Pharmaceuticals and Endocrine Active Chemicals in Minnesota Lakes

Minnesota Pollution Control Agency

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Contributors/acknowledgements

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Glossary of terms

mg/L = milligrams per liter, or parts per million (ppm)

µg/L = micrograms per liter, or parts per billion (ppb)

ng/L = nanograms per liter, or parts per trillion (ppt)

EAC	Endocrine active chemical
PPCPs	Pharmaceuticals and personal care products

Executive summary

Many previous studies have established that a variety of pharmaceuticals, personal care products (PPCPs), and other chemicals are commonly detected at low concentration in rivers and lakes (Kolpin et al. 2002; Lee et al. 2004; Lee et al. 2008). Although the effects of most of these contaminants on aquatic ecosystems are not well understood, several of these chemicals possess endocrine active properties because they mimic the actions of naturally occurring hormones. These chemicals can have adverse effects on aquatic ecosystems and on fish at extremely low concentration. For example:

- The presence of five parts per trillion of a common contraceptive medication can cause the collapse of fish populations (Kidd et al. 2007).
- Low concentrations of alkylphenols and antidepressants in water have a measurable effect on fish responses and alter reproductive behaviors (Painter et al. 2009;Schoenfuss et al. 2008).

Recent field studies in Minnesota have documented similar findings. A 2008 study of 11 lakes in Minnesota showed that pharmaceuticals, personal care products, and other chemicals were widespread at low concentration, even in lakes with very minimal shoreline development (Writer et al. 2010). Evidence of endocrine disruption was clearly observed in fish collected from these lakes. A subsequent study, focusing on particular "microhabitats" within a single lake (Ferrey et al. 2012), indicated that fish exhibit morphological (such as body size and weight), physiological (such as metabolic or enzyme functions), and genetic changes when they are exposed to specific areas in the lake that were influenced by drainfields, urban runoff, and agricultural sources of contaminants. A monitoring study of 25 wastewater treatment plants across Minnesota (Lee et al. 2011) demonstrated that a wide variety of chemicals routinely enter our aquatic environment, and the expression of genes is altered upon exposure to surface water containing wastewater treatment plant effluent (Martinovic et al. 2008).

Together, these studies suggest that PPCPs and endocrine active chemicals are widespread in lakes and rivers, and that fish are likely altered on genetic, cellular, organism, and population levels when exposed to the chemicals that find their way into surface water from a variety of sources.

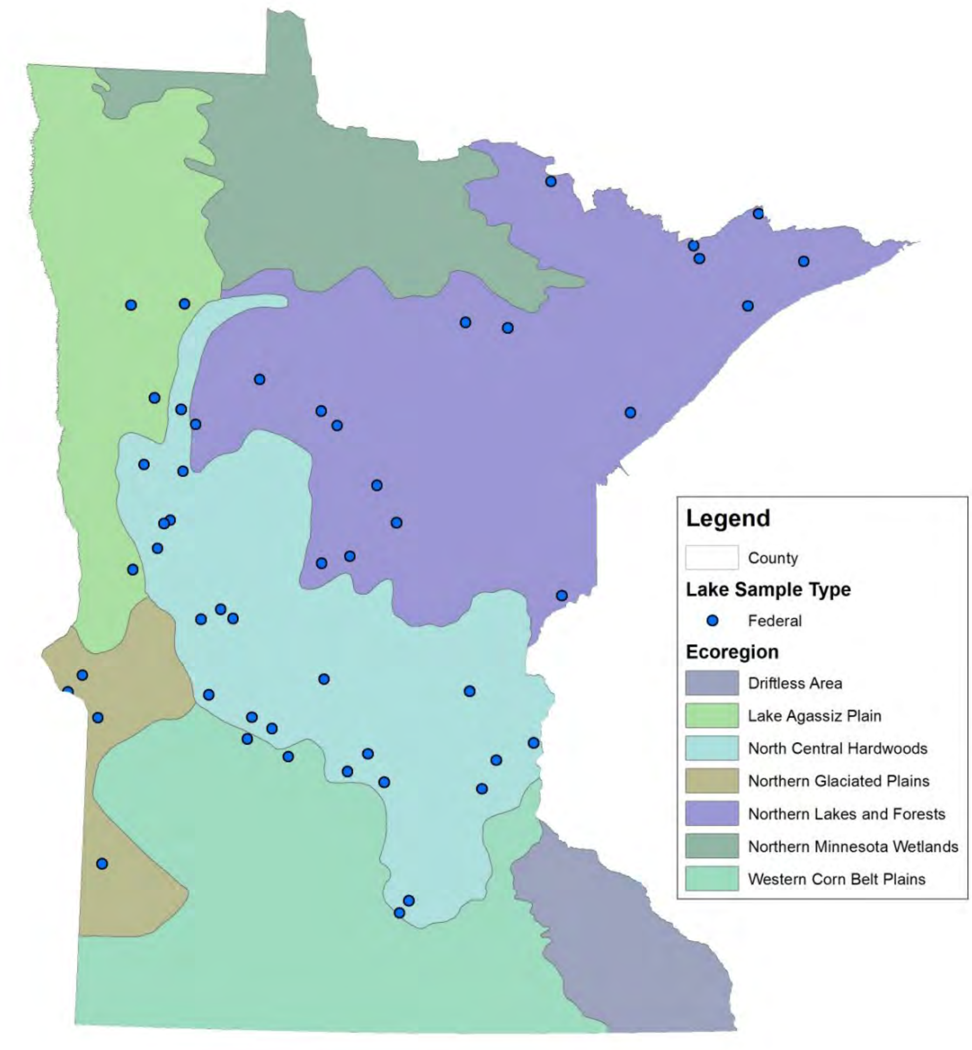
In this study, 50 lakes across Minnesota were randomly selected in 2012 as part of the National Lakes Assessment Project (NLAP). Surface water was sampled and analyzed for 125 chemicals, including PPCPs and endocrine active chemicals (EACs) (Figure 1). The results presented here broaden our understanding of the effects these chemicals have on lakes, and is generally consistent with the findings of previous investigations. The insect repellent DEET was found in 76 percent of the lakes sampled, making this chemical the most frequently discovered. Endocrine active chemicals, including bisphenol A, nonylphenol, and the hormone androstenedione, were detected at frequencies and at concentrations similar to previous studies. Chemicals not previously analyzed – cocaine, the antidepressant amitriptyline, and the veterinary antibiotic carbadox were all often detected in lakes. The sources and mechanism of transport of these contaminants to many of these lakes is not clear.

Study design and methods

Study description

Fifty Minnesota lakes were randomly selected for the 2012 NLAP, which was designed in cooperation with U.S. Environmental Protection Agency (EPA) (Figure 1; see http://www.pca.state.mn.us/qzqh141c). The NLAP survey provides environmental data on the nation's lakes every five years to assess their overall quality. Because the lakes that were included in the study were selected at random, the data collected in the study provides a statistically valid representation of PPCPs, EACs, and other chemicals present in Minnesota lakes.

Figure 1. The locations of Minnesota lakes included in this study.



Sampling and analysis

Mid-lake grab samples were collected in amber glass or HDPE bottles, depending on the analysis to be conducted on the water samples. Field staff did not apply fragrances, insect repellant (DEET), or sunscreen prior to sampling. Sample bottles were transported to the site in re-sealable plastic bags. During sampling, powder-free latex gloves were used by samplers employing a "dirty hands/clean hands" routine. This ensured that the person responsible for taking the surface water sample was in contact only with the sampling bottle and minimized the risk for cross-contamination of the sample. Bottles were re-sealed in the plastic bags, chilled, and shipped overnight to the laboratory (Axys Analytical Laboratory, Vancouver, BC) for chemical analysis. Water samples were extracted at the lab within seven days of sample collection. Analysis of 125 chemicals included 97 pharmaceuticals, the personal care products DEET (insect repellant) and triclosan, four alkylphenol and alkylphenol ethoxylates, 19 hormones, and the illicit drug cocaine and its metabolite benzoylecgonine (Table 1). Cocaine and benzoylecgonine were not initially targeted for analysis in this study. However, they were analyzed due to their coincidental inclusion as analytes within a broader suite of chemicals that were all extracted and analyzed by the same method in the laboratory.

Table 1 Chemicals analyzed in surface water for this study.

Alkylphenols		
4-Nonylphenol diethoxylates		
4-Nonylphenol monoethoxylates		
4-Nonylphenols		
Octylphenol		
Personal Care Products		
DEET		
Triclosan		
Illicit Drugs		
Cocaine		
Benzoylecgonine		
Hormones		
17 alpha-Dihydroequilin		
17 alpha-Estradiol		
17 alpha-Ethinyl-Estradiol		
17 beta-Estradiol		
Allyl Trenbolone		
Androstenedione		
Androsterone		
Desogestrel		
Equilenin		
Equilin		
Estriol		
Estrone		
Mestranol		
Norethindrone		
Norgestrel		
Progesterone		
Testosterone		
Trenbolone		
Trenbolone acetate		
Pharmaceuticals/Medications		
1,7-Dimethylxanthine	Glipizide	Sulfathiazole
10-Hydroxy-amitriptyline	Glyburide	Tetracycline [TC]
2-Hydroxy-ibuprofen	Hydrochlorothiazide	Theophylline

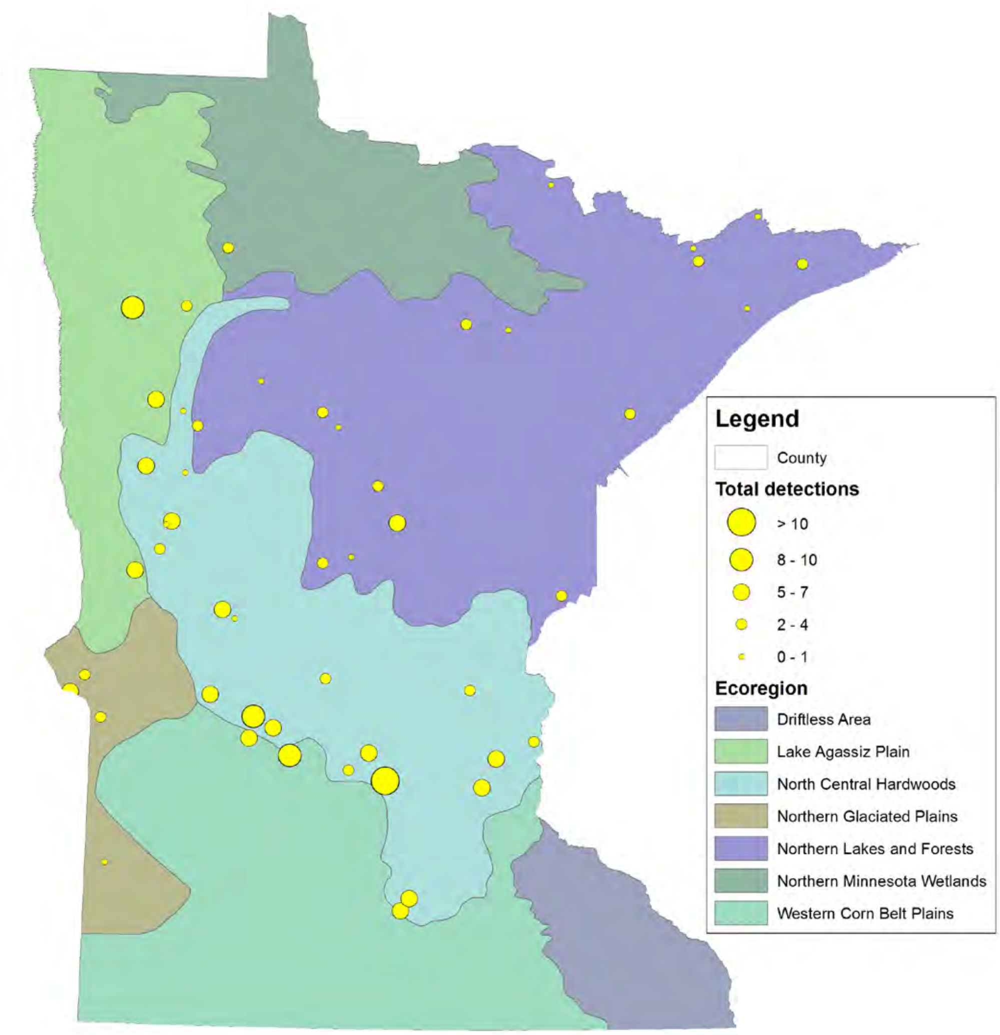
4-Epianhydrochlortetracycline [EACTC]	Hydrocortisone	Thiabendazole
4-Epianhydrotetracycline [EATC]	Ibuprofen	Triclocarban
4-Epichlortetracycline [ECTC]	Isochlortetracycline [ICTC]	Trimethoprim
4-Epioxytetracycline [EOTC]	Lincomycin	Tylosin
4-Epitetracycline [ETC]	Lomefloxacin	Valsartan
Acetaminophen	Meprobamate	Verapamil
Alprazolam	Methylprednisolone	Virginiamycin
Amitriptyline	Metoprolol	Warfarin
Amlodipine	Miconazole	
Anhydrochlortetracycline [ACTC]	Minocycline	
Anhydrotetracycline [ATC]	Naproxen	
Azithromycin	Norfloxacin	
Benztropine	Norfluoxetine	
Betamethasone	Norgestimate	
Caffeine	Norverapamil	
Carbadox	Ofloxacin	
Carbamazepine	Ormetoprim	
Cefotaxime	Oxacillin	
Chlortetracycline [CTC]	Oxolinic Acid	
Ciprofloxacin	Oxytetracycline [OTC]	
Clarithromycin	Paroxetine	
Clinafloxacin	Penicillin G	
Cloxacillin	Penicillin V	
Dehydronifedipine	Prednisolone	
Demeclocycline	Prednisone	
Desmethyldiltiazem	Promethazine	
Diazepam	Propoxyphene	
Digoxigenin	Propranolol	
Digoxin	Roxithromycin	
Diltiazem	Sarafloxacin	
Diphenhydramine	Sertraline	
Doxycycline	Simvastatin	
Enrofloxacin	Sulfachloropyridazine	
Erythromycin-H2O	Sulfadiazine	
Flumequine	Sulfadimethoxine	
Fluocinonide	Sulfamerazine	
Fluoxetine	Sulfamethazine	
Fluticasone propionate	Sulfamethizole	
Furosemide	Sulfamethoxazole	
Gemfibrozil	Sulfanilamide	
Other		
Bisphenol A		

Results

Frequency of detection

Forty-seven of the fifty lakes sampled for this study contained at least one chemical in Table 1. The maximum number of detections was 13 for one lake – South Lake (MN 118), which currently receives treated domestic wastewater. The average number of chemical detections per lake was 3.7 (Figure 2). Thirty percent (38 of the 125) of the chemicals analyzed were found in the lakes selected for this study. The insect repellant DEET was the most common contaminant detected, occurring in 76 percent of the lakes, with a maximum concentration of 125 ng/L (Figure 3). Bisphenol A was discovered in 43 percent of the lakes. Cocaine was discovered in 32 percent of the lakes, followed by androstenedione in 30 percent of the samples. Carbadox, amitriptyline, and the cocaine metabolite benzoylecgonine were all found in 28 percent of the lakes. Caffeine was detected in 16 percent of the lake samples, and the disinfectant triclosan was found in 14 percent of the lakes (Figure 2). Together, the ten most frequently detected chemicals comprised 73 percent of the total detections in this study. Table 3 lists the highest concentrations detected for each chemical analyzed in this investigation.

Figure 2 State map showing the magnitude of chemical detections by sampling location.



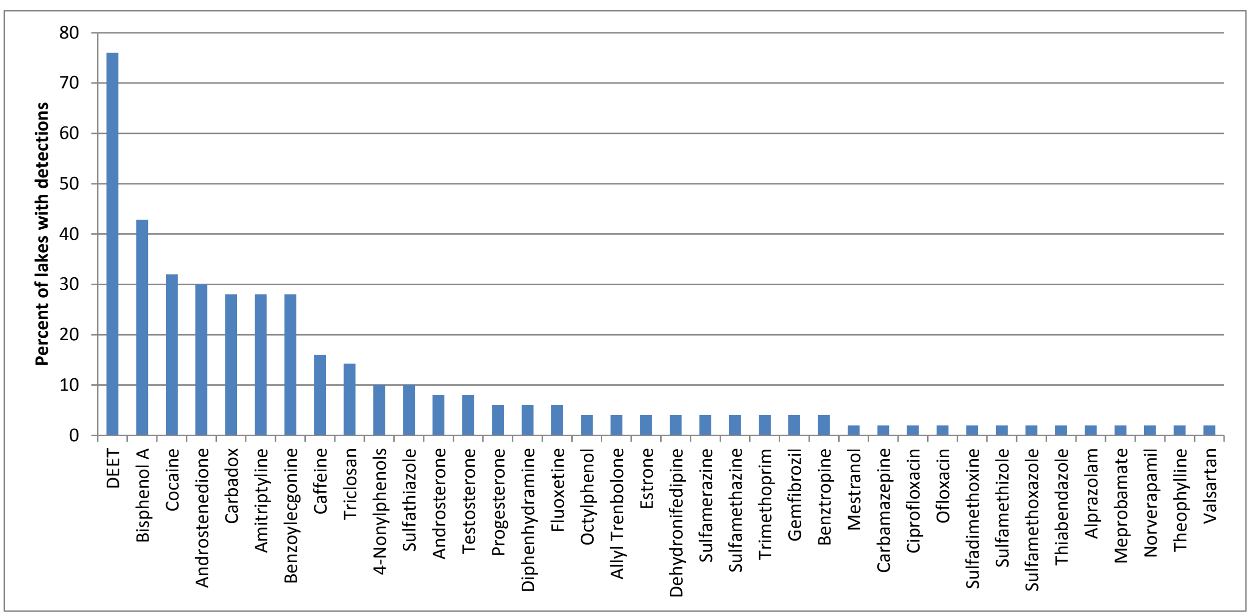
Pharmaceuticals and personal care products

Table 2 lists the 24 pharmaceuticals detected in at least one lake for this study. Carbadox, an antibiotic approved for use only in swine production, and amitriptyline, an antidepressant medication, were the most frequently detected pharmaceuticals (14 detections each) and were found at concentrations ranging up to 121 ng/L and 4.1 ng/L, respectively. Several sulfonamide (sulfa) antibiotics were also frequently discovered along with trimethoprim, a medication that is typically co-prescribed with sulfa drugs. The antibiotic sulfamethazine was detected up to 134 ng/L. Carbamazepine, which was often detected in a prior study of rivers near waste water treatment plants (Lee et al. 2011) was found in one lake in this study at 36.7 ng/L. Triclosan, a common disinfectant, was found in 13 percent of the lakes.

Table 2 Pharmaceuticals that were detected in at least one lake.

