

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

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Environmental Health Section

Environmental and Occupational Health Program

TO: Chris Bellucci, Connecticut Department of Energy and Environmental Protection (CTDEEP)

FROM: Sharee Rusnak, Epidemiologist, Site Assessment and Chemical Risk Unit

SUBJ: Aspinook Pond Mercury in Fish Evaluation

DATE: March 29, 2016

This Letter Health Consultation (LHC) was prepared to document our evaluation of fish contaminant data from Aspinook Pond. Fish contaminant data in this LHC was obtained from Connecticut Department of Energy and Environmental Protection (CTDEEP).

Statement of Issues

In July 2015, the Inland Fisheries Program at the Connecticut Department of Energy and Environmental Protection (CTDEEP) requested that CTDPH evaluate fish tissue data from Aspinook Pond that was analyzed for mercury as part of the statewide fish monitoring program. This LHC documents the data evaluation process for Aspinook Pond.

Background

Aspinook Pond is 301 acres in area and is located within the towns of Lisbon, Griswold, and Canterbury, Connecticut. It is an impoundment of the Quinebaug River in the Thames River Drainage Basin. The pond proper extends from Butts Bridge Road in Canterbury to the dam at Jewett City. In addition to the Quinebaug River, the pond is fed by Cory Brook from the west, nearby Clayville Pond from the east, and by several small streams.

As part of the statewide fish monitoring program, the CTDEEP Inland Fisheries Program sampled fish from the Aspinook Pond on July 2015. CTDPH requested fish samples from this pond because previous samples in 2011 showed elevated mercury levels in fish that would have



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prompted CTDPH to place fish from this pond in a more restrictive consumption advisory category than its current consumption advisory. In addition, CTDEEP determined that the 2011 fish fillet data had quality assurance issues which further supported the need for another round of fish sampling.

Health Comparison Values and Fish Contaminant Levels

In July 2015, 10 largemouth bass from Aspinook Pond were sampled and analyzed for mercury content as part of the statewide fish monitoring program.

1. Health Comparison Values

In order to set safe levels of mercury in fish associated with fish consumption advisories, CTDPH developed a risk based consumption advisory protocol (Appendix A). This protocol was developed using the United States Environmental Protection Agency’s (US EPA) Reference Dose (RfD) for mercury and assumptions about fish meal size and body weight. It also takes into account the FDA mercury Action Level and a single outlier fish meal that may result in an unacceptable acute mercury exposure. A more detailed explanation can be found in Ginsberg and Rao (1995).

2. Fish Contaminant Levels

Average mercury concentrations in largemouth bass collected from Aspinook Pond in 2015 exceeded levels where CTDPH issues a consumption advisory. Table 1 gives the mercury concentrations in Aspinook Pond in largemouth bass sampled in 2015.

Table 1. Mercury Concentrations in Largemouth Bass Caught in Aspinook Pond in 2015.

Number of Samples	Total Number of Individuals	Average Mercury Concentration (ppm[^])	Mercury Concentration Range (ppm)
10	10	0.48	0.22-.75

[^]Parts per Million

3. Mercury Level History

It is also informative to look at contaminant levels in fish tissue over time. Table 2 gives the mercury level history in largemouth bass from Aspinook Pond. With the exception of 2011, (which shows higher mercury levels in largemouth bass than the other years), mercury levels in



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largemouth bass in Aspinook Pond have been stable. It is important to reiterate that it was noted by CTDEEP that there were quality assurance issues with the 2011 data set which would make the data less reliable.

Table 2. Mercury Level History in Largemouth Bass from Aspinook Pond in 1995-2015[^]

Sampling Year	Average Mercury Concentration (ppm) [@]	Mercury Concentration Range (ppm)
1995	0.55	0.29-1.01
2005	0.48	0.24-.87
2011	0.88	0.30-1.61
2015	0.48	0.22-0.75

[^]It is important to note that while there is link between fish size and mercury concentrations, generally speaking, most of the fish in all rounds of sampling were about the same average size. Mercury concentrations were not adjusted for fish weight.

