment Guidance Manual. Agency for Toxic Substance and Disease Registry, Available at <https://www.atsdr.cdc.gov/pha-guidance/index.html>. Updated on April 14, 2022.

Rusnak 2023. Memorandum Regarding PFOS in Fish Consumption Limits. Connecticut Department of Public Health, Environmental and Occupational Health Assessment Program. March 2023.

## Appendix A

**Table 1. CTDPH's Risk Based Consumption Protocol for PFOS in Fish**

Restriction Category (Level)	# Meals	Updated PFOS Concentration (ppb)
A	Unlimited	< 4
B	1 meal/week	≥ 4 to < 8
C	1 meal/month	≥ 8 to < 31
D	Do not eat	≥ 31

\*Parts per billion

**Table 2. Consumption Advisory History for Fish Caught in 11 waterbodies in Connecticut**

Waterbody	Species	Previous Consumption Recommendation	Updated Consumption Recommendation	Updated Advisory Category
Connecticut River	All	1 Meal Per Month (High Risk), 1 Meal Per Week Advisory for Catfish Due to PCB Levels*	1 Meal Per Month-Everyone	C
Farmington (Upper)	Yellow Perch	No Specific Advisory	1 Meal Per Month-Everyone	C
Farmington River (Lower)	Yellow Perch and Bass	No Specific Advisory	1 Meal Per Month-Everyone	C
Hockanum River	All	Do Not Eat-Everyone	No Change	D
Housatonic River (Near O'Sullivan's Island)	All	No Specific Advisory	1 Meal Per Month-Everyone	C
Housatonic River (Upper)	Bass	Do Not Eat (High Risk), One Meal/2 Months (Low Risk) due to PCB Levels	No Change	No comparable Category
Natchaug River	Bass	Bass-One Meal per Month-Everyone	Do Not Eat-Everyone	D
Natchaug River	All Species Except for Bass	No Specific Advisory	1 Meal Per Month-Everyone	C
Naugatuck River	Bass	No Specific Advisory	1 Meal Per Month-Everyone	C
Pequabuck River	American Eel	No Specific Advisory	1 Meal Per Month-Everyone	C
Quinnipiac River (Meriden south)	All	All species-One meal/month due to PCBs	1 Meal Per Month	C
Quinebaug River	NA	No Specific Advisory	No Specific Advisory	A
Scantic River	American Eel	No Specific Advisory	1 Meal Per Month	C
Still River (Winsted)	Bass	No Specific Advisory	1 Meal Per Month	C

## **REPORT PREPARATION**

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