Alprazolam	Norverapamil
Amitriptyline	Ofloxacin
Benztropine	Sulfadimethoxine
Caffeine	Sulfamerazine
Carbadox	Sulfamethazine
Carbamazepine	Sulfamethizole
Ciprofloxacin	Sulfamethoxazole
Dehydronifedipine	Sulfathiazole
Diphenhydramine	Theophylline
Fluoxetine	Thiabendazole
Gemfibrozil	Trimethoprim
Meprobamate	Valsartan

Figure 3 The detection frequency of individual chemicals found in a random sampling of 50 Minnesota lakes.



Steroid hormones

The steroid hormones androstenedione, androsterone, testosterone, progesterone, and estrone were all detected in lake water samples. These are either naturally occurring or of anthropogenic origin. Mestranol, a synthetic contraceptive, was detected in one lake at 71.7 ng/L.

Alkylphenols

The endocrine active chemicals nonylphenol and octylphenol, breakdown products of commonly used alkylphenol ethoxylate detergents, were detected in 10 percent and 4 percent of the lakes that were sampled, respectively. Nonylphenol was detected up to 20.1 ng/L, whereas the maximum concentration of octylphenol was 3.8 ng/L.

Table 3 Maximum concentrations of analytes that were detected in this study.

Chemical	Maximum detected (ng/L)
Alkylphenols	
4-Nonylphenol diethoxylate	5
4-Nonylphenol monoethoxylate	0
4-Nonylphenol	0
Octylphenol	2
Personal Care Products	
DEET	125
Triclosan	11.8
Illicit Drugs	
Cocaine	5.3
Benzoylecgonine	9.5
Hormones	
17 alpha-Dihydroequilin	ND
17 alpha-Estradiol	ND
17 alpha-Ethinyl-Estradiol	ND
17 beta-Estradiol	ND
Allyl Trenbolone	1.1
Androstenedione	7.5
Androsterone	406
Desogestrel	ND
Equilenin	ND
Equilin	ND
Estriol	ND
Estrone	15.5
Mestranol	71.7

Norethindrone	ND
Norgestrel	ND
Progesterone	1
Testosterone	4.1
Trenbolone	ND
Trenbolone acetate	ND
Pharmaceuticals/Medications	
1,7-Dimethylxanthine	ND
10-Hydroxy-amitriptyline	ND
2-Hydroxy-ibuprofen	ND
4-Epianhydrochlortetracycline [EACTC]	ND
4-Epianhydrotetracycline [EATC]	ND
4-Epichlortetracycline [ECTC]	ND
4-Epioxytetracycline [EOTC]	ND
4-Epitetracycline [ETC]	ND
Acetaminophen	ND
Alprazolam	0.4
Amitriptyline	4.1
Amlodipine	ND
Anhydrochlortetracycline [ACTC]	ND
Anhydrotetracycline [ATC]	ND
Azithromycin	ND
Benztropine	0.7
Betamethasone	ND
Caffeine	42.9
Carbadox	121
Carbamazepine	36.7
Cefotaxime	ND
Chlortetracycline [CTC]	ND
Ciprofloxacin	19.4
Clarithromycin	ND
Clinafloxacin	ND
Cloxacillin	ND
Dehydronifedipine	1.6
Demeclocycline	ND
Desmethyldiltiazem	ND
Diazepam	ND

Pharmaceuticals/Medications	
Digoxigenin	ND
Digoxin	ND
Diltiazem	ND
Diphenhydramine	1.1
Doxycycline	ND
Enrofloxacin	ND
Erythromycin-H2O	ND
Flumequine	ND
Fluocinonide	ND
Fluoxetine	4.5
Fluticasone propionate	ND
Furosemide	ND
Gemfibrozil	13.2
Glipizide	ND
Glyburide	ND
Hydrochlorothiazide	ND
Hydrocortisone	ND
Ibuprofen	ND
Isochlortetracycline [ICTC]	ND
Lincomycin	ND
Lomefloxacin	ND
Meprobamate	29.4
Methylprednisolone	ND
Metoprolol	ND
Miconazole	ND
Minocycline	ND
Naproxen	ND
Norfloxacin	ND
Norfluoxetine	ND
Norgestimate	ND
Norverapamil	0.2
Ofloxacin	8.9
Ormetoprim	ND
Oxacillin	ND
Oxolinic Acid	ND
Oxytetracycline [OTC]	ND

Pharmaceuticals/Medications	
Paroxetine	ND
Penicillin G	ND
Penicillin V	ND
Prednisolone	ND
Prednisone	ND
Promethazine	ND
Propoxyphene	ND
Propranolol	ND
Roxithromycin	ND
Sarafloxacin	ND
Sertraline	ND
Simvastatin	ND
Sulfachloropyridazine	ND
Sulfadiazine	ND
Sulfadimethoxine	3.5
Sulfamerazine	12.5
Sulfamethazine	134
Sulfamethizole	2.5
Sulfamethoxazole	57.1
Sulfanilamide	ND
Sulfathiazole	32.8
Tetracycline [TC]	ND
Theophylline	90.6
Thiabendazole	4
Triclocarban	ND
Trimethoprim	6.2
Tylosin	ND
Valsartan	5
Verapamil	ND
Virginiamycin	ND
Warfarin	ND
Other	
Bisphenol A	14.9

Discussion

Most prior studies of PPCPs or EACs have typically focused on surface water near wastewater treatment plants (WWTPs) that function as a source of pharmaceuticals, personal care products, alkylphenol-based detergents, and other contaminants to rivers or lakes. These studies have clearly demonstrated that wastewater is a significant source of contaminants to the aquatic environment.

One of the 50 lakes, all of which were included by random selection in this study, currently receives treated domestic wastewater discharge– South Lake (MN 118). As anticipated, this lake showed the highest number of PPCP detections in this investigation. Four other lakes – Darling (MN 106), Cokato (MN 107), Woodcock (MN 114), and Big Stone (MN 119) – received treated domestic wastewater prior to 1990.

Yet while most of the lakes sampled in this study have no history of exposure to treated wastewater effluent, they contained a variety of pharmaceuticals, personal care products, or other unregulated contaminants, regardless of the surrounding shoreline development. Only the surface water of three of the 50 lakes in this study did not contain at least one of the chemicals analyzed in Table 1.

The means by which many of the contaminants detected in this study are entering most lakes is not entirely clear. Carbadox, for example, is a veterinary antibiotic approved only for use in the rearing of swine in the US. However, this antibiotic appears to be widespread in Minnesota's surface water, being detected in 28 percent of the lakes in this study. The detection of this antibiotic in lakes that are not associated with areas of swine or any livestock production is perplexing. Whether this indicates that carbadox is being used for off-label purposes or if it is transported to lakes through unknown mechanisms is not clear. Carbadox is classified as a genotoxic carcinogen, and is banned in Canada and the European Union (EU).

The detection of cocaine in roughly one-third of Minnesota lakes along with its metabolite benzoylecgonine is consistent with recent studies in Europe showing that this illicit drug is detectable in daily samples of air (Cecinato et al. 2009; Viana et al. 2010) and is a common contaminant of surface water (Kasprzyk-Hordern et al. 2008; Postigo et al. 2010; Vazquez-Roig et al. 2010; Zuccato et al. 2008). In the U.S., there has been far less study of illicit drugs in the environment, though there have been reports of cocaine present in sewage (Brewer et al. 2012), in biosolids collected from wastewater treatment plants (Chari and Halden 2012), and in water influenced by WWTP effluent (Bartelt-Hunt et al. 2009). However, no other studies to our knowledge have demonstrated that cocaine is present in ambient lake water not associated with a WWTP effluent source.

The detection of cocaine in surface water is also consistent with the reported volume of cocaine that is currently used in the U.S., estimated at 157 tons per annum (UN drug report, 2011) – an amount that is comparable to the annual production of many commonly prescribed pharmaceutical compounds (Zuccato and Castiglioni 2009). Current estimates by the United Nations suggest that 2.4 percent of the population in the U.S. uses cocaine at least occasionally (http://www.unodc.org/documents/data-and-analysis/WDR2011/The_coca-cocaine_market.pdf). Thus, the appearance of this drug in aquatic environmental samples at a frequency comparable to other pharmaceuticals is perhaps not surprising.

Cocaine was detected in lakes across much of the state, many without public access. This indicates that the chemical is being introduced to the lakes via an indirect means. In other studies of drugs in air associated with urban locations, cocaine was closely associated with airborne particulate matter less than 2.5 micrometers in size ($PM_{2.5}$) (Viana et al. 2010). The presence of cocaine in the atmosphere and the association with fine particulates is likely attributable to the manner in which cocaine is used, either through the smoking of crack cocaine or the inhalation of the powdered drug. Thus, it is reasonable to assume that the presence of cocaine in lakes sampled for this study is largely due to long-range transport of fine particulates in the atmosphere.

The ratio of the concentration of cocaine to the concentration of its metabolite, benzoylecgonine, can reveal the source of cocaine to the aquatic environment (Postigo et al. 2008). Specifically, a ratio of 1.2-2.0 indicates that excretion is the likely source of these contaminants, whereas a ratio of less than 1.2 indicates that cocaine has been directly deposited to water. In this study, the ratio of cocaine to benzoylecgonine averaged 1.16, supporting the idea that much of the cocaine detected in lake water was attributable to the direct deposition of cocaine bound to fine particulate matter.

In this study, cocaine was present in concentrations up to 5.3 ng/L and benzoylecgonine was detected up to 9.5 ng/L. Although the biological effects of cocaine in the aquatic environment are not known, it has been shown to accumulate in eel tissue (Capaldo et al. 2012) when eels were exposed to concentrations similar to those reported in this study, with concerns that long-term exposure to this biologically active chemical might have effects on the reproductive behavior of aquatic organisms. Recently, researchers reported that benzoylecgonine caused sublethal but “notable adverse effects” in freshwater mussels at 500 parts per trillion (Parolini et al. 2013). Recent studies of benzoylecgonine showed concentrations up to 3300 ppt in the primary treatments of wastewater treatment plants (Pedrouzo et al. 2011) and up to 740 ppt in effluent-dominated surface water (Zuccato et al. 2005).

The insect repellent DEET is commonly present in lakes, and was detected in 76 percent of the lakes in this study at concentrations up to 125 ng/L. This is consistent with a previous lake investigation in Minnesota that showed DEET was present in 100 percent of the lakes sampled at levels up to 579 ng/L (Ferrey et al. 2008; Writer et al. 2010). In a 2010 study focused on wastewater treatment plants in Minnesota, DEET was detected in 38 percent of surface water samples upstream of WWTPs, in 80 percent of WWTP effluent samples, and in 50 percent of downstream samples. The environmental effects of DEET at ng/L concentrations are not known.

Amitriptyline, an antidepressant medication, was the most frequently detected pharmaceutical, found in 28 percent of lakes in this study. Amitriptyline has not been analyzed in previous studies of surface water in Minnesota. It was found in several lakes lacking any shoreline development or road access, making it difficult to understand how this medication is transported to these surface waters.

Caffeine, considered an indicator of wastewater, was detected in 16 percent of the lakes. It has been frequently detected in other studies of surface water, and was detected in 64 percent of the lakes included in a 2008 lake study (Ferrey et al. 2008; Writer et al. 2010).

The sulfonamide antibiotics – sulfamerizine, sulfamethazine, sulfadimethoxine, sulfamethizole, and sulfamethoxazole - appear to be commonly present in surface water, with twelve total detections of sulfa-related antibiotics in lakes in this study. Trimethoprim, which is typically co-prescribed with sulfonamide antibiotics, was found in 4 percent of the lakes. Trimethoprim and sulfonamide antibiotics were frequently detected in the study of WWTPs in Minnesota.

The widely used disinfectant triclosan is commonly found in wastewater treatment plant effluent, detected in 76 percent of wastewater effluent samples (Lee et al. 2011). Sediment cores collected from Minnesota lakes show a record of increasing concentrations of triclosan and chlorinated triclosan derivatives over several decades (Anger et al. 2013). In this study it was detected in the surface water of three of 22 lakes (13.6 percent) at a maximum of 11.8 ng/L. Triclosan was not detected in an earlier investigation of Minnesota lakes (Writer et al. 2010). However, triclosan was frequently detected downstream of the WWTP outfall locations in 12 percent of the surface water and in 31 percent of the sediment samples.

The hormone androstenedione was detected in 30 percent of the lakes in this study, in lakes with and without lakeshore development. Androstenedione is the precursor to the hormones estrogen and testosterone, and is sometimes used as a hormone supplement ("andro"). Both testosterone and androsterone were found in 8 percent of the lakes, while progesterone was found in 6 percent of the lakes. Mestranol, a synthetic contraceptive, was found in one lake in this study. Mestranol was also detected in one of eleven lakes in the 2008 Lake Study and in rivers in the 2010 WWTP Study.

The alkylphenols nonylphenol and octylphenol are endocrine active chemicals that are frequently found in surface water. Alkylphenols are breakdown products of the parent alkylphenol ethoxylates, which are commonly used as detergents and as surfactants in herbicide formulations. In this study, the detection frequency in lakes for nonylphenol and octylphenol was 10 percent and 4 percent, respectively; the maximum concentration for nonylphenol was 20 ng/L, while the highest concentration for octylphenol was 3.7 ng/L. In the 2008 study of 11 Minnesota lakes, nonylphenol was detected in 18 percent of the lakes at concentrations reaching 214 ng/L. As might be expected, alkylphenols were far more frequently detected in WWTP effluent (80 percent) at higher concentration (in the ppb range) and in downstream river water (50 percent of the samples). Nonlyphenols appear to accumulate at higher concentrations in sediment (Ferrey et al. 2008; Lee et al. 2011) and are resistant to biological degradation. Several studies have demonstrated that nonylphenol effects fish behavior and reproduction (Barber et al. 2007; Lee et al. 2008; Schoenfuss et al. 2008).

Many of the contaminants discussed in this study were detected in lakes lacking any shoreline or near-shore development. The lack of obvious, proximate sources of contaminants, or evidence of recreational use or other human presence, makes it difficult to understand the mechanisms by which pharmaceuticals, personal care products, or other chemicals enter many of these lakes. Some of the hormones, such as androstenedione, testosterone, or estrone, are produced naturally by wildlife and are not entirely due to the influence of humans. However, most of the chemicals discussed here are not naturally occurring. The widespread presence of chemicals in surface water has been attributed in past studies with WWTPs or attributed to nearby residential drainfields. While WWTPs are undoubtedly sources of PPCPs and other contaminants to surface water, this study suggests that there are other sources of these chemicals to our lake environment that are difficult to pinpoint or quantify. For many of the lakes sampled in this investigation the impact of shoreline residences is likely.

However, for many lakes, there are no apparent sources, making the appearance of amitriptyline, carbadox, and other pharmaceuticals in these lakes difficult to understand. Moreover, there is no consistent pattern to the distribution of these chemicals in lakes that were included in the study. The recent studies by Viana et al. (2010) on air samples and studies of pesticide deposition in remote mountain snowpack (Hageman et al. 2006) suggest that many of these chemicals are associated with fine particulate matter ($PM_{2.5}$), which are subsequently deposited in surface water. In the 2007 NLAP survey in Minnesota, atrazine was detected in the Boundary Waters Canoe Area Wilderness, suggesting that this pesticide is transported in a similar fashion. While there are clearly several ways that chemicals can enter water in the trace amounts reported in these studies, deposition of airborne particles would appear to be one of the most feasible mechanisms for the appearance of many of these chemicals in rather remote Minnesota lakes.

The proposition that these contaminants are being introduced to lakes via fine particulate matter is supported by the widespread detection of cocaine residue and its breakdown product, BECG. In EU studies, cocaine is present and detectable in atmospheric samples to the degree that the researchers were able to estimate patterns of use over urban areas. Although their focus was not on the dispersion and deposition of cocaine in the aquatic environment, it is reasonable to assume that eventual deposition of fine particulate matter could lead to the detections that we have observed in this study.

Extending this reasoning to other chemicals yields insight into the possible dispersal of pharmaceuticals, bisphenol A, and alkylphenols in the environment.

It is important to emphasize that the data from this study are based on one set of samples taken from lakes in one point in time – a snapshot of the conditions that existed when the samples were collected. More frequent sampling would undoubtedly reveal a wide temporal variation in the contaminants present and their concentration. Still, this study has expanded our understanding of the number and types of contaminants in surface water, lending more clarity to the impact we are having on our environment.

Despite the additional insight this investigation provides about contaminants in lakes, several important questions remain. First, it is not clear how long contaminants such as these persist in the surface water or to what extent they accumulate in lake sediment. Some chemicals tend to degrade relatively rapidly; others may be very recalcitrant to degradation. As a result, some chemicals, such as nonylphenol, may accumulate in sediment over time to levels that may have adverse effects on benthic organisms (Soares et al. 2008).

Second, it is not clear what affect most of these contaminants might have on fish and wildlife or on human health at the low concentrations we have observed. Studies on the effect of trace levels of pharmaceuticals on human embryonic cells (Pomati et al. 2006) and fish cells (Pomati et al. 2007) have shown that combinations of pharmaceuticals at part per trillion concentrations represses cell division, alters the genetic expression of estrogen receptors on cells, and affects the transcription of DNA. Other studies show a clear and sometimes dramatic effect on fish behavior (Painter et al. 2009), fresh water mussel reproduction (Fong 1998), and fish population (Kidd et al. 2007) from exposure to antidepressants and hormones at low part per trillion concentrations. The wider potential for most of the chemicals to exert adverse effects on ecosystems is not known.

Data other than the chemicals discussed in this report were also collected for this NLAP study. Further analysis of that additional information in context with the chemical data presented here may eventually reveal important associations or patterns of occurrence that are not yet apparent. Finally, while we are beginning to understand that wastewater treatment plants, septic systems, road runoff, agriculture, and areal transport are all sources of these contaminants to lakes, rivers and streams, the degree to which each of these sources contribute particular chemicals to the environment is still unclear. Further study on the presence of unregulated contaminants in surface water should be accompanied by investigations of how various sources, including fine particulate matter, contribute contaminants to the aquatic environment.

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Appendix A

Descriptions of chemicals that were analyzed in this study by category.