[@]parts per million

Discussion

Exposure Pathway Analysis

To determine if community members are exposed to contaminated fish in Aspinook Pond, 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 2005):

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



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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 2005).

Environmental data show that largemouth bass from Aspinook Pond are contaminated with mercury. Individuals who catch and eat fish in these water bodies would likely be exposed to mercury in the fish. In addition, their families and friends would also be exposed to mercury if they eat the fish.

Public Health Implications for Adults and Children

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 are below health-based comparison values, health impacts from exposure to those levels are unlikely. Contaminant levels exceeding comparison values do not indicate that health impacts are likely, but instead warrant further investigation. In this health consultation, CTDPH used a Risk Based Consumption Protocol for Mercury in Fish as health protective levels as described in the Environmental Contamination section of this document.

Ingestion of largemouth bass of fish from Aspinook Pond which contain elevated levels of mercury is a complete exposure pathway and is evaluated in this health consultation, using this Risk Based Consumption Protocol for Mercury in Fish.

Appendix A gives 3 restriction level categories; “A” being the least restrictive and “C” being the most restrictive. Average mercury levels in largemouth bass from Aspinook Pond are within the Fish Consumption Advisory Category ‘B’ (Appendix A). We have placed all fish species from Aspinook Pond in one appropriate consumption category (restriction level). CTDPH has concluded that fish from Aspinook Pond contain elevated mercury levels such that the current consumption advisory (Category B, “One meal/week-low risk group, one meal/month-high risk group”) is still necessary to protect public health.



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In summary, CTDPH has decided to maintain the current consumption advisory of Category B for Aspinook Pond for the following reasons:

1. All four rounds of fish sampling data have indicated elevated levels of mercury contamination in this waterbody. Mercury levels in fish sampled from this waterbody have generally been stable over time.
2. Although 2011 fish data indicate higher mercury levels than the other three round of data, CTDEEP has indicated that this round of data had quality assurance issues that would make the data less reliable.

Conclusion

CTDPH has decided to maintain the advisory of “One meal/week-low risk group, one meal/month-high risk group” for all species in Aspinook Pond because mercury levels have been stable over time and remain elevated enough to warrant limited consumption. Mercury levels from fish species from Aspinook Pond could harm people’s health if they do not follow the consumption advisory. If community members adhere to the current consumption advisory for Aspinook Pond, exposure to mercury in fish is unlikely to harm health. CTDPH believes that this consumption advisory is necessary to protect public health while allowing community members to benefit from the nutritional advantages of eating fish.

Recommendations

1. CTDPH recommends that the CTDEEP continue to work together to develop a mercury fish sampling plan for Aspinook Pond as well as other freshwater bodies in Connecticut. CTDEEP should continue to consult and share information with CTDPH throughout this process.
2. CTDEEP Inland Fisheries Division should continue to work with CTDPH to educate fishing populations along Aspinook Pond about the consumption advisory.

Please contact me at (860) 509-7583, sharee.rusnak@ct.gov to discuss the findings of this letter.



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References

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Appendix A

CTDPH's Risk Based Consumption Protocol for Mercury in Fish[^]

Restriction Category (Level)	Mercury Level (ppm*)	Consumption Advisory	
		Low Risk [@]	High Risk [#]
A	< 0.1 (High Risk) ≤0.3 (Low Risk)	Unlimited Consumption	Unlimited Consumption
B	Mean <1.0	One Meal Per Week	One Meal Per Month
C	Mean ≥1.0 Or One Fish ≥2.0	One Meal Per Month	Do Not Eat

[^](Ginsberg and Rao 1996)

*Parts Per Million

[@]Includes all other groups not included in the high risk group

[#]Includes pregnant women, women planning to become pregnant within a year, and children under 6 years old



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