Alkylphenols	
4-Nonylphenol diethoxylate	Nonionic detergent
4-Nonylphenol monoethoxylate	Nonionic detergent
4-Nonylphenol	An alkylphenol; breakdown product of nonylphenol ethoxylate detergents
Octylphenol	An alkylphenol; breakdown product of octylphenol ethoxylate detergents
Personal Care Products	
DEET	Pesticide; insect repellant
Triclosan	Disinfectant
Illicit Drugs	
Cocaine	
Benzoylecgonine	Metabolite of cocaine
Hormones	
17 alpha-Dihydroequilin	
17 alpha-Estradiol	A female estrogenic hormone
17 alpha-Ethinyl-Estradiol	Synthetic oral contraceptive in birth control prescriptions
17 beta-Estradiol	One of three naturally occurring estrogens
Allyl Trenbolone	Steroid hormone used to increase muscle mass in livestock
Androstenedione	Precursor to estrogen and testosterone
Androsterone	A steroid hormone with weak androgenic activity
Desogestrel	A hormone used as an oral contraceptive
Equilenin	An estrogen used in hormone replacement therapy
Equilin	An estrogen used in hormone replacement therapy
Estriol	One of three naturally occurring estrogens
Estrone	One of three naturally occurring estrogens
Mestranol	An estrogen used in oral contraceptives and converted to ethinylestradiol
Norethindrone	Progestogen used in oral contraceptives
Norgestrel	A progestin used in contraceptives
Progesterone	A female steroid hormone
Testosterone	A male hormone and anabolic steroid
Trenbolone	Steroid hormone used to increase muscle mass in livestock
Trenbolone acetate	Steroid hormone used to increase muscle mass in livestock

Pharmaceuticals/Medications	
1,7-Dimethylxanthine	Metabolite of caffeine
10-Hydroxy-amitriptyline	Metabolite of amitriptyline
2-Hydroxy-ibuprofen	Metabolite of ibuprofen
4-Epianhydrochlortetracycline [EACTC]	Degradation product of the antibiotic chlortetracycline
4-Epianhydrotetracycline [EATC]	Degradation product of the antibiotic tetracycline
4-Epichlortetracycline [ECTC]	Degradation product of the antibiotic chlortetracycline
4-Epioxytetracycline [EOTC]	Degradation product of the antibiotic oxytetracycline
4-Epitetracycline [ETC]	Degradation product of the antibiotic tetracycline
Acetaminophen	A common analgesic
Alprazolam	A sedative and muscle relaxant
Amitriptyline	An antidepressant
Amlodipine	Blood pressure medication
Anhydrochlortetracycline [ACTC]	Degradation product of the antibiotic tetracycline
Anhydrotetracycline [ATC]	Degradation product of the antibiotic tetracycline
Azithromycin	Antibiotic
Benztropine	Anticholinergic used to treat Parkinson's disease
Betamethasone	Anti-inflammatory steroid
Caffeine	Stimulant
Carbadox	Antibiotic used in rearing swine
Carbamazepine	Anticonvulsive used to treat epilepsy and attention deficit hyperactivity disorder (ADHD)
Cefotaxime	An antibiotic
Chlortetracycline [CTC]	An antibiotic
Ciprofloxacin	An antibiotic
Clarithromycin	An antibiotic
Clinafloxacin	An antibiotic
Cloxacillin	An antibiotic
Dehydronifedipine	Metabolite of nifedipine, a blood pressure medication
Demeclocycline	A tetracycline-related antibiotic
Desmethyldiltiazem	A metabolite of diltiazem
Diazepam	Anti-anxiety medication; sedative
Digoxigenin	A plant-derived steroid used as a probe in molecular biology
Digoxin	Heart medication
Diltiazem	Heart medication
Diphenhydramine	Antihistamine
Doxycycline	An antibiotic
Enrofloxacin	A veterinary antibiotic

Erythromycin-H2O	An antibiotic
Flumequine	An antibiotic
Fluocinonide	Anti-inflammatory steroid
Fluoxetine	Antidepressant
Fluticasone propionate	Steroid medication for asthma
Furosemide	Medication used to treat high blood pressure and edema
Gemfibrozil	Lipid regulator
Glipizide	anti-diabetic drug
Glyburide	anti-diabetic drug
Hydrochlorothiazide	A diuretic
Hydrocortisone	A steroid hormone
Ibuprofen	A common analgesic
Isochlortetracycline [ICTC]	Degradation product of the antibiotic chlortetracycline
Lincomycin	An antibiotic
Lomefloxacin	An antibiotic
Meprobamate	Anti-anxiety medication; sedative
Methylprednisolone	Anti-inflammatory steroid
Metoprolol	Blood pressure medication
Miconazole	Topical antifungal medication
Minocycline	A tetracycline-related antibiotic
Naproxen	An analgesic
Norfloxacin	A seldom used antibiotic
Norfluoxetine	An antidepressant
Norgestimate	A hormone used in oral contraceptives
Norverapamil	Blood pressure medication
Ofloxacin	An antibiotic
Ormetoprim	An antibiotic used together with sulfonamides
Oxacillin	An antibiotic
Oxolinic Acid	An antibiotic
Oxytetracycline [OTC]	An antibiotic
Paroxetine	An antidepressant
Penicillin G	An antibiotic
Penicillin V	An antibiotic
Prednisolone	An anti-inflammatory corticosteroid and active metabolite of prednisone
Prednisone	An anti-inflammatory corticosteroid
Promethazine	An antihistamine
Propoxyphene	An analgesic

Propranolol	Sedative and blood pressure medication
Roxithromycin	An antibiotic
Sarafloxacin	An antibiotic
Sertraline	An antidepressant
Simvastatin	Lipid regulator
Sulfachloropyridazine	One of several sulfonamide antibiotics
Sulfadiazine	One of several sulfonamide antibiotics
Sulfadimethoxine	One of several sulfonamide antibiotics
Sulfamerazine	One of several sulfonamide antibiotics
Sulfamethazine	One of several sulfonamide antibiotics
Sulfamethizole	One of several sulfonamide antibiotics
Sulfamethoxazole	One of several sulfonamide antibiotics
Sulfanilamide	One of several sulfonamide antibiotics
Sulfathiazole	One of several sulfonamide antibiotics
Tetracycline [TC]	An antibiotic
Theophylline	Asthma medication
Thiabendazole	A fungicide
Triclocarban	Disinfectant
Trimethoprim	An antibiotic used together with sulfonamides
Tylosin	An antibiotic
Valsartan	Blood pressure medication
Verapamil	Medication for high blood pressure and migraines
Virginiamycin	An antibiotic
Warfarin	Blood thinner

Other	
Bisphenol A	Material to make polycarbonate plastic and other uses

Appendix B

Analytical Data Tables

Table 1:	Alkylphenols and alkylphenol ethoxylates
Table 2:	Triclosan and bisphenol A
Tables 3-4:	Hormones
Tables 5-8:	Pharmaceuticals
Table 9:	GPS coordinates of the lakes included in this study

Data flags for analytical data in Appendix B.

B	**Analyte found in sample and the associated blank**
D	**Dilution data**
E	**Exceeds calibrated linear range, see dilution data**
H	**Data provided for information only**
K	**Peak detected but did not meet quantification criteria, result reported represent the estimated maximum possible concentration**
MAX	**Concentration is a maximum estimated value**
N	**Analyte recovery is not within method control limits in the OPR**
NQ	**Data not quantifiable**
TIC	**Compound identity and concentration are estimated**
U	**Identifies a compound that was not detected**
V	**Surrogate recovery is not within method control limits**
X	**Results reported separately**

Sample ID suffices:

i	**Instrumental re-analysis performed on the sample extract**
N	**A dilution of the sample extract followed by instrumental re-analysis**
R	**Repeat analysis using a fresh aliquot of sample**

Table 1 Alkylphenols

Lake number	Lake name	4-Nonylphenols (ng/L)	4-Nonylphenol monoethoxylates (ng/L)	4-Nonylphenol diethoxylates (ng/L)	Octylphenol (ng/L)
NLA12_MN-101	Long	< 3.74	< 3.34	< 4.84	< 1.49
NLA12_MN-102	Spring	B 15.4	< 5.55	< 2.55	< 0.970
NLA12_MN-103	Lookout	10.5	< 4.97	< 2.37	< 0.949
NLA12_MN-104	Fairy	< 3.53	< 6.41	< 5.95	< 2.44
NLA12_MN-105	Becoosin	B 25.7	< 11.8	< 6.97	< 1.35
NLA12_MN-106	Darling	18.5	< 6.79	< 6.03	< 1.30
NLA12_MN-106 Duplicate		20.1	< 8.74	< 2.91	< 0.859
NLA12_MN-107	Cokato	B 24.0	< 8.19	< 6.10	< 2.15
NLA12_MN-108	Long	B 20.5	< 6.13	< 4.56	< 1.35
NLA12_MN-109	Richey	< 7.02	< 8.08	< 4.68	< 2.60
NLA12_MN-110	Crow Wing	< 6.25	< 7.95	< 7.51	< 1.23
NLA12_MN-111	Snail	B 12.3	< 5.65	< 6.05	< 1.42
NLA12_MN-112	Eagle	< 5.41	< 13.2	< 4.38	< 3.17
NLA12_MN-113	North Ash	B 432	< 15.5	< 8.12	< 2.47
NLA12_MN-114	Woodcock	< 7.61	< 6.26	< 4.19	< 1.36
NLA12_MN-115	Round	< 4.49	< 12.3	< 2.11	< 2.43
NLA12_MN-115 duplicate		< 5.25	< 9.19	< 5.83	< 2.07
NLA12_MN-116	Nokomis	< 4.20	< 6.24	< 5.52	< 1.28
NLA12_MN-118 *	South	B 12.0	< 29.7	< 5.31	< 2.35
NLA12_MN-119	Big Stone	4.59	< 4.85	< 5.53	< 1.85
NLA12_MN-120	Flat	B 26.1	< 6.73	< 7.40	< 2.05
NLA12_MN-121	Norway	< 5.31	< 15.5	< 6.46	< 2.31
NLA12_MN-122	Jennie	B 14.2	< 7.68	< 4.74	< 1.42
NLA12_MN-123	unnamed	B 346	< 10.9	< 9.66	< 2.28
NLA12_MN-123 Duplicate		B 404	< 11.2	< 7.66	< 3.74
NLA12_MN-126	Diamond	< 4.71	< 8.50	< 5.53	< 1.96
NLA12_MN-127	unnamed	12.2	< 8.31	< 3.16	< 2.37
NLA12_MN-130A	Net	B 23.5	< 10.7	< 4.53	< 1.89
NLA12_MN-131	unnamed	< 5.36	< 8.77	< 6.05	< 2.41
NLA12_MN-132	Clear	B 14.6	< 3.76	< 3.92	< 1.33
NLA12_MN-135	Lindgren	B 224	< 8.48	< 7.63	< 2.57
NLA12_MN-136	unnamed	B 24.3	< 6.49	< 7.28	< 0.686
NLA12_MN-136 Blank		B 39.7	< 10.6	< 5.59	< 1.43
NLA12_MN-137	Cucumber	B 36.5	< 17.4	< 8.65	< 3.13
NLA12_MN-138A	Tenor	B 16.1	< 7.35	< 6.67	< 1.61
NLA12_MN-141	East Red River	< 4.18	< 8.73	< 6.87	< 1.60

Lake number	Lake name	4-Nonylphenols (ng/L)	4-Nonylphenol monoethoxylates (ng/L)	4-Nonylphenol diethoxylates (ng/L)	Octylphenol (ng/L)
NLA12_MN-143	unnamed	< 8.18	< 6.87	< 5.40	< 1.83
NLA12_MN-144	unnamed	B 32.0	< 6.39	< 6.08	< 0.906
NLA12_MN-145	Terrapin	B 22.8	< 3.05	< 4.25	< 1.27
NLA12_MN-147	Wilbur	B 2.45	< 4.69	< 23.4	< 0.815
NLA12_MN-150	Spree	B 16.2	< 9.63	< 6.81	< 1.96
NLA12_MN-152	61-0091	B 188	< 10.4	< 3.30	< 1.97
NLA12_MN-153	Bear	B 344	< 9.50	< 5.25	< 2.12
NLA12_MN-157	Glorvigan	< 4.78	< 10.0	< 6.03	< 1.76
NLA12_MN-158	unnamed	< 11.7	< 16.5	< 6.86	< 2.65
NLA12_MN-158 Blank		B 25.0	< 4.01	< 5.41	< 1.10
NLA12_MN-160	unnamed	B 231	< 7.38	< 7.11	< 2.05
NLA12_MN-162	Waymier	< 12.5	< 17.1	< 5.71	< 4.58
NLA12_MN-163	unnamed	B 22.6	< 10.1	< 4.38	< 2.35
NLA12_MN-167	unnamed	< 11.8	< 10.0	< 6.57	< 4.43
NLA12_MN-170A	unnamed	B 32.5	< 5.01	< 5.60	3.76
NLA12_MN-171	unnamed	B 20.6	< 5.55	< 5.02	< 1.71
NLA12_MN-171 Blank		B 41.0	< 3.97	< 5.11	< 1.03
NLA12_MN-177	unnamed	B 188	< 8.08	< 12.3	2.91
NLA12_MN-181	unnamed	< 3.86	< 12.2	< 11.2	< 1.97
NLA12_MN-206	unnamed	B 25.3	< 6.69	< 6.58	< 1.58

* Currently receives treated domestic wastewater.

Table 2 Triclosan and Bisphenol A

Lake number	Lake name	Triclosan (ng/L)	Bisphenol A (ng/L)
NLA12_MN-101	Long	4.75	14.9
NLA12_MN-102	Spring	< 6.21	B 4.86
NLA12_MN-106	Darling	< 4.75	4.72
NLA12_MN-107	Cokato	< 4.83	B 4.31
NLA12_MN-109	Richey	< 5.03	< 2.60
NLA12_MN-110	Crow Wing	< 5.05	< 1.99
NLA12_MN-111	Snail	< 4.77	B 3.54
NLA12_MN-112	Eagle	11.8	< 2.07
NLA12_MN-115	Round	< 5.43	< 1.67
NLA12_MN-115 duplicate		< 4.93	< 1.96
NLA12_MN-116	Nokomis	6.23	2.24
NLA12_MN-119	Big Stone	< 4.68	3.37
NLA12_MN-120	Flat	< 8.87	B 2.18
NLA12_MN-121	Norway	< 4.87	2.92
NLA12_MN-122	Jennie	< 4.27	B 5.36
NLA12_MN-131	unnamed	< 4.82	4.23
NLA12_MN-143	unnamed	< 5.08	2.58
NLA12_MN-144	unnamed	< 5.15	B 7.85
NLA12_MN-145	Terrapin	< 4.01	B 2.27
NLA12_MN-147	Wilbur	< 5.00	2.82
NLA12_MN-162	Waymier	< 5.11	< 2.40
NLA12_MN-163	unnamed	< 6.12	B 2.10
NLA12_MN-167	unnamed	< 4.70	1.67

Table 3 Hormones – Positive

Lake number	Lake name	Allyl Trenbolone (ng/L)	Androstenedione (ng/L)	Androsterone (ng/L)	Desogestrel (ng/L)	Estriol (ng/L)	Mestranol (ng/L)	Norethindrone (ng/L)	Norgestrel (ng/L)	Progesterone (ng/L)	Testosterone (ng/L)
NLA12_MN-101	Long	< 0.791	< 1.93	< 19.8	< 116	< 331	K 39.2	< 4.54	< 3.86	< 0.772	< 1.80
NLA12_MN-102	Spring	< 1.07	2.29	< 55.6	B 413	< 15.5	K B 136	< 3.88	< 5.25	0.989	< 1.22
NLA12_MN-103	Lookout	< 0.815	< 1.99	< 40.9	< 119	< 31.8	< 60.5	< 5.87	< 4.87	< 0.795	< 0.795
NLA12_MN-104	Fairy	< 0.828	2.2	< 24.9	< 60.6	< 32.3	K B 75.5	< 4.04	< 4.04	< 0.928	< 1.51
NLA12_MN-105	Becoosin	< 1.66	< 2.02	406	B 719	< 16.0	K B 226	< 4.01	< 5.42	< 1.42	< 2.15
NLA12_MN-106	Darling	< 0.864	< 2.11	< 43.3	< 126	< 33.7	< 26.9	< 5.05	< 4.35	< 0.843	< 0.843
NLA12_MN-106 Duplicate		< 0.854	< 2.08	< 42.8	< 125	< 33.3	< 33.3	< 4.44	< 4.17	< 0.833	< 0.833
NLA12_MN-107	Cokato	< 0.867	2.2	72.7	B 165	< 15.8	K B 499	< 3.96	< 4.73	< 0.838	< 1.39
NLA12_MN-108	Long	< 0.964	2.62	< 54.3	B 380	< 15.2	K B 107	< 3.81	< 4.50	< 0.762	< 1.22
NLA12_MN-109	Richey	< 1.19	< 2.57	< 79.5	< 571	< 526	< 82.3	< 9.12	< 3.92	< 1.26	< 2.99
NLA12_MN-110	Crow Wing	< 1.05	< 2.28	< 63.8	< 267	< 33.3	71.7	< 6.94	< 4.16	< 1.17	< 3.22
NLA12_MN-111	Snail	< 1.69	3.41	< 66.9	B 431	< 15.7	K B 169	< 3.92	< 5.40	< 0.783	2.12
NLA12_MN-112	Eagle	< 0.850	< 2.55	< 42.6	< 124	< 33.2	< 56.1	< 6.81	< 5.44	< 0.829	< 0.829
NLA12_MN-113	North Ash	< 0.797	< 2.03	< 20.0	< 117	< 485	K 306	< 3.89	< 4.65	< 1.18	< 0.777
NLA12_MN-114	Woodcock	< 0.827	4.64	< 79.0	TIC 276	< 451	K B D 20000	< 8.51	< 4.00	< 0.801	4.11
NLA12_MN-115	Round	< 0.836	< 2.04	< 41.9	< 122	< 32.6	< 24.9	< 4.08	< 4.71	< 0.815	1.98
NLA12_MN-115 duplicate		< 0.825	< 2.01	< 41.4	< 121	< 32.2	< 26.0	< 4.67	< 4.02	< 0.805	< 0.805
NLA12_MN-116	Nokomis	< 0.800	< 1.95	< 20.1	< 117	< 359	K 41.2	< 5.64	< 5.89	< 1.11	< 4.48
NLA12_MN-118*	South	< 1.80	7.48	< 139	< 968	< 15.7	K B 110	< 3.94	< 6.23	< 0.930	< 2.19
NLA12_MN-119	Big Stone	< 0.826	< 2.02	< 32.6	< 60.5	< 32.2	K B 581	< 4.03	< 4.03	< 1.04	< 2.24
NLA12_MN-120	Flat	< 1.07	4.47	< 52.1	B 380	< 16.0	K B 75.4	< 4.00	< 5.42	< 0.827	< 1.39
NLA12_MN-121	Norway	< 0.823	4.18	< 45.5	< 60.2	< 32.1	K B 200	< 4.31	< 4.02	< 0.803	< 2.80
NLA12_MN-122	Jennie	< 1.34	2.39	< 42.8	B 241	< 15.7	K B 77.9	< 3.93	< 3.93	< 0.786	< 1.25
NLA12_MN-123	unnamed	< 0.791	< 1.93	< 19.8	< 116	< 298	K 155	< 4.17	< 3.86	< 0.771	< 0.771
NLA12_MN-123 Duplicate		< 0.804	< 1.96	< 65.0	< 118	< 230	K 253	< 3.92	< 3.92	< 0.784	< 0.784
NLA12_MN-126	Diamond	< 1.33	< 2.48	< 87.4	< 403	< 31.3	< 49.0	< 8.54	< 4.32	< 0.933	< 3.57
NLA12_MN-127	unnamed	< 0.807	< 2.12	< 74.4	TIC 288	< 329	K B 3340	< 5.03	< 3.94	< 0.788	< 2.63
NLA12_MN-130A	Net	< 1.29	< 1.99	< 65.2	B 340	< 15.9	K B 145	< 3.97	< 5.02	< 0.794	< 1.36
NLA12_MN-131	unnamed	< 0.835	3.24	< 58.6	< 61.1	< 32.6	K B 142	< 7.20	< 5.23	< 1.17	< 3.20
NLA12_MN-132	Clear	< 1.52	< 2.00	141	B 262	< 16.0	K B 135	< 4.01	< 7.69	< 1.06	< 1.57
NLA12_MN-135	Lindgren	< 0.811	< 2.68	< 40.7	< 119	< 31.6	< 43.6	< 7.35	< 6.60	0.796	< 0.791

Lake number	Lake name	Allyl Trenbolone (ng/L)	Androstenedione (ng/L)	Androsterone (ng/L)	Desogestrel (ng/L)	Estriol (ng/L)	Mestranol (ng/L)	Norethindrone (ng/L)	Norgestrel (ng/L)	Progesterone (ng/L)	Testosterone (ng/L)
NLA12_MN-136	unnamed	< 0.848	< 2.07	< 37.4	TIC 169	< 16.5	B 44.5	< 4.14	< 4.14	< 0.827	< 0.827
NLA12_MN-136 Blank		< 0.816	< 2.10	< 47.0	TIC 229	< 393	K B 410	< 4.75	< 3.98	< 0.797	< 2.31
NLA12_MN-137	Cucumber	< 1.32	7.31	129	< 712	< 15.9	K B 111	< 3.98	< 6.57	< 2.35	< 2.34
NLA12_MN-138A	Tenor	< 1.94	< 2.01	< 106	B 397	< 16.1	K B 166	< 4.02	< 12.3	< 0.943	< 1.45
NLA12_MN-141	East Red River	< 0.805	< 1.96	< 59.9	< 196	< 31.4	K 61.9	< 4.98	< 3.93	< 1.04	< 1.76
NLA12_MN-143	unnamed	< 0.815	< 2.69	< 64.5	< 59.7	< 31.8	K B 316	< 5.80	< 4.60	< 1.36	< 3.30
NLA12_MN-144	unnamed	< 0.802	2.7	< 24.4	< 123	< 15.6	K B 89.6	< 3.91	< 3.91	< 0.782	< 1.17
NLA12_MN-145	Terrapin	1.14	< 1.99	< 78.1	B 375	< 299	K B 150	< 3.98	< 6.25	< 1.07	< 1.50
NLA12_MN-147	Wilbur	< 0.773	< 1.89	< 36.1	< 113	< 209	K 104	< 3.92	< 6.00	< 0.850	< 1.48
NLA12_MN-150	Spree	< 1.64	< 1.97	< 158	B 336	< 15.8	K B 162	< 3.94	< 5.66	< 1.19	< 1.70
NLA12_MN-152	61-0091	< 0.837	< 2.26	< 42.0	< 122	< 32.7	< 22.9	< 4.57	< 4.63	< 0.816	< 0.816
NLA12_MN-153	Bear	< 0.777	< 1.90	< 19.5	< 114	< 272	K 102	< 5.00	< 3.82	< 1.18	< 2.13
NLA12_MN-157	Glorvigan	< 1.08	K 3.45	< 70.0	< 856	< 556	K 99.0	< 8.51	< 4.24	< 2.41	< 4.11
NLA12_MN-158	unnamed	0.987	< 2.98	< 150	TIC 468	< 534	K B 14600	< 7.85	< 4.32	< 1.34	< 4.17
NLA12_MN-158 Blank		< 0.837	< 2.04	< 29.2	TIC 184	< 16.3	B 35.1	< 4.08	< 4.08	< 0.817	< 0.817
NLA12_MN-160	unnamed	< 1.35	< 2.57	< 40.8	< 119	< 31.7	< 44.2	< 6.33	< 4.24	< 0.793	< 0.793
NLA12_MN-162	Waymier	< 0.932	< 2.63	< 34.5	< 166	< 490	< 54.4	< 6.90	< 5.48	< 0.881	< 2.15
NLA12_MN-163	unnamed	< 1.03	< 1.98	< 97.9	B 287	< 15.8	< 57.0	< 3.96	< 7.99	0.948	3.57
NLA12_MN-167	unnamed	< 0.807	< 1.97	< 40.5	< 118	< 31.5	< 39.4	< 5.40	< 4.47	< 0.788	< 0.788
NLA12_MN-170A	unnamed	< 0.794	< 2.51	< 30.8	< 123	< 323	< 19.4	< 4.01	< 3.87	< 0.774	< 1.55
NLA12_MN-171	unnamed	< 0.785	4.53	< 24.6	< 175	< 15.3	K B 113	< 3.94	< 3.83	< 0.765	< 1.96
NLA12_MN-171 Blank		< 0.804	< 1.96	< 20.2	< 70.6	< 15.7	K B 41.6	< 3.92	< 3.92	< 0.785	< 0.785
NLA12_MN-177	unnamed	< 0.847	< 3.61	< 42.5	< 124	< 33.0	< 70.6	< 10.9	< 7.86	< 0.826	< 7.30
NLA12_MN-181	unnamed	< 0.822	< 2.41	< 43.2	< 60.1	< 359	< 20.0	< 5.09	< 4.89	< 0.802	< 1.60
NLA12_MN-206	unnamed	< 1.17	3.24	< 60.8	B 527	< 15.2	K B 121	< 3.80	< 4.25	< 1.07	< 1.62

* Currently receives treated domestic wastewater.

Table 4 Hormones – Negative

Lake number	Lake name	17 alpha-Dihydroequilin (ng/L)	Equilenin (ng/L)	Equilin (ng/L)	17 beta-Estradiol (ng/L)	17 alpha-Estradiol (ng/L)	Estrone (ng/L)	17 alpha-Ethinyl-Estradiol (ng/L)
NLA12_MN-101	Long	< 3.86	< 0.772	< 7.72	< 3.86	< 3.86	< 3.86	< 4.83
NLA12_MN-102	Spring	< 3.88	< 0.776	< 7.76	< 3.88	< 3.88	< 3.88	< 4.85
NLA12_MN-103	Lookout	< 3.98	< 0.795	< 7.95	< 3.98	< 3.98	< 3.98	< 4.97
NLA12_MN-104	Fairy	< 4.04	< 0.807	< 8.07	< 4.04	< 4.04	< 4.04	< 5.05
NLA12_MN-105	Becoosin	< 4.01	< 0.801	< 8.01	< 4.01	< 4.01	< 4.01	< 5.01
NLA12_MN-106	Darling	< 4.21	< 0.843	< 8.43	< 4.21	< 4.21	< 4.21	< 5.27
NLA12_MN-106 Duplicate		< 4.17	< 0.833	< 8.33	< 4.17	< 4.17	< 4.17	< 5.21
NLA12_MN-107	Cokato	< 3.96	< 0.792	< 7.92	< 3.96	< 3.96	< 3.96	< 4.95
NLA12_MN-108	Long	< 3.81	< 0.763	< 7.63	< 3.81	< 3.81	< 3.81	< 4.77
NLA12_MN-109	Richey	< 3.92	< 0.784	< 7.84	< 3.92	< 3.92	< 3.92	< 4.90
NLA12_MN-110	Crow Wing	< 4.16	< 0.832	< 8.32	< 4.16	< 4.16	< 4.16	< 5.20
NLA12_MN-111	Snail	< 3.92	< 0.784	< 7.84	< 3.92	< 3.92	< 3.92	< 4.90
NLA12_MN-112	Eagle	< 4.15	< 0.829	< 8.29	< 4.15	< 4.15	< 4.15	< 5.18
NLA12_MN-113	North Ash	< 3.89	< 0.777	< 7.77	< 3.89	< 3.89	< 3.89	< 4.86
NLA12_MN-114	Woodcock	< 4.00	< 0.801	< 8.01	< 4.00	< 4.00	< 4.00	< 5.64
NLA12_MN-115	Round	< 4.08	< 0.815	< 8.15	< 4.08	< 4.08	< 4.08	< 5.10
NLA12_MN-115 duplicate		< 4.02	< 0.805	< 8.05	< 4.02	< 4.02	< 4.02	< 5.03
NLA12_MN-116	Nokomis	< 3.90	< 0.781	< 7.81	< 3.90	< 3.90	< 3.90	< 4.88
NLA12_MN-118*	South	< 3.94	< 0.787	< 7.87	< 3.94	< 3.94	< 3.94	< 4.92
NLA12_MN-119	Big Stone	< 4.03	< 0.806	< 8.06	< 4.03	< 4.03	< 4.03	< 5.04
NLA12_MN-120	Flat	< 4.00	< 0.799	< 7.99	< 4.00	< 4.00	< 4.00	< 5.00
NLA12_MN-121	Norway	< 4.02	< 0.803	< 8.03	< 4.02	< 4.02	< 4.02	< 5.02
NLA12_MN-122	Jennie	< 3.93	< 0.786	< 7.86	< 3.93	< 3.93	< 3.93	< 4.91
NLA12_MN-123	unnamed	< 3.86	< 0.771	< 7.71	< 3.86	< 3.86	13.8	< 4.82
NLA12_MN-123 Duplicate		< 3.92	< 0.784	< 7.84	< 3.92	< 3.92	15.5	< 4.90
NLA12_MN-126	Diamond	< 3.92	< 0.784	< 7.84	< 3.92	< 3.92	< 3.92	< 4.90
NLA12_MN-127	unnamed	< 3.94	< 0.788	< 7.88	< 3.94	< 3.94	< 3.94	< 6.49
NLA12_MN-130A	Net	< 3.97	< 0.794	< 7.94	< 3.97	< 3.97	< 3.97	< 4.96
NLA12_MN-131	unnamed	< 4.08	< 0.815	< 8.15	< 4.08	< 4.08	< 4.08	< 5.09
NLA12_MN-132	Clear	< 4.01	< 0.802	< 8.02	< 4.01	< 4.01	< 4.01	< 5.01
NLA12_MN-135	Lindgren	< 3.95	< 0.791	< 7.91	< 3.95	< 3.95	< 3.95	< 4.94

Lake number	Lake name	17 alpha-Dihydroequilin (ng/L)	Equilenin (ng/L)	Equilin (ng/L)	17 beta-Estradiol (ng/L)	17 alpha-Estradiol (ng/L)	Estrone (ng/L)	17 alpha-Ethinyl-Estradiol (ng/L)
NLA12_MN-136	unnamed	< 4.14	< 0.827	< 8.27	< 4.14	< 4.14	< 4.14	< 5.17
NLA12_MN-136 Blank		< 3.98	< 0.797	< 7.97	< 3.98	< 3.98	< 3.98	< 4.98
NLA12_MN-137	Cucumber	< 3.98	< 0.796	< 7.96	< 3.98	< 3.98	< 3.98	< 4.98
NLA12_MN-138A	Tenor	< 4.02	< 0.804	< 8.04	< 4.02	< 4.02	< 4.02	< 5.03
NLA12_MN-141	East Red River	< 3.93	< 0.785	< 7.85	< 3.93	< 3.93	< 3.93	< 4.91
NLA12_MN-143	unnamed	< 3.98	< 0.795	< 7.95	< 3.98	< 3.98	< 3.98	< 4.97
NLA12_MN-144	unnamed	< 3.91	< 1.09	< 7.82	< 5.08	< 3.91	< 3.91	< 4.89
NLA12_MN-145	Terrapin	< 3.98	< 0.795	< 7.95	< 3.98	< 3.98	< 3.98	< 4.97
NLA12_MN-147	Wilbur	< 3.77	< 0.754	< 7.54	< 3.77	< 3.77	< 3.77	< 4.71
NLA12_MN-150	Spree	< 3.94	< 0.788	< 7.88	< 3.94	< 3.94	< 3.94	< 4.93
NLA12_MN-152	61-0091	< 4.08	< 0.816	< 8.16	< 4.08	< 4.08	< 4.08	< 5.10
NLA12_MN-153	Bear	< 3.79	< 0.758	< 7.58	< 3.79	< 3.79	< 3.79	< 4.74
NLA12_MN-157	Glorvigan	< 3.84	< 0.769	< 7.69	< 3.84	< 3.84	< 3.84	< 4.80
NLA12_MN-158	unnamed	< 3.89	< 1.11	< 7.78	< 3.89	< 3.89	< 3.89	< 4.86
NLA12_MN-158 Blank		< 4.08	< 0.817	< 8.17	< 4.08	< 4.08	< 4.08	< 5.11
NLA12_MN-160	unnamed	< 3.96	< 0.793	< 7.93	< 3.96	< 3.96	< 3.96	< 4.96
NLA12_MN-162	Waymier	< 3.96	< 0.793	< 7.93	< 3.96	< 3.96	< 3.96	< 6.63
NLA12_MN-163	unnamed	< 3.96	< 0.792	< 7.92	< 3.96	< 3.96	< 3.96	< 4.95
NLA12_MN-167	unnamed	< 3.94	< 0.788	< 7.88	< 3.94	< 3.94	< 3.94	< 4.92
NLA12_MN-170A	unnamed	< 5.94	< 0.774	< 7.74	< 3.87	< 3.87	< 3.87	< 4.84
NLA12_MN-171	unnamed	< 3.83	< 3.17	< 7.65	< 3.83	< 3.83	< 3.83	< 4.78
NLA12_MN-171 Blank		< 3.92	< 0.935	< 7.85	< 3.92	< 3.92	< 3.92	< 4.90
NLA12_MN-177	unnamed	< 4.13	< 0.826	< 8.26	< 4.13	< 4.13	< 4.13	< 5.16
NLA12_MN-181	unnamed	< 4.01	< 0.802	< 8.02	< 4.01	< 4.01	< 4.01	< 5.01
NLA12_MN-206	unnamed	< 3.80	< 0.759	< 7.59	< 3.80	< 3.80	< 3.80	< 4.74
* Currently receives treated domestic wastewater.								

Table 5 Pharmaceuticals List 1

Lake number	Lake name	Acetaminophen (ng/L)	Azithromycin (ng/L)	Caffeine (ng/L)	Carbadox (ng/L)	Carbamazepine (ng/L)	Cefotaxime (ng/L)	Ciprofloxacin (ng/L)	Clarithromycin (ng/L)	Clinafloxacin (ng/L)	Cloxacillin (ng/L)	Dehydronifedipine (ng/L)	Diphenhydramine (ng/L)	Diltiazem (ng/L)	Digoxin (ng/L)	Digoxigenin (ng/L)	Enrofloxacin (ng/L)	Erythromycin-H_2O (ng/L)	Flumequine (ng/L)	Fluoxetine (ng/L)	Lincomycin (ng/L)	Lomefloxacin (ng/L)	Miconazole (ng/L)
NLA12_MN-101	Long	< 14.5	< 4.42	< 14.5	< 6.66	< 1.45	< 70.0	< 26.1	< 1.45	< 50.9	< 2.91	< 1.43	< 0.581	< 0.345	< 5.81	< 437	< 4.00	< 2.23	< 4.73	< 1.45	< 2.91	< 13.7	< 1.45
NLA12_MN-102	Spring	< 15.0	< 2.06	< 15.0	< 9.64	< 1.50		< 11.7	< 1.50	< 47.1	< 3.00	< 0.600	< 0.600	< 0.300	< 6.00	< 38.7	< 3.00	< 2.30	< 1.72	< 1.50		< 11.9	< 1.50
NLA12_MN-103	Lookout	< 16.6	< 3.19	17.5	< 15.6	< 1.56	< 6.25	< 38.4	< 1.56	< 156	< 3.12	< 3.14	< 0.625	< 0.602	< 6.25	< 346	< 4.62	< 2.40	< 2.24	< 1.56	< 3.12	< 17.2	< 2.10
NLA12_MN-104	Fairy	< 14.8	< 2.05	< 14.8	B 7.11	< 1.48	< 29.0	< 19.6	< 1.48	< 49.1	< 2.97	< 0.593	< 0.593	< 0.851	< 5.93	< 521	< 3.71	< 2.27	< 4.86	< 1.48	< 2.97	< 12.1	< 1.48
NLA12_MN-105	Becoosin	< 15.8	< 4.01	< 15.8	< 8.83	< 1.58		< 87.1	< 1.58	< 210	< 3.16	< 1.51	< 0.632	< 0.410	< 6.32	< 489	< 6.64	< 2.42	< 2.67	< 1.58		< 31.4	< 1.58
NLA12_MN-106	Darling	< 15.9	< 2.73	23.7	< 22.6	< 1.59	< 6.37	< 12.6	< 1.59	< 56.0	< 3.19	< 1.03	< 0.637	< 0.495	< 6.37	< 435	< 3.34	< 2.44	< 2.44	< 1.59	< 3.19	< 6.11	< 1.76
NLA12_MN-106 Duplicate		< 15.7	< 4.10	< 15.7	< 11.3	< 1.57	< 6.28	< 22.1	< 1.57	< 78.2	< 3.14	< 0.764	< 0.628	< 0.598	< 6.28	< 297	< 3.49	< 2.41	< 4.46	< 1.57	< 3.14	< 10.4	< 1.57
NLA12_MN-107	Cokato	< 14.9	< 1.84	< 14.9	< 6.13	< 1.49		< 5.94	< 1.49	< 9.79	< 2.97	< 0.620	< 0.594	< 0.301	< 5.94	< 605	< 2.97	< 2.28	< 1.49	1.77		< 9.24	< 1.49
NLA12_MN-108	Long	< 14.9	< 1.49	< 14.9	< 2.57	< 1.49		< 14.5	< 1.49	< 28.9	< 2.98	< 0.595	< 0.595	< 0.298	< 5.95	< 272	< 2.98	< 2.28	< 1.49	< 1.49		< 6.83	< 1.49
NLA12_MN-109	Richey	< 15.5	< 2.96	< 15.5	< 4.68	< 1.55	< 49.8	< 42.9	< 1.55	< 17.3	< 3.10	< 1.50	< 0.620	< 0.364	< 6.20	< 6.20	< 5.31	< 2.38	< 5.03	< 1.55	< 3.10	< 7.47	< 1.79
NLA12_MN-110	Crow Wing	< 15.3	< 2.52	< 15.3	< 1.53	< 1.53	< 47.5	< 26.1	< 1.53	< 86.9	< 3.07	< 1.04	< 0.613	< 0.493	< 6.13	< 805	< 5.93	< 2.35	< 3.11	< 1.53	< 3.07	< 24.9	< 1.53
NLA12_MN-111	Snail	< 15.3	< 1.81	< 15.3	8.9	< 1.53		< 42.7	< 1.53	< 89.1	< 3.06	< 0.613	< 0.613	< 0.344	< 6.13	< 390	< 3.20	< 2.35	< 1.53	< 1.53		< 8.74	< 1.53
NLA12_MN-112	Eagle	< 15.7	< 5.06	< 15.7	62.2	< 1.57	< 6.27	< 29.5	< 1.57	< 129	< 3.14	< 5.13	< 0.627	< 0.710	< 6.48	< 377	< 5.50	< 2.40	< 5.22	< 1.57	< 3.14	< 5.89	< 2.07
NLA12_MN-113	North Ash	< 15.1	K 11.7	< 15.1	< 13.6	< 1.51	< 66.6	< 21.7	< 1.51	< 128	< 3.01	< 1.73	< 0.603	< 0.835	< 6.03	< 753	< 3.85	< 2.31	< 5.33	< 1.51	< 3.01	< 9.19	< 1.62
NLA12_MN-114	Woodcock	< 15.2	< 3.84	< 15.2	35.1	< 1.52		< 27.3	< 1.52	< 72.1	< 3.03	< 1.46	< 0.606	< 0.304	< 6.06	< 1160	< 4.62	< 2.32	< 8.34	< 1.52	< 4.02	< 14.4	< 1.56
NLA12_MN-115	Round	< 15.0	< 2.13	20.3	< 7.34	< 1.50	< 6.01	< 12.3	< 1.50	< 55.9	< 3.00	< 0.737	0.7	< 0.361	< 6.01	< 253	< 3.07	< 2.30	< 2.61	< 1.50	< 3.00	< 7.02	< 1.50
NLA12_MN-115 duplicate		< 15.6	< 2.25	23.3	< 9.60	< 1.56	< 6.23	< 10.1	< 1.56	< 42.4	< 3.11	< 0.908	1.12	< 0.393	< 6.23	< 268	< 3.11	< 2.39	< 2.55	< 1.56	< 3.11	< 9.73	< 1.56
NLA12_MN-116	Nokomis	< 14.9	< 3.26	17.4	6.51	< 1.49	< 42.0	< 17.4	< 1.49	< 42.5	< 2.97	< 1.17	< 0.594	< 0.559	< 5.94	< 319	< 3.80	< 2.28	< 2.70	< 1.49	< 2.97	< 6.63	< 1.49
NLA12_MN-118*	South	< 15.8	< 3.27	42.9	75.9	36.7		< 91.7	< 1.58	< 9.84	< 3.16	< 0.631	0.634	< 0.323	< 6.31	< 886	< 5.22	< 2.42	< 3.94	< 1.58		< 3.96	< 1.77
NLA12_MN-119	Big Stone	< 14.9	< 3.69	< 19.7	43.3	< 1.49	< 5.98	< 18.8	< 1.49	< 96.6	< 2.99	< 2.05	< 0.598	< 0.905	< 5.98	< 429	< 3.20	< 2.29	< 7.45	< 1.49	< 2.99	< 12.7	< 1.56
NLA12_MN-120	Flat	< 15.0	< 1.72	< 15.0	< 6.85	< 1.50		< 26.7	< 1.50	< 17.2	< 3.00	< 0.599	< 0.599	< 0.391	< 5.99	< 39.4	< 3.60	< 2.30	< 1.50	< 1.50		< 11.7	< 1.50
NLA12_MN-121	Norway	< 15.0	< 5.45	24.8	31.9	< 1.50	< 5.99	< 20.8	< 1.50	< 57.0	< 2.99	< 1.38	< 0.713	< 1.54	< 5.99	< 678	< 3.95	< 2.30	< 9.75	< 1.50	< 2.99	< 7.86	< 2.11
NLA12_MN-122	Jennie	< 15.9	< 1.79	< 15.9	< 9.66	< 1.59		< 6.36	< 1.59	< 48.7	< 3.18	< 0.636	< 0.636	< 0.318	< 6.36	< 315	< 3.18	< 2.44	< 3.33	4.52		< 10.6	< 1.59

Lake number	Lake name	Acetaminophen (ng/L)	Azithromycin (ng/L)	Caffeine (ng/L)	Carbadox (ng/L)	Carbamazepine (ng/L)	Cefotaxime (ng/L)	Ciprofloxacin (ng/L)	Clarithromycin (ng/L)	Clinafloxacin (ng/L)	Cloxacillin (ng/L)	Dehydronifedipine (ng/L)	Diphenhydramine (ng/L)	Diltiazem (ng/L)	Digoxin (ng/L)	Digoxigenin (ng/L)	Enrofloxacin (ng/L)	Erythromycin-H_2O (ng/L)	Flumequine (ng/L)	Fluoxetine (ng/L)	Lincomycin (ng/L)	Lomefloxacin (ng/L)	Miconazole (ng/L)
NLA12_MN-123	unnamed	< 14.7	< 2.09	< 14.7	< 7.59	< 1.47	< 37.9	< 13.6	< 1.47	< 46.1	< 2.93	< 0.587	< 0.587	< 0.492	< 5.87	< 247	< 2.93	< 2.25	< 1.47	< 1.47	< 2.93	< 8.31	< 1.47
NLA12_MN-123 Duplicate		< 15.0	< 2.33	< 15.0	< 7.94	< 1.50	< 33.0	< 14.3	< 1.50	< 44.1	< 3.00	< 0.887	0.683	< 0.300	< 6.00	< 235	< 3.44	< 2.30	2.01	< 1.50	< 3.00	< 8.91	< 1.50
NLA12_MN-126	Diamond	< 14.9	< 1.78	< 14.9	< 1.49	< 1.49	< 49.0	< 5.95	< 1.49	< 78.1	< 2.97	< 0.841	< 0.595	< 0.297	< 5.95	< 67.0	< 2.97	< 2.28	< 2.80	< 1.49	< 2.97	< 14.0	< 1.49
NLA12_MN-127	unnamed	< 14.8	< 4.39	< 14.8	< 18.2	< 1.48		19.4	< 1.48	< 104	< 2.95	1.62	< 0.590	< 0.953	< 5.90	< 917	< 5.43	< 2.26	< 8.40	< 1.48	< 3.64	< 9.73	< 1.57
NLA12_MN-130A	Net	< 17.2	< 3.51	< 17.2	< 5.26	< 1.72		< 47.4	< 1.72	< 39.7	< 3.44	< 0.688	< 0.688	< 0.906	< 6.88	< 578	< 4.50	< 2.64	< 2.43	< 1.72		< 5.36	< 1.72
NLA12_MN-131	unnamed	< 15.8	< 5.01	< 21.5	24.4	< 1.58	< 120	< 25.8	< 1.58	< 125	< 3.15	< 3.03	< 0.631	< 0.736	< 6.31	< 817	< 4.13	< 2.42	< 6.26	< 1.58	< 3.31	< 13.7	< 1.96
NLA12_MN-132	Clear	< 15.0	< 3.30	< 15.0	16.3	< 1.50		< 21.6	< 1.50	< 95.4	< 3.00	< 0.600	< 0.600	< 0.472	< 6.00	< 833	< 3.00	< 2.30	< 2.17	< 1.50		< 21.7	< 1.50
NLA12_MN-135	Lindgren	< 14.9	< 7.25	< 30.9	113	< 1.49	< 5.97	< 34.1	< 1.49	< 116	< 2.99	< 3.40	< 0.597	< 1.63	< 5.97	< 1130	< 5.96	< 2.29	< 11.5	< 1.49	< 2.99	< 12.3	< 2.33
NLA12_MN-136	unnamed	< 15.4	< 1.54	< 15.4	< 1.54	< 1.54		< 6.16	< 1.54	< 24.6	< 3.08	< 0.648	< 0.616	< 0.308	< 6.16	< 11.6	< 3.08	< 2.36	< 1.54	< 1.54	< 3.08	< 3.08	< 1.54
NLA12_MN-136 Blank		< 15.0	< 2.20	< 15.0	< 6.18	< 1.50		< 11.8	< 1.50	< 61.5	< 3.01	< 1.08	< 0.601	< 0.371	< 6.01	< 461	< 4.43	< 2.30	< 7.80	< 1.50	< 3.01	< 18.5	< 1.50
NLA12_MN-137	Cucumber	< 15.5	< 5.26	< 15.5	58.1	< 1.55		< 84.0	< 1.55	< 124	< 3.10	< 1.32	< 0.620	< 0.680	< 6.20	< 829	< 3.21	< 2.38	< 6.34	3.8		< 5.40	< 1.79
NLA12_MN-138A	Tenor	< 14.9	< 5.31	< 14.9	< 5.97	< 1.49		< 96.1	< 2.28	< 84.1	< 2.97	< 0.751	< 0.594	< 0.375	< 5.94	< 924	< 4.35	< 2.28	< 3.42	< 1.49		< 33.5	< 1.49
NLA12_MN-141	East Red River	< 15.4	< 2.05	< 15.4	< 9.50	< 1.54	< 43.0	< 25.4	< 1.54	< 69.0	< 3.07	< 1.07	< 0.615	< 0.307	< 6.15	< 708	< 3.07	< 2.36	< 4.40	< 1.54	< 3.07	< 24.0	< 1.54
NLA12_MN-143	unnamed	< 15.6	< 5.49	< 18.2	< 18.0	< 1.56	< 130	< 25.2	< 1.56	< 125	< 3.12	< 2.14	< 0.625	< 0.780	< 6.25	< 477	< 4.32	< 2.39	< 4.90	< 1.56	< 3.12	< 7.84	< 2.48
NLA12_MN-144	unnamed	< 14.6	< 1.87	< 54.1	< 10.8	< 1.46		< 17.2	< 1.46	< 46.8	< 2.91	< 0.845	< 0.583	< 0.329	< 5.83	< 841	< 3.16	< 2.23	< 2.48	< 1.46	< 2.91	< 12.1	< 1.46
NLA12_MN-145	Terrapin	< 15.7	< 3.50	< 15.7	< 6.56	< 1.57		< 6.28	< 1.57	< 47.1	< 3.14	0.715	< 0.628	< 0.345	< 6.28	< 81.0	< 3.14	< 2.41	< 1.57	< 1.57		< 5.81	< 1.57
NLA12_MN-147	Wilbur	< 14.3	< 2.35	< 14.3	< 1.43	< 1.43	< 31.4	< 31.4	< 1.43	< 91.3	< 2.86	< 1.17	< 0.572	< 0.437	< 5.72	< 473	< 4.19	< 2.19	< 3.73	< 1.43	< 2.86	< 10.2	< 1.43
NLA12_MN-150	Spree	< 14.8	< 5.14	< 14.8	< 5.93	< 1.48		< 54.3	< 1.48	< 26.1	< 2.96	< 0.932	< 0.592	< 0.643	< 5.92	< 1180	< 3.24	< 2.27	< 1.82	< 1.48		< 11.7	< 1.48
NLA12_MN-152	61-0091	< 15.4	< 4.56	21.6	< 11.4	< 1.54	< 6.17	< 16.2	< 1.54	< 55.9	< 3.09	< 0.883	< 0.617	< 0.425	< 6.17	< 414	< 5.83	< 2.37	< 4.70	< 1.54	< 3.09	< 8.19	< 1.54
NLA12_MN-153	Bear	< 14.6	< 3.67	< 14.6	< 7.47	< 1.46	< 36.8	< 16.3	< 1.46	< 48.5	< 2.92	< 0.944	< 0.584	< 0.445	< 5.84	< 558	< 2.92	< 2.24	< 1.90	< 1.46	< 2.92	< 7.44	< 1.46
NLA12_MN-157	Glorvigan	< 14.3	< 3.63	< 14.3	< 7.89	< 1.43	< 68.3	< 5.71	< 1.43	< 8.13	< 2.85	< 1.54	< 0.571	< 0.872	< 5.71	< 5.71	< 4.75	< 2.19	< 5.55	< 1.43	< 2.85	< 18.2	< 1.93
NLA12_MN-158	unnamed	< 15.2	< 4.08	< 15.4	34.3	< 1.52		< 28.7	< 1.52	< 96.3	< 3.48	< 1.81	< 0.607	< 0.969	< 6.07	< 632	< 4.51	< 2.33	< 8.46	< 1.52	< 3.59	< 22.2	< 1.62
NLA12_MN-158 Blank		< 15.2	< 1.52	< 15.2	< 1.52	< 1.52		< 6.08	< 1.52	< 8.76	< 3.04	< 0.608	< 0.608	< 0.304	< 6.08	< 11.0	< 3.04	< 2.33	< 1.52	< 1.52	< 3.04	< 3.04	< 1.52
NLA12_MN-160	unnamed	< 14.9	< 4.72	< 15.1	< 13.5	< 1.49	< 5.96	< 19.3	< 1.49	< 102	< 2.98	< 1.67	< 0.596	< 0.535	< 5.96	< 603	< 5.94	< 2.29	< 2.06	< 1.49	< 2.98	< 12.6	< 1.72

Lake number	Lake name	Acetaminophen (ng/L)	Azithromycin (ng/L)	Caffeine (ng/L)	Carbadox (ng/L)	Carbamazepine (ng/L)	Cefotaxime (ng/L)	Ciprofloxacin (ng/L)	Clarithromycin (ng/L)	Clinafloxacin (ng/L)	Cloxacillin (ng/L)	Dehydronifedipine (ng/L)	Diphenhydramine (ng/L)	Diltiazem (ng/L)	Digoxin (ng/L)	Digoxigenin (ng/L)	Enrofloxacin (ng/L)	Erythromycin-H_2O (ng/L)	Flumequine (ng/L)	Fluoxetine (ng/L)	Lincomycin (ng/L)	Lomefloxacin (ng/L)	Miconazole (ng/L)
NLA12_MN-162	Waymier	< 14.8	< 5.24	< 25.8	< 22.0	< 1.48		< 38.7	< 1.48	< 165	< 4.87	< 3.90	< 0.592	< 0.709	< 7.84	< 1700	< 9.92	< 2.27	< 3.57	< 1.48	< 2.96	< 32.9	< 2.12
NLA12_MN-163	unnamed	< 14.5	< 2.14	< 14.5	< 7.79	< 1.45		< 33.4	< 1.45	< 79.7	< 2.90	< 0.579	< 0.579	< 0.328	< 5.79	< 392	< 2.94	< 2.22	< 3.11	< 1.45		< 9.04	< 1.45
NLA12_MN-167	unnamed	< 14.9	< 1.90	23.2	25	< 1.49	< 5.96	< 16.1	< 1.49	< 59.9	< 2.98	< 0.799	0.784	< 0.312	< 5.96	< 308	< 3.53	< 2.29	< 3.90	< 1.49	< 2.98	< 10.2	< 1.77
NLA12_MN-170A	unnamed	< 14.4	< 3.21	< 14.4	< 1.44	< 1.44		< 26.7	< 1.44	< 105	< 2.87	< 0.574	< 0.574	< 0.584	< 5.74	< 1270	< 3.62	< 2.20	< 3.02	< 1.44	< 2.87	< 27.5	< 1.44
NLA12_MN-171	unnamed	< 14.0	< 3.87	< 14.0	< 31.6	< 1.40		< 19.0	< 1.40	< 220	< 3.70	< 2.50	< 0.562	< 0.551	< 5.62	< 2000	< 10.3	< 2.15	< 3.14	< 1.40	< 2.81	< 37.2	< 2.12
NLA12_MN-171 Blank		< 15.0	< 1.50	< 15.0	< 1.50	< 1.50		< 8.30	< 1.50	< 16.8	< 3.00	< 0.599	< 0.599	< 0.300	< 5.99	< 5.99	< 3.13	< 2.30	< 1.50	< 1.50	< 3.00	< 8.92	< 1.50
NLA12_MN-177	unnamed	< 21.8	< 6.74	< 18.4	121	< 1.56	< 6.24	< 30.0	< 1.56	< 149	< 3.12	< 1.58	< 0.666	< 1.22	< 6.24	< 997	< 7.02	< 2.39	< 13.3	< 1.56	< 3.69	< 11.5	< 2.52
NLA12_MN-181	unnamed	< 15.0	< 2.29	< 17.0	< 10.1	< 1.50		< 17.1	< 1.50	< 90.5	< 3.33	< 0.599	< 0.599	< 0.667	< 5.99	< 1020	< 4.59	< 2.29	< 9.40	< 1.50	< 2.99	< 27.5	< 1.50
NLA12_MN-206	unnamed	< 14.5	< 3.69	< 14.5	< 4.64	< 1.45		< 41.1	< 1.45	< 191	< 2.90	< 0.832	< 0.579	< 0.920	< 5.79	< 526	< 4.09	< 2.22	< 1.50	< 1.45		< 2.90	< 1.45
* Currently receives treated domestic wastewater.																							

Table 5 Pharmaceuticals List 1 continued

Lake number	Lake name	Norflox acin (ng/L)	Norgest imate (ng/L)	Oflox acin (ng/L)	Ormeto prim (ng/L)	Oxacillin (ng/L)	Oxolinic Acid (ng/L)	Penicillin G (ng/L)	Penicillin V (ng/L)	Roxithro mycin (ng/L)	Sarafl oxacin (ng/L)	Sulfachloro pyridazine (ng/L)	Sulfad iazine (ng/L)	Sulfadim ethoxine (ng/L)	Sulfam erazine (ng/L)	Sulfameth azine (ng/L)	Sulfameth izole (ng/L)	Sulfametho xazole (ng/L)	Sulfanila mide (ng/L)	Sulfathi azole (ng/L)	Thiabend azole (ng/L)	Trimetho prim (ng/L)	Tylosin (ng/L)	Virginia mycin (ng/L)	1,7-Dimethylxan thine (ng/L)
NLA12_MN-101	Long	< 44.8	< 11.6	< 2.67	< 0.581	< 3.68	< 2.80	< 2.91	< 6.35	< 0.291	< 14.5	< 3.75	< 1.45	< 1.02	< 1.85	< 9.21	< 2.75	< 3.30	< 14.5	< 2.25	< 1.45	< 2.47	< 5.81	< 37.3	< 58.1
NLA12_MN-102	Spring	< 71.3	< 3.00	< 2.30	< 0.600	< 3.00	< 0.842	< 3.00		< 0.300	< 15.0	< 3.07	< 1.50	< 0.646	< 1.54	< 1.70	< 0.600	< 1.69	< 15.0	< 1.50	< 1.50	< 2.02	< 6.00	< 29.9	< 60.0
NLA12_MN-103	Lookout	< 89.8	< 16.5	< 4.22	< 1.01	< 3.54	< 1.43	< 3.12	< 3.12	< 0.312	< 16.0	< 2.26	< 1.56	< 0.312	< 2.08	< 9.04	< 3.08	< 2.08	< 15.6	< 2.65	< 1.56	< 1.56	< 6.25	< 41.4	< 62.5
NLA12_MN-104	Fairy	< 52.3	< 10.8	< 3.01	< 0.593	< 2.97	< 2.40	< 9.89	< 2.97	< 0.297	< 23.3	< 2.34	< 1.48	< 1.02	< 2.28	< 2.22	< 0.593	< 0.593	< 14.8	< 2.06	< 1.48	< 2.60	< 5.93	< 28.1	< 59.3
NLA12_MN-105	Becoosin	< 188	< 3.16	< 4.92	< 0.632	< 3.16	< 2.50	< 3.16		< 0.643	< 15.8	< 18.3	< 3.31	< 1.09	< 3.75	< 18.3	< 0.632	< 2.79	< 15.8	< 1.58	< 1.58	< 2.37	< 6.83	< 75.7	< 63.2
NLA12_MN-106	Darling	< 49.1	< 17.0	< 3.12	< 0.637	< 5.12	< 0.694	< 3.19	< 3.19	< 0.319	< 15.9	< 1.92	< 1.59	< 2.25	< 2.12	< 3.09	< 1.71	< 2.12	< 15.9	< 2.24	< 1.59	< 2.96	< 6.37	< 14.0	< 63.7
NLA12_MN-106 Duplicate		< 37.9	< 11.0	< 3.70	< 0.628	< 3.14	< 5.46	< 3.14	< 3.14	< 0.314	< 15.7	< 3.29	< 1.57	< 1.01	< 2.09	< 8.85	< 1.85	< 2.09	< 15.7	< 2.11	< 1.57	< 1.57	< 6.28	< 22.1	< 62.8
NLA12_MN-107	Cokato	< 53.5	< 2.97	< 2.67	< 0.594	< 2.97	< 1.03	< 2.97		< 0.297	< 14.9	< 3.97	< 1.67	< 0.297	< 1.71	5.54	< 0.594	< 1.60	< 14.9	< 1.49	< 1.49	< 2.68	< 5.94	< 5.41	< 59.4
NLA12_MN-108	Long	< 36.2	< 2.98	< 2.30	< 0.595	< 2.98	< 0.595	< 2.98		< 0.298	< 14.9	< 3.13	< 1.49	< 0.298	< 1.42	< 2.16	< 0.595	< 0.689	< 14.9	< 1.49	< 1.49	< 1.55	< 5.95	< 7.34	< 59.5
NLA12_MN-109	Richey	< 15.5	< 31.6	< 3.58	< 0.620	< 3.10	< 0.620	< 3.10	< 10.3	< 0.310	< 15.5	< 1.55	< 2.27	< 1.05	< 3.76	< 6.29	< 4.53	< 0.620	< 15.5	< 1.55	< 1.55	< 3.69	< 6.20	< 7.33	< 65.8
NLA12_MN-110	Crow Wing	< 63.1	< 20.2	< 4.83	< 0.613	< 3.07	< 1.05	< 3.07	< 10.2	< 0.307	< 15.3	< 1.53	< 1.53	< 0.307	< 0.613	< 4.76	< 2.10	< 3.83	< 15.3	< 1.53	< 1.53	< 2.44	< 6.13	< 34.0	< 69.7
NLA12_MN-111	Snail	< 24.1	< 3.06	< 4.20	< 0.613	< 3.06	< 2.11	< 3.06		< 0.306	< 15.3	< 2.94	< 1.53	< 0.408	< 1.33	< 2.34	< 0.613	< 0.613	< 15.3	< 1.53	< 1.53	< 2.41	< 6.13	< 5.49	< 61.3
NLA12_MN-112	Eagle	< 107	< 25.4	< 2.73	< 0.627	< 7.12	< 4.27	< 3.14	< 6.30	< 0.314	< 15.7	< 4.80	< 1.69	< 1.44	< 2.09	< 14.6	< 1.93	< 2.09	< 15.7	< 4.21	< 1.57	< 3.37	< 6.27	< 34.5	< 62.7
NLA12_MN-113	North Ash	< 74.6	< 18.6	< 3.41	< 0.911	< 5.30	< 4.63	< 3.01	< 3.10	< 0.301	< 15.1	< 4.11	< 1.51	< 1.00	< 1.25	< 4.78	< 2.27	< 1.17	< 15.1	< 2.92	< 1.51	< 2.79	< 6.03	< 35.9	< 60.3
NLA12_MN-114	Woodcock	< 54.3	< 24.2	< 4.33	< 1.22	< 7.22	< 4.44	< 3.78	< 14.8	< 0.303	< 15.2	< 5.08	< 1.52	< 0.331	< 2.47	< 6.30	< 3.10	< 1.69	< 15.2	18.1	< 1.52	< 2.31	< 6.06	< 41.9	< 60.6
NLA12_MN-115	Round	< 36.0	< 13.7	< 2.70	< 0.601	< 3.00	< 1.83	< 3.00	< 3.00	< 0.300	< 15.0	< 1.50	< 1.50	< 1.41	< 2.00	< 1.33	< 1.49	< 2.49	< 15.0	< 1.50	< 1.50	< 1.50	< 6.01	< 12.3	< 60.1
NLA12_MN-115 duplicate		< 32.6	< 11.5	< 1.86	< 0.623	< 3.11	< 2.06	< 3.11	< 4.37	< 0.311	< 15.6	< 2.03	< 1.56	< 0.813	< 2.08	< 1.80	< 1.34	< 2.08	< 15.6	< 1.62	< 1.56	< 1.56	< 6.23	< 12.2	< 62.3
NLA12_MN-116	Nokomis	< 48.6	< 14.1	< 2.51	< 0.594	< 6.44	< 0.686	< 2.97	< 2.97	< 0.297	< 14.9	< 1.50	< 1.49	< 0.845	< 1.75	< 2.74	< 0.844	< 1.51	< 14.9	< 1.52	3.98	< 1.49	< 5.94	< 26.1	< 59.4
NLA12_MN-118*	South	< 211	< 3.16	8.94	< 0.631	< 3.16	< 3.02	< 3.16		< 0.322	< 15.8	< 16.5	< 2.45	< 0.667	< 2.31	134	< 0.631	57.1	< 15.8	< 2.87	< 1.58	< 4.42	< 6.31	< 43.3	< 63.1
NLA12_MN-119	Big Stone	< 59.9	< 30.3	< 3.49	< 0.598	< 2.99	< 3.54	< 2.99	< 2.99	< 0.299	< 14.9	< 1.78	< 1.49	< 2.73	< 1.99	< 2.69	< 1.86	< 1.99	< 14.9	< 2.02	< 1.49	< 1.49	< 5.98	< 21.9	< 59.8
NLA12_MN-120	Flat	< 33.1	< 3.00	< 4.44	< 0.599	H 3.08	< 2.01	< 3.00		< 0.300	< 15.0	< 4.69	< 1.50	< 0.335	< 1.09	< 1.98	2.48	< 0.976	< 15.0	< 1.50	< 1.50	< 3.30	< 5.99	< 30.4	< 59.9
NLA12_MN-121	Norway	< 55.4	< 26.8	< 4.69	< 0.599	< 7.80	< 1.76	< 2.99	< 2.99	< 0.299	< 15.0	< 3.57	< 1.50	< 1.18	< 2.36	< 5.69	< 2.13	< 2.00	< 15.0	< 2.45	< 1.50	< 1.50	< 5.99	< 43.6	< 59.9
NLA12_MN-122	Jennie	< 50.3	< 3.18	< 2.66	< 0.636	< 3.18	< 2.81	< 3.18		< 0.318	< 15.9	< 3.10	< 1.59	< 0.318	< 1.11	< 1.73	< 0.636	< 0.712	< 15.9	< 1.59	< 1.59	< 1.65	< 6.36	< 4.42	< 63.6
NLA12_MN-123	unnamed	< 37.7	< 10.6	< 2.42	< 0.587	< 4.69	< 1.11	< 2.93	< 2.93	< 0.293	< 14.7	< 2.13	< 1.47	< 0.367	< 1.01	< 1.93	< 0.919	< 2.18	< 14.7	< 1.64	< 1.47	< 1.88	< 5.87	< 20.4	< 58.7

Lake number	Lake name	Norfloxacin (ng/L)	Norgestimate (ng/L)	Ofloxacin (ng/L)	Ormetoprim (ng/L)	Oxacillin (ng/L)	Oxolinic Acid (ng/L)	Penicillin G (ng/L)	Penicillin V (ng/L)	Roxithromycin (ng/L)	Sarafloxacin (ng/L)	Sulfachloropyridazine (ng/L)	Sulfadiazine (ng/L)	Sulfadimethoxine (ng/L)	Sulfamerazine (ng/L)	Sulfamethazine (ng/L)	Sulfamethizole (ng/L)	Sulfamethoxazole (ng/L)	Sulfanilamide (ng/L)	Sulfathiazole (ng/L)	Thiabendazole (ng/L)	Trimethoprim (ng/L)	Tylosin (ng/L)	Virginiamycin (ng/L)	1,7-Dimethylxanthine (ng/L)
NLA12_MN-123 Duplicate		< 42.8	< 11.2	< 2.25	< 0.600	< 3.48	< 1.96	< 3.00	< 3.00	< 0.300	< 15.0	< 2.34	< 1.50	< 0.384	< 0.699	< 2.52	< 1.06	< 1.26	< 15.0	< 1.51	< 1.50	< 1.68	< 6.00	< 19.7	< 60.0
NLA12_MN-126	Diamond	< 14.9	< 23.9	< 2.18	< 0.595	< 2.97	< 1.57	< 2.97	< 9.92	< 0.297	< 14.9	< 1.49	< 1.49	< 0.297	< 0.595	< 3.43	< 1.52	< 1.78	< 14.9	< 1.49	< 1.49	< 1.52	< 5.95	< 3.76	< 69.8
NLA12_MN-127	unnamed	< 70.4	< 21.8	< 3.48	< 1.64	< 4.40	< 5.33	< 2.95	< 4.54	< 0.295	< 14.8	< 6.42	< 1.52	< 1.18	< 5.52	< 8.93	< 7.38	< 2.29	< 14.8	18.9	< 1.48	< 3.11	< 5.90	< 74.0	< 59.0
NLA12_MN-130A	Net	< 81.1	< 8.77	< 5.00	< 0.688	< 3.44	< 0.688	< 3.44		< 0.344	< 17.2	< 4.80	< 1.83	< 0.615	< 2.12	< 2.96	< 0.688	< 1.32	< 17.2	< 1.72	< 1.72	< 2.01	< 6.88	< 34.6	< 68.8
NLA12_MN-131	unnamed	< 51.7	< 16.2	< 3.25	< 0.631	< 9.15	< 1.10	< 3.15	< 4.13	< 0.315	< 16.9	< 6.48	< 1.58	3.52	12.5	< 3.56	< 4.69	< 5.85	< 15.8	< 3.73	< 1.58	< 3.16	< 6.31	< 37.1	< 63.1
NLA12_MN-132	Clear	< 72.8	< 3.00	< 3.37	< 0.600	< 3.00	< 1.85	< 3.00		< 0.300	< 15.0	< 5.04	< 1.50	< 0.981	< 1.10	< 2.01	< 0.600	< 2.09	< 15.0	< 1.50	< 1.50	< 3.42	< 6.00	< 39.3	< 60.0
NLA12_MN-135	Lindgren	< 91.6	< 25.8	< 7.66	< 0.597	< 5.70	< 2.75	< 2.99	< 7.35	< 0.299	< 15.8	< 3.88	< 1.49	< 3.71	< 1.99	< 4.73	< 4.69	< 1.99	< 14.9	18.1	< 1.49	< 1.49	< 5.97	< 42.4	< 59.7
NLA12_MN-136	unnamed	< 21.7	< 3.22	< 1.54	< 0.616	< 3.08	< 0.616	< 3.08	< 3.08	< 0.308	< 15.4	< 1.54	< 1.54	< 0.308	< 0.616	< 0.673	< 0.616	< 0.616	< 15.4	< 1.54	< 1.54	< 1.54	< 6.16	< 3.21	< 61.6
NLA12_MN-136 Blank		< 61.3	< 12.0	< 2.49	< 0.601	< 4.58	< 3.68	< 4.01	< 4.19	< 0.301	< 15.0	< 1.50	< 1.50	< 0.527	< 1.98	< 4.22	< 3.85	< 2.22	< 15.0	< 2.30	< 1.50	< 2.01	< 6.01	< 27.3	< 60.1
NLA12_MN-137	Cucumber	< 39.0	< 3.10	< 4.20	< 0.620	< 3.10	< 13.6	< 3.10		< 0.447	< 15.5	< 5.25	< 2.74	< 1.49	< 4.43	< 5.10	< 0.620	< 4.37	< 15.5	< 1.55	< 1.55	< 7.17	< 6.20	< 87.4	< 62.0
NLA12_MN-138A	Tenor	< 224	< 2.97	< 5.25	< 0.594	< 2.97	< 1.01	< 2.97		< 0.442	< 14.9	< 14.9	< 3.79	< 0.331	< 4.55	< 10.3	< 0.594	< 5.01	< 14.9	< 1.49	< 1.49	< 1.95	< 12.7	< 35.5	< 59.4
NLA12_MN-141	East Red River	< 50.8	< 7.63	< 4.74	< 0.615	< 3.07	< 0.615	< 3.07	< 10.2	< 0.307	< 15.4	< 1.54	< 1.54	< 0.307	< 0.615	< 2.54	< 2.09	< 0.615	< 15.4	< 1.54	< 1.54	< 1.67	< 6.15	< 13.1	< 67.4
NLA12_MN-143	unnamed	< 87.5	< 26.1	< 3.15	< 0.625	< 5.95	< 6.19	< 3.12	< 5.14	< 0.312	< 15.6	< 2.35	< 1.56	< 4.94	< 2.08	< 5.08	< 1.66	< 2.08	< 15.6	< 2.56	< 1.56	< 1.56	< 6.25	< 33.1	< 62.5
NLA12_MN-144	unnamed	< 71.1	< 16.4	< 3.03	< 0.857	< 2.91	< 4.46	< 2.91	< 7.00	< 0.291	< 17.6	< 2.23	< 1.46	< 0.291	< 2.33	< 6.77	< 1.87	< 3.27	< 14.6	< 2.18	< 1.46	3.51	< 5.83	< 22.0	< 58.3
NLA12_MN-145	Terrapin	< 81.4	< 3.14	< 4.13	< 0.628	< 3.14	< 1.53	< 3.14		< 0.314	< 15.7	< 1.64	< 1.57	< 1.04	< 2.80	< 2.93	< 0.628	< 1.66	< 15.7	< 1.57	< 1.57	< 2.47	< 6.28	< 18.5	< 62.8
NLA12_MN-147	Wilbur	< 66.8	< 8.24	< 3.61	< 0.572	< 5.56	< 2.17	< 2.86	< 3.05	< 0.286	< 14.3	< 3.21	< 1.43	< 0.291	< 1.07	< 2.85	< 0.996	< 2.25	< 14.3	< 1.80	< 1.43	< 1.88	< 5.72	< 13.9	< 57.2
NLA12_MN-150	Spree	< 145	< 2.96	< 3.59	< 0.592	< 2.96	< 2.13	< 2.96		< 0.395	< 14.8	< 17.6	< 3.48	< 0.772	< 3.31	< 8.18	< 0.592	< 4.24	< 14.8	< 1.48	< 1.48	< 3.25	< 6.11	< 71.2	< 59.2
NLA12_MN-152	61-0091	< 44.1	< 12.5	< 2.84	< 0.617	< 3.09	< 3.75	< 3.09	< 4.59	< 0.309	< 15.4	< 1.68	< 1.54	< 0.391	< 2.06	< 4.70	< 3.62	< 3.28	< 15.4	32.8	< 1.54	< 1.54	< 6.17	< 18.8	< 61.7
NLA12_MN-153	Bear	< 56.7	< 24.6	< 1.67	< 0.584	< 4.53	< 2.42	< 2.92	< 2.92	< 0.292	< 14.6	< 2.36	< 1.46	< 0.857	< 1.23	< 4.31	< 1.91	< 2.78	< 14.6	< 2.27	< 1.46	< 2.47	< 5.84	< 29.3	< 58.4
NLA12_MN-157	Glorvigan	< 56.7	< 35.9	< 3.47	< 0.571	< 2.85	< 2.27	< 2.85	< 9.52	< 0.285	< 14.3	< 1.43	< 1.43	< 0.383	< 0.571	< 5.25	< 4.59	< 4.82	< 14.3	< 2.58	< 1.43	< 3.59	< 5.71	< 51.0	< 77.5
NLA12_MN-158	unnamed	< 134	< 30.4	< 4.49	< 0.607	< 5.47	< 1.76	< 6.46	< 6.86	< 0.304	< 15.2	< 1.52	< 1.74	< 3.20	< 3.33	< 14.1	< 3.89	< 4.56	< 15.2	< 4.32	< 1.52	< 2.57	< 6.07	< 42.8	< 60.7
NLA12_MN-158 Blank		< 15.2	< 3.85	< 1.52	< 0.608	< 3.04	< 0.608	< 3.04	< 3.04	< 0.304	< 15.2	< 1.52	< 1.52	< 0.313	< 0.608	< 0.875	< 0.608	< 0.608	< 15.2	< 1.52	< 1.52	< 1.52	< 6.08	< 3.04	< 60.8
NLA12_MN-160	unnamed	< 54.6	< 42.9	< 3.36	< 1.76	< 4.28	< 9.67	< 2.98	< 2.98	< 0.298	< 19.3	< 2.07	< 1.74	< 1.06	2.89	< 3.14	< 4.18	< 4.82	< 14.9	< 3.78	< 1.49	< 1.49	< 5.96	< 33.2	< 59.6
NLA12_MN-162	Waymier	< 142	< 55.1	< 4.82	< 0.592	< 14.0	< 7.29	< 2.96	< 5.15	< 0.296	< 54.7	< 9.02	< 2.55	< 5.58	< 5.05	< 7.61	< 4.45	< 5.47	< 14.8	< 1.48	< 1.48	< 2.96	< 5.92	< 60.1	< 59.2
NLA12_M	unnamed	< 94.1	< 2.90	< 3.06	< 0.579	< 2.90	< 0.579	< 2.90		< 0.290	< 14.5	< 4.35	< 1.53	< 0.290	< 1.88	< 2.30	< 0.579	< 1.45	< 14.5	< 1.45	< 1.45	< 1.95	< 5.79	< 18.6	< 57.9

Lake number	Lake name	Norflox acin (ng/L)	Norgest imate (ng/L)	Oflox acin (ng/L)	Ormeto prim (ng/L)	Oxacillin (ng/L)	Oxolinic Acid (ng/L)	Penicillin G (ng/L)	Penicillin V (ng/L)	Roxithro mycin (ng/L)	Sarafl oxacin (ng/L)	Sulfachloro pyridazine (ng/L)	Sulfad iazine (ng/L)	Sulfadim ethoxine (ng/L)	Sulfam erazine (ng/L)	Sulfameth azine (ng/L)	Sulfameth izole (ng/L)	Sulfametho xazole (ng/L)	Sulfanila mide (ng/L)	Sulfathi azole (ng/L)	Thiabend azole (ng/L)	Trimetho prim (ng/L)	Tylosin (ng/L)	Virginia mycin (ng/L)	1,7-Dimethylxan thine (ng/L)
N-163																									
NLA12_MN-167	unnamed	< 53.8	< 15.5	< 2.45	< 0.596	< 3.07	< 1.79	< 2.98	< 2.98	< 0.298	< 14.9	< 2.10	< 1.49	< 1.41	< 1.99	< 2.70	< 1.98	< 1.99	< 14.9	15.5	< 1.49	< 1.49	< 5.96	< 23.1	< 59.6
NLA12_MN-170A	unnamed	< 89.4	< 25.0	< 3.80	< 0.574	< 5.25	< 5.35	< 2.87	< 3.28	< 0.287	< 40.9	< 5.41	< 1.44	< 0.585	< 2.06	< 7.43	< 2.70	< 3.19	< 14.4	< 1.44	< 1.44	< 2.19	< 5.74	< 36.6	< 57.4
NLA12_MN-171	unnamed	< 77.9	< 33.5	< 7.27	< 2.14	< 7.06	< 3.17	< 7.95	< 6.56	< 0.281	< 29.7	< 14.7	< 1.40	< 1.07	< 2.93	< 8.17	< 5.10	< 8.32	< 14.0	< 4.23	< 1.40	6.22	< 5.62	< 43.3	< 62.1
NLA12_MN-171 Blank		< 25.4	< 10.6	< 2.13	< 0.599	< 3.00	< 0.599	< 3.00	< 3.17	< 0.300	< 15.0	< 1.50	< 1.50	< 0.300	< 0.599	< 2.00	< 0.599	< 2.00	< 15.0	< 1.50	< 1.50	< 1.50	< 5.99	< 3.50	< 59.9
NLA12_MN-177	unnamed	< 110	< 36.2	< 3.54	< 2.17	< 11.9	< 7.44	< 3.12	< 7.88	< 0.312	< 21.0	< 4.08	< 1.73	< 0.561	< 2.08	< 13.0	< 2.64	< 2.08	< 15.6	< 4.94	< 1.56	< 1.56	< 6.24	< 62.0	< 62.4
NLA12_MN-181	unnamed	< 58.5	< 13.1	< 2.46	< 0.599	< 3.72	< 1.50	< 2.99	< 4.91	< 0.299	< 27.9	< 5.88	< 1.50	< 1.33	< 1.77	< 5.03	< 3.09	< 3.43	< 15.0	< 1.50	< 1.50	< 3.65	< 5.99	< 26.2	< 59.9
NLA12_MN-206	unnamed	< 99.5	< 2.90	< 5.58	< 0.579	< 2.90	< 7.67	< 2.90		< 0.294	< 14.5	< 5.78	< 2.32	< 0.541	< 2.03	< 7.78	< 0.579	< 2.89	< 14.5	< 1.45	< 1.45	< 3.46	< 5.79	< 39.9	< 57.9

* Currently receives treated domestic wastewater.

Table 6 Pharmaceuticals List 2

Lake number	Lake name	Anhydro-chlortetracycline [ACTC] (ng/L)	Anhydro-tetracycline [ATC] (ng/L)	Chlortetracycline [CTC] (ng/L)	Demeclocycline (ng/L)	Doxycycline (ng/L)	4-Epianhydro-chlortetracycline [EACTC] (ng/L)	4-Epianhydro-tetracycline [EATC] (ng/L)	4-Epichlor-tetracycline [ECTC] (ng/L)	4-Epioxy-tetracycline [EOTC] (ng/L)	4-Epi-tetracycline [ETC] (ng/L)	Isochlor-tetracycline [ICTC] (ng/L)	Minocycline (ng/L)	Oxy-tetracycline [OTC] (ng/L)	Tetracycline [TC] (ng/L)
NLA12_MN-101	Long	< 188	< 92.2	< 11.3	< 29.5	< 21.5	< 369	< 174	< 27.8	< 13.2	< 33.9	< 15.7	< 463	< 12.9	< 17.2
NLA12_MN-102	Spring	< 34.8	< 36.6		< 17.5	< 9.37	< 93.7	< 64.8	< 22.3	< 14.5	< 8.58	< 7.79	< 184	< 9.88	< 6.93
NLA12_MN-103	Lookout	< 29.0	< 15.6	< 20.8	< 15.6	< 6.25	< 62.5	< 15.6	< 15.6	< 20.8	< 6.25	< 6.25	< 521	< 7.07	< 6.25
NLA12_MN-104	Fairy	< 34.7	< 38.1	< 8.56	< 14.8	< 5.93	< 59.3	< 14.8	< 53.8	< 19.8	< 17.5	< 5.93	< 375	< 9.88	< 6.96
NLA12_MN-105	Becoosin	< 61.9	< 64.4		< 21.1	< 12.9	< 63.2	< 133	< 33.7	< 24.2	< 6.32	< 12.0	< 288	< 14.9	< 6.32
NLA12_MN-106	Darling	< 21.8	< 15.9	< 21.2	< 16.6	< 6.37	< 63.7	< 15.9	< 15.9	< 21.2	< 6.37	< 6.37	< 531	< 6.37	< 6.37
NLA12_MN-106 Duplicate		< 18.7	< 15.7	< 20.9	< 15.7	< 6.28	< 62.8	< 15.7	< 15.7	< 20.9	< 6.28	< 9.08	< 523	< 6.28	< 6.28
NLA12_MN-107	Cokato	< 27.8	< 34.8		< 19.3	< 9.18	< 78.1	< 60.5	< 25.3	< 13.9	< 10.7	< 8.49	< 155	< 9.56	< 8.14
NLA12_MN-108	Long	< 23.3	< 36.0		< 16.2	< 8.72	< 68.1	< 63.3	< 15.3	< 7.92	< 6.91	< 5.95	< 102	< 6.55	< 5.96
NLA12_MN-109	Richey	< 47.5	< 39.6	< 9.12	< 25.3	< 7.15	< 207	< 15.5	< 15.5	< 20.7	< 33.2	< 7.17	< 475	< 10.1	< 11.1
NLA12_MN-110	Crow Wing	< 49.7	< 20.0	< 8.43	< 19.0	< 6.13	< 204	< 41.6	< 15.3	< 20.4	< 25.4	< 7.36	< 444	< 6.80	< 8.90
NLA12_MN-111	Snail	< 28.8	< 25.0		< 17.0	< 8.46	< 80.8	< 35.1	< 18.3	< 6.13	< 7.62	< 7.58	< 61.3	< 8.43	< 6.42
NLA12_MN-112	Eagle	< 37.7	< 15.7	< 20.9	< 33.1	< 6.90	< 62.7	< 15.7	< 15.7	< 20.9	< 6.27	< 8.04	< 596	< 6.27	< 7.95
NLA12_MN-113	North Ash	< 187	< 87.3	< 11.3	< 20.4	< 20.5	< 330	< 15.1	< 27.5	< 15.5	< 32.5	< 12.6	< 578	< 15.1	< 15.9
NLA12_MN-114	Woodcock	< 32.3	< 17.0	< 10.5	< 23.3	< 10.0	< 112	< 21.5	< 39.2		< 18.6	< 6.06	< 135	< 11.7	< 8.55
NLA12_MN-115	Round	< 23.3	< 15.0	< 20.0	< 15.0	< 6.01	< 60.1	< 15.0	< 15.0	< 20.0	< 6.01	< 6.01	< 501	< 6.01	< 6.01
NLA12_MN-115 duplicate		< 20.2	< 15.6	< 20.8	< 15.6	< 6.23	< 62.3	< 15.6	< 15.6	< 20.8	< 6.23	< 6.23	< 519	< 6.23	< 6.23
NLA12_MN-116	Nokomis	< 160	< 87.7	< 12.9	< 14.9	< 19.8	< 171	< 14.9	< 32.4	< 11.4	< 24.4	< 8.43	< 218	< 11.0	< 10.1
NLA12_MN-118*	South	< 50.1	< 69.4		< 27.0	< 11.5	< 63.9	< 145	< 38.7	< 6.31	< 11.5	< 7.13	< 196	< 10.5	< 8.73

Lake number	Lake name	Anhydro-chlortetracycline [ACTC] (ng/L)	Anhydro-tetracycline [ATC] (ng/L)	Chlortetracycline [CTC] (ng/L)	Demeclocycline (ng/L)	Doxycycline (ng/L)	4-Epianhydro-chlortetracycline [EACTC] (ng/L)	4-Epianhydro-tetracycline [EATC] (ng/L)	4-Epichlor-tetracycline [ECTC] (ng/L)	4-Epioxy-tetracycline [EOTC] (ng/L)	4-Epi-tetracycline [ETC] (ng/L)	Isochlor-tetracycline [ICTC] (ng/L)	Minocycline (ng/L)	Oxy-tetracycline [OTC] (ng/L)	Tetracycline [TC] (ng/L)
NLA12_MN-119	Big Stone	< 29.5	< 14.9	< 19.9	< 14.9	< 5.98	< 59.8	< 14.9	< 14.9	< 19.9	< 5.98	< 5.98	< 498	< 5.98	< 5.98
NLA12_MN-120	Flat	< 31.5	< 35.8		< 26.6	< 9.84	< 86.4	< 62.6	< 41.5	< 10.0	< 14.1	< 9.20	< 177	< 7.64	< 10.1
NLA12_MN-121	Norway	< 23.5	< 15.0	< 20.0	< 15.0	< 5.99	< 59.9	< 15.0	< 15.0	< 20.0	< 5.99	< 5.99	< 499	< 5.99	< 5.99
NLA12_MN-122	Jennie	< 26.7	< 24.8		< 21.9	< 9.11	< 76.8	< 33.6	< 28.5	< 16.3	< 9.54	< 10.2	< 129	< 11.0	< 7.60
NLA12_MN-123	unnamed	< 155	< 58.8	< 11.8	< 21.0	< 20.1	< 154	< 105	< 29.1	< 12.4	< 28.9	< 17.1	< 468	< 12.0	< 13.5
NLA12_MN-123 Duplicate		< 165	< 77.1	< 15.0	< 15.0	< 20.0	< 197	< 15.0	< 38.5	< 12.2	< 28.1	< 13.1	< 482	< 11.7	< 12.7
NLA12_MN-126	Diamond	< 33.5	< 14.9	< 8.06	< 16.2	< 5.95	< 198	< 14.9	< 14.9	< 19.8	< 7.63	< 5.95	< 270	< 5.95	< 5.95
NLA12_MN-127	unnamed	< 21.2	< 17.3	< 11.0	< 21.2	< 9.21	< 59.0	< 14.8	< 43.3		< 14.3	< 5.90	< 121	< 10.7	< 7.06
NLA12_MN-130A	Net	< 36.5	< 45.0		< 23.4	< 11.0	< 99.9	< 81.8	< 26.2	< 6.88	< 9.31	< 8.28	< 235	< 12.3	< 7.64
NLA12_MN-131	unnamed	< 22.7	< 15.8	< 21.0	< 15.8	< 6.54	< 63.1	< 15.8	< 15.8	< 21.0	< 6.31	< 6.63	< 610	< 6.53	< 6.31
NLA12_MN-132	Clear	< 41.3	< 40.6		< 19.4	< 6.99	< 108	< 74.7	< 32.9	< 12.4	< 9.17	< 11.6	< 164	< 8.85	< 7.26
NLA12_MN-135	Lindgren	< 81.6	< 14.9	< 19.9	< 15.4	< 7.67	< 59.7	< 14.9	< 14.9	< 19.9	< 5.97	< 13.7	< 699	< 7.00	< 5.97
NLA12_MN-136	unnamed	< 16.8	< 15.4	< 6.43	< 15.4	< 6.16	< 61.6	< 15.4	< 15.4		< 6.16	< 6.16	< 61.6	< 6.16	< 6.16
NLA12_MN-136 Blank		< 22.1	< 19.0	< 8.07	< 21.5	< 8.52	< 60.1	< 28.8	< 22.3		< 8.97	< 6.01	< 92.1	< 7.38	< 6.01
NLA12_MN-137	Cucumber	< 60.4	< 45.5		< 32.8	< 7.16	< 70.8	< 86.0	< 55.8	< 6.35	< 14.9	< 15.3	< 271	< 6.20	< 10.6
NLA12_MN-138A	Tenor	< 44.6	< 46.9		< 29.7	< 8.28	< 115	< 90.8	< 33.8	< 16.3	< 22.0	< 10.5	< 241	< 10.8	< 14.6
NLA12_MN-141	East Red River	< 45.4	< 24.9	< 9.11	< 16.3	< 6.20	< 205	< 15.4	< 15.4	< 20.5	< 28.5	< 9.30	< 428	< 6.74	< 9.78
NLA12_MN-143	unnamed	< 19.9	< 15.6	< 20.8	< 15.6	< 6.25	< 62.5	< 15.6	< 15.6	< 20.8	< 6.25	< 6.25	< 521	< 6.25	< 6.25
NLA12_MN-144	unnamed	< 42.4	< 36.5	< 12.3	< 14.6	< 7.36	< 103	< 47.5	< 22.9	< 8.41	< 6.62	< 7.11	< 194	< 5.86	< 6.89
NLA12_MN-145	Terrapin	< 27.1	< 32.3		< 18.5	< 8.75	< 77.3	< 52.8	< 28.7	< 6.88	< 7.64	< 8.60	< 107	< 6.28	< 6.49

Lake number	Lake name	Anhydro-chlortetracycline [ACTC] (ng/L)	Anhydro-tetracycline [ATC] (ng/L)	Chlortetracycline [CTC] (ng/L)	Demeclocycline (ng/L)	Doxycycline (ng/L)	4-Epianhydro-chlortetracycline [EACTC] (ng/L)	4-Epianhydro-tetracycline [EATC] (ng/L)	4-Epichlor-tetracycline [ECTC] (ng/L)	4-Epioxy-tetracycline [EOTC] (ng/L)	4-Epi-tetracycline [ETC] (ng/L)	Isochlor-tetracycline [ICTC] (ng/L)	Minocycline (ng/L)	Oxy-tetracycline [OTC] (ng/L)	Tetracycline [TC] (ng/L)
NLA12_MN-147	Wilbur	< 192	< 163	< 15.0	< 20.7	< 20.8	< 406	< 14.3	< 38.7	< 18.1	< 24.9	< 16.8	< 509	< 17.8	< 10.7
NLA12_MN-150	Spree	< 55.3	< 78.5		< 27.5	< 7.46	< 65.8	< 170	< 52.3	< 20.8	< 21.1	< 15.2	< 259	< 13.0	< 14.0
NLA12_MN-152	61-0091	< 20.1	< 15.4	< 20.6	< 18.9	< 6.17	< 61.7	< 15.4	< 15.4	< 20.6	< 6.17	< 7.01	< 515	< 6.54	< 6.17
NLA12_MN-153	Bear	< 157	< 94.1	< 14.2	< 28.1	< 19.5	< 166	< 178	< 36.3	< 12.2	< 23.1	< 12.4	< 468	< 11.7	< 9.28
NLA12_MN-157	Glorvigan	< 73.0	< 38.2	< 14.8	< 40.4	< 7.62	< 190	< 114	< 14.3	< 19.0	< 26.8	< 10.1	< 650	< 13.5	< 9.17
NLA12_MN-158	unnamed	< 38.4	< 21.8	< 12.9	< 31.2	< 10.5	< 149	< 15.2	< 55.6		< 21.6	< 6.07	< 151	< 18.4	< 9.53
NLA12_MN-158 Blank		< 16.3	< 15.2	< 6.29	< 15.2	< 6.08	< 60.8	< 15.2	< 15.2		< 6.08	< 6.08	< 60.8	< 6.08	< 6.08
NLA12_MN-160	unnamed	< 24.1	< 16.2	< 19.9	< 14.9	< 5.96	< 59.6	< 14.9	< 14.9	< 19.9	< 5.96	< 7.32	< 497	< 5.99	< 5.96
NLA12_MN-162	Waymier	< 76.2	< 65.8	< 11.5	< 28.4	< 7.85	< 152	< 111	< 26.4	< 21.0	< 5.92	< 5.92	< 59.2	< 13.6	< 10.0
NLA12_MN-163	unnamed	< 32.3	< 31.5		< 23.1	< 8.84	< 87.7	< 52.9	< 23.4	< 15.8	< 9.75	< 6.35	< 57.9	< 5.79	< 7.53
NLA12_MN-167	unnamed	< 27.8	< 14.9	< 19.9	< 14.9	< 5.96	< 59.6	< 14.9	< 14.9	< 19.9	< 5.96	< 5.96	< 497	< 5.96	< 5.96
NLA12_MN-170A	unnamed	< 40.7	< 50.9	< 10.2	< 14.4	< 5.74	< 86.3	< 84.1	< 23.7	< 14.6	< 5.74	< 5.74	< 57.4	< 9.92	< 8.01
NLA12_MN-171	unnamed	< 53.3	< 48.6	< 11.0	< 22.1	< 9.88	< 122	< 65.7	< 20.5	< 11.6	< 7.17	< 7.53	< 341	< 7.77	< 7.17
NLA12_MN-171 Blank		< 15.0	< 15.0	< 5.99	< 15.0	< 5.99	< 59.9	< 15.0	< 15.0	< 5.99	< 5.99	< 5.99	< 200	< 5.99	< 5.99
NLA12_MN-177	unnamed	< 19.9	< 15.6	< 20.8	< 16.7	< 7.05	< 62.4	< 15.6	< 15.6	< 20.8	< 6.24	< 10.3	< 541	< 6.71	< 6.24
NLA12_MN-181	unnamed	< 44.9	< 37.9	< 11.0	< 17.3	< 5.99	< 94.4	< 60.1	< 25.3	< 8.13	< 5.99	< 5.99	< 59.9	< 6.33	< 8.45
NLA12_MN-206	unnamed	< 42.7	< 43.5		< 31.2	< 13.3	< 111	< 82.8	< 44.7	< 18.0	< 20.9	< 16.2	< 282	< 11.5	< 13.9

* Currently receives treated domestic wastewater.

Table 7 Pharmaceuticals List 3

Lake number	Lake name	Bisphenol A (ng/L)	Furosemide (ng/L)	Gemfibrozil (ng/L)	Glipizide (ng/L)	Glyburide (ng/L)	Hydro-chlorothiazide (ng/L)	2-Hydroxy-ibuprofen (ng/L)	Ibuprofen (ng/L)	Naproxen (ng/L)	Triclocarban (ng/L)	Triclosan (ng/L)	Warfarin (ng/L)
NLA12_MN-101	Long	< 484	< 38.7	< 1.45	< 5.81	< 2.03	< 9.68	< 77.5	< 14.5	< 2.91	< 2.91	< 58.1	< 1.45
NLA12_MN-102	Spring	< 500	< 40.0	< 1.50	< 6.00	< 2.10	< 10.0	< 80.0	< 15.0	< 3.00	< 3.00	< 60.0	< 1.50
NLA12_MN-103	Lookout	< 521	< 41.7	1.9	< 6.25	< 2.19	< 10.4	< 83.3	< 15.6	< 3.12	< 3.12	< 62.5	< 1.56
NLA12_MN-104	Fairy	< 495	< 39.6	< 1.48	< 5.93	< 2.08	< 9.89	< 79.1	< 14.8	< 2.97	< 2.97	< 59.3	< 1.48
NLA12_MN-105	Becoosin	< 1050	< 84.2	< 3.16	< 12.6	< 4.42	< 21.1	< 168	< 31.6	D 7.93	< 6.32	< 126	< 3.16
NLA12_MN-106	Darling	< 531	< 42.5	< 1.59	< 6.37	< 2.23	< 10.6	< 84.9	< 15.9	< 3.19	< 3.19	< 63.7	< 1.59
NLA12_MN-106 Duplicate		< 523	< 41.8	< 1.57	< 6.28	< 2.20	< 10.5	< 83.7	< 15.7	< 3.14	< 3.14	< 62.8	< 1.57
NLA12_MN-107	Cokato	< 495	< 66.9	< 1.49	< 5.94	< 2.08	< 9.91	< 79.3	< 14.9	< 2.97	< 2.97	< 59.4	< 1.49
NLA12_MN-108	Long	< 496	< 57.5	< 1.49	< 5.95	< 2.08	< 9.92	< 79.4	< 14.9	< 2.98	< 2.98	< 59.5	< 1.49
NLA12_MN-109	Richey	< 517	< 41.4	< 1.55	< 6.20	< 2.17	< 10.3	< 82.7	< 15.5	< 3.10	< 3.10	< 62.0	< 1.55
NLA12_MN-110	Crow Wing	< 511	< 40.9	< 1.53	< 6.13	< 2.15	< 10.2	< 81.8	< 15.3	< 3.07	< 3.07	< 61.3	< 1.53
NLA12_MN-111	Snail	< 511	< 40.8	< 1.53	< 6.13	< 2.14	< 10.2	< 81.7	< 15.3	< 3.06	< 3.06	< 61.3	< 1.53
NLA12_MN-112	Eagle	< 523	< 41.8	< 1.57	< 6.27	< 2.19	< 10.5	< 83.6	< 15.7	< 3.14	< 3.14	< 62.7	< 1.57
NLA12_MN-113	North Ash	< 502	< 40.2	< 1.51	< 6.03	< 2.11	< 10.0	< 80.4	< 15.1	< 3.01	< 3.01	< 60.3	< 1.51
NLA12_MN-114	Woodcock	< 505	< 40.4	< 1.52	< 6.06	< 2.12	< 10.1	< 80.8	< 15.2	< 3.03	< 3.03	< 60.6	< 1.52
NLA12_MN-115	Round	< 501	< 40.1	< 1.50	< 6.01	< 2.10	< 10.0	< 80.1	< 15.0	< 3.00	< 3.00	< 60.1	< 1.50
NLA12_MN-115 duplicate		< 519	< 41.5	< 1.56	< 6.23	< 2.18	< 10.4	< 83.1	< 15.6	< 3.11	< 3.11	< 62.3	< 1.56
NLA12_MN-116	Nokomis	< 495	< 39.6	< 1.49	< 5.94	< 2.08	< 9.90	< 79.2	K 16.3	< 2.97	< 2.97	< 59.4	< 1.49
NLA12_MN-118*	South	< 526	< 42.1	13.2	< 6.31	< 2.21	< 10.5	< 84.2	< 15.8	< 3.16	< 3.16	< 63.1	< 1.58
NLA12_MN-119	Big Stone	< 498	< 39.8	< 1.49	< 5.98	< 2.09	< 9.96	< 79.7	< 14.9	< 2.99	< 2.99	< 59.8	< 1.49
NLA12_MN-120	Flat	< 499	< 67.0	< 1.50	< 5.99	< 2.10	< 9.99	< 79.9	< 15.0	< 3.00	< 3.00	< 59.9	< 1.50
NLA12_MN-121	Norway	< 499	< 39.9	< 1.50	< 5.99	< 2.10	< 9.98	< 79.8	< 15.0	< 2.99	< 2.99	< 59.9	< 1.50
NLA12_MN-122	Jennie	< 530	< 86.8	< 1.59	< 6.36	< 2.23	< 10.6	< 84.8	< 15.9	< 3.18	< 3.18	< 63.6	< 1.59
NLA12_MN-123	unnamed	< 489	< 39.1	< 1.47	< 5.87	< 2.05	< 9.78	< 78.2	< 14.7	< 2.93	< 2.93	< 58.7	< 1.47
NLA12_MN-123 Duplicate		< 500	< 40.0	< 1.50	< 6.00	< 2.10	< 10.0	< 80.0	< 15.0	< 3.00	< 3.00	< 60.0	< 1.50
NLA12_MN-126	Diamond	< 496	< 39.7	< 1.49	< 5.95	< 2.08	< 9.92	< 79.3	< 14.9	< 2.97	< 2.97	< 59.5	< 1.49
NLA12_MN-127	unnamed	< 492	< 39.4	< 1.48	< 5.90	< 2.07	< 9.84	< 78.7	K 20.2	< 2.95	< 2.95	< 59.0	< 1.48
NLA12_MN-130A	Net	< 1150	< 112	< 3.44	< 13.8	< 4.81	< 22.9	< 183	< 34.4	< 6.88	< 6.88	< 138	< 3.44
NLA12_MN-131	unnamed	< 526	< 42.1	< 1.58	< 6.31	< 2.21	< 10.5	< 84.1	< 15.8	< 3.15	< 3.15	< 63.1	< 1.58
NLA12_MN-132	Clear	< 500	< 57.6	< 1.50	< 6.00	< 2.10	< 9.99	< 80.0	< 15.0	< 3.00	< 3.00	< 60.0	< 1.50
NLA12_MN-135	Lindgren	< 498	< 39.8	< 1.49	< 5.97	< 2.09	< 9.96	< 79.6	< 14.9	< 2.99	< 2.99	< 59.7	< 1.49
NLA12_MN-136	unnamed	< 513	< 41.0	< 1.54	< 6.16	< 2.16	< 10.3	< 82.1	< 15.4	< 3.08	< 3.08	< 61.6	< 1.54
NLA12_MN-136 Blank		< 501	< 40.1	< 1.50	< 6.01	< 2.10	< 10.0	< 80.1	< 15.0	< 3.01	< 3.01	< 60.1	< 1.50
NLA12_MN-137	Cucumber	< 517	< 115	< 1.55	< 6.20	< 2.17	< 10.3	< 82.7	< 15.5	< 3.10	< 3.10	< 62.0	< 1.55
NLA12_MN-138A	Tenor	< 991	< 80.4	< 2.97	< 11.9	< 4.16	< 19.8	< 159	< 29.7	< 5.94	< 5.94	< 119	< 2.97
NLA12_MN-141	East Red River	< 512	< 41.0	< 1.54	< 6.15	< 2.15	< 10.2	< 81.9	< 15.4	< 3.07	< 3.07	< 61.5	< 1.54

Lake number	Lake name	Bisphenol A (ng/L)	Furosemide (ng/L)	Gemfibrozil (ng/L)	Glipizide (ng/L)	Glyburide (ng/L)	Hydro-chlorothiazide (ng/L)	2-Hydroxy-ibuprofen (ng/L)	Ibuprofen (ng/L)	Naproxen (ng/L)	Triclocarban (ng/L)	Triclosan (ng/L)	Warfarin (ng/L)
NLA12_MN-143	unnamed	< 521	< 41.6	< 1.56	< 6.25	< 2.19	< 10.4	< 83.3	< 15.6	< 3.12	< 3.12	< 62.5	< 1.56
NLA12_MN-144	unnamed	< 486	< 38.9	< 1.46	< 5.83	< 2.04	< 9.71	< 77.7	< 14.6	< 2.91	< 2.91	< 58.3	< 1.46
NLA12_MN-145	Terrapin	< 523	< 41.9	< 1.57	< 6.28	< 2.20	< 10.5	< 83.7	< 15.7	< 3.14	< 3.14	< 62.8	< 1.57
NLA12_MN-147	Wilbur	< 477	< 38.2	< 1.43	< 5.72	< 2.00	< 9.54	< 76.3	< 14.3	< 2.86	< 2.86	< 57.2	< 1.43
NLA12_MN-150	Spree	< 987	< 83.5	< 2.96	< 11.8	< 4.14	< 19.7	< 158	< 29.6	< 5.92	< 5.92	< 118	< 2.96
NLA12_MN-152	61-0091	< 515	< 41.2	< 1.54	< 6.17	< 2.16	< 10.3	< 82.3	< 15.4	< 3.09	< 3.09	< 61.7	< 1.54
NLA12_MN-153	Bear	< 487	< 38.9	< 1.46	< 5.84	< 2.04	< 9.74	< 77.9	< 14.6	< 2.92	< 2.92	< 58.4	< 1.46
NLA12_MN-157	Glorvigan	< 476	< 38.1	< 1.43	< 5.71	< 2.00	< 9.52	< 76.1	< 14.3	< 2.85	< 2.85	< 57.1	< 1.43
NLA12_MN-158	unnamed	< 506	< 40.5	< 1.52	< 6.07	< 2.13	< 10.1	< 81.0	< 15.2	< 3.04	< 3.04	< 60.7	< 1.52
NLA12_MN-158 Blank		< 507	< 40.5	< 1.52	< 6.08	< 2.13	< 10.1	< 81.1	< 15.2	< 3.04	< 3.04	< 60.8	< 1.52
NLA12_MN-160	unnamed	< 497	< 39.8	< 1.49	< 5.96	< 2.09	< 9.94	< 79.5	< 14.9	< 2.98	< 2.98	< 59.6	< 1.49
NLA12_MN-162	Waymier	< 493	< 39.5	< 1.48	< 5.92	< 2.07	< 9.86	< 78.9	< 14.8	< 2.96	< 2.96	< 59.2	< 1.48
NLA12_MN-163	unnamed	< 966	< 85.7	< 2.90	< 11.6	< 4.06	< 19.3	< 155	< 29.0	< 5.79	< 5.79	< 116	< 2.90
NLA12_MN-167	unnamed	< 497	< 39.7	< 1.49	< 5.96	< 2.09	< 9.94	< 79.5	< 14.9	< 2.98	< 2.98	< 59.6	< 1.49
NLA12_MN-170A	unnamed	< 478	< 38.3	< 1.44	< 5.74	< 2.01	< 9.57	< 76.5	< 14.4	< 2.87	< 2.87	< 57.4	< 1.44
NLA12_MN-171	unnamed	< 468	< 37.4	< 1.40	< 5.62	< 1.97	< 9.36	< 74.9	< 14.0	< 2.81	< 2.81	< 56.2	< 1.40
NLA12_MN-171 Blank		< 499	< 39.9	< 1.50	< 5.99	< 2.10	< 9.98	< 79.9	< 15.0	< 3.00	< 3.00	< 59.9	< 1.50
NLA12_MN-177	unnamed	< 520	< 41.6	< 1.56	< 6.24	< 2.18	< 10.4	< 83.2	< 15.6	< 3.12	< 3.12	< 62.4	< 1.56
NLA12_MN-181	unnamed	< 499	< 39.9	< 1.50	< 5.99	< 2.10	< 9.98	< 79.8	< 15.0	< 2.99	< 2.99	< 59.9	< 1.50
NLA12_MN-206	unnamed	< 965	< 92.7	< 2.90	< 11.6	< 4.05	< 19.3	< 154	< 29.0	< 5.79	< 5.79	< 116	< 2.90

* Currently receives treated domestic wastewater.

Table 8 Pharmaceuticals List 5

Lake number	Lake name	Alprazolam (ng/L)	Amitriptyline (ng/L)	Amlodipine (ng/L)	Benzoylecgonine (ng/L)	Benztropine (ng/L)	Betamethasone (ng/L)	Cocaine (ng/L)	DEET (ng/L)	Desmethyl-diltiazem (ng/L)	Diazepam (ng/L)	Fluocinonide (ng/L)	Fluticasone propionate (ng/L)	Hydrocortisone (ng/L)	10-hydroxy-amitriptyline (ng/L)	Meprobamate (ng/L)
NLA12_MN-101	Long	< 0.291	< 0.291	< 1.45	< 0.294	< 0.678	< 1.45	< 0.145	B 51.0	< 0.145	< 0.291	< 5.81	< 3.78	< 58.1	< 0.196	< 3.87
NLA12_MN-102	Spring	< 0.300	< 0.482	< 1.50	< 0.300	< 0.700	< 1.50	B 1.38	14.1	< 0.150	< 0.300	< 6.00	< 4.08	< 60.0	< 0.153	< 4.00
NLA12_MN-103	Lookout	< 0.312	0.41	< 1.56	< 0.320	< 0.729	< 1.56	1.58	45.2	< 0.156	< 0.312	< 6.25	< 2.08	< 178	< 0.156	< 4.17
NLA12_MN-104	Fairy	< 0.297	B 1.04	< 1.48	< 0.297	< 0.692	< 3.21	B 0.175	B 8.92	< 0.148	< 0.297	< 5.93	< 3.33	< 144	< 0.148	< 3.96
NLA12_MN-105	Becoosin	< 0.316	< 0.929	< 1.58	< 0.316	< 0.737	< 1.58	< 0.196	7	< 0.158	< 0.324	< 6.32	< 8.99	< 63.2	< 0.219	< 4.21
NLA12_MN-106	Darling	< 0.319	< 0.319	< 1.59	0.702	< 0.743	< 1.59	2.59	50.5	< 0.159	< 0.319	< 6.37	< 2.12	< 119	< 0.159	< 4.25
NLA12_MN-106 Duplicate		< 0.314	< 0.314	< 1.57	< 0.314	< 0.732	< 1.57	0.453	48.1	< 0.157	< 0.314	< 6.28	< 2.09	< 87.5	< 0.157	< 4.18
NLA12_MN-107	Cokato	< 0.297	< 1.06	< 1.49	< 0.297	< 0.693	< 1.49	B 0.632	13	< 0.149	< 0.297	< 5.94	< 4.44	< 59.4	< 0.149	< 3.96
NLA12_MN-108	Long	< 0.298	< 0.298	< 1.49	< 0.298	< 0.694	< 1.49	B 0.359	14.9	< 0.149	< 0.298	< 5.95	< 2.77	< 59.5	< 0.149	< 3.97
NLA12_MN-109	Richey	< 0.310	K 0.918	< 1.55	< 0.310	< 0.724	< 1.55	< 0.155	B 29.8	< 0.155	< 0.310	< 6.20	< 5.49	< 176	< 0.227	< 4.14
NLA12_MN-110	Crow Wing	< 0.307	< 0.307	< 1.53	< 0.307	< 0.715	< 1.53	< 0.153	B 97.7	< 0.153	< 0.307	< 6.13	< 3.41	< 75.0	< 0.153	< 4.09
NLA12_MN-111	Snail	< 0.306	0.528	< 1.53	< 0.658	< 0.715	< 1.53	< 0.153	59.6	< 0.153	< 0.306	< 6.13	< 3.33	< 61.3	< 0.153	< 4.08
NLA12_MN-112	Eagle	< 0.314	< 1.57	< 1.57	2.64	< 0.732	< 1.57	0.66	13.9	< 0.157	< 0.314	< 6.27	< 2.09	< 166	< 0.157	< 4.18
NLA12_MN-113	North Ash	< 0.301	K 1.76	< 1.51	< 0.449	< 0.703	< 1.51	0.219	B 6.58	< 0.151	< 0.301	< 6.03	< 3.99	< 60.3	< 0.280	< 4.02
NLA12_MN-114	Woodcock	< 0.303	4.05	< 1.52	< 0.558	< 0.707	< 1.52	< 0.152	39.9	< 0.152	< 0.303	< 6.06	< 2.02	< 401	< 0.152	< 4.04
NLA12_MN-115	Round	< 0.300	< 0.300	< 1.50	0.621	< 0.701	< 1.50	0.785	32.3	< 0.150	< 0.300	< 6.01	< 2.00	< 120	< 0.150	< 4.01
NLA12_MN-115 duplicate		< 0.311	< 0.311	< 1.56	1.49	< 0.727	< 1.56	1.41	34.8	< 0.156	< 0.311	< 6.23	< 2.08	< 144	< 0.156	< 4.15
NLA12_MN-116	Nokomis	< 0.297	K 0.756	< 1.49	0.622	0.72	< 1.49	< 0.149	B 135	< 0.149	< 0.297	< 5.94	< 2.96	< 59.4	< 0.149	< 3.96
NLA12_MN-118*	South	0.369	K 10.2	< 1.58	< 0.543	< 0.737	< 1.58	< 0.158	57.7	< 0.158	< 0.316	< 6.31	< 6.02	< 63.1	< 0.160	29.4
NLA12_MN-119	Big Stone	< 0.299	0.794	< 1.49	1.18	< 0.697	< 1.49	1.12	16.9	< 0.149	< 0.299	< 5.98	< 1.99	< 161	< 0.149	< 3.98
NLA12_MN-120	Flat	< 0.300	0.751	< 1.50	< 0.446	< 0.699	< 1.50	B 0.410	2.51	< 0.150	< 0.300	< 5.99	< 3.92	< 59.9	< 0.150	< 4.00
NLA12_MN-121	Norway	< 0.299	1.36	< 1.50	9.48	< 0.699	< 1.50	5.26	44	< 0.150	< 0.299	< 5.99	< 2.00	< 104	< 0.150	< 3.99
NLA12_MN-122	Jennie	< 0.318	< 0.398	< 1.59	2.33	< 0.742	< 1.59	B 0.347	12.4	< 0.159	< 0.318	< 6.36	< 3.06	< 63.6	< 0.159	< 4.24
NLA12_MN-123	unnamed	< 0.293	< 0.293	< 1.47	< 0.293	< 0.684	< 1.47	0.364	B 4.48	< 0.147	< 0.293	< 5.87	< 2.79	< 58.7	< 0.147	< 3.91
NLA12_MN-123 Duplicate		< 0.300	< 0.300	< 1.50	0.521	< 0.700	< 1.50	0.659	B 4.62	< 0.150	< 0.300	< 6.00	< 2.00	< 60.0	< 0.166	< 4.00
NLA12_MN-126	Diamond	< 0.297	K 0.630	< 1.49	< 0.297	< 0.694	< 1.49	B 0.724	B 6.30	< 0.149	< 0.297	< 5.95	< 3.11	< 117	< 0.215	< 3.97
NLA12_MN-127	unnamed	< 0.295	3.86	< 1.48	< 0.316	< 0.689	< 1.48	< 0.148	6.41	< 0.148	< 0.295	< 5.90	< 1.97	< 108	< 0.148	< 3.94
NLA12_MN-130A	Net	< 0.344	K 0.500	< 1.72	< 0.344	< 0.802	< 1.72	< 0.172	2.17	< 0.172	< 0.344	< 6.88	< 3.82	< 68.8	< 0.172	< 4.59
NLA12_MN-131	unnamed	< 0.315	1.04	< 1.58	0.73	< 0.736	< 1.58	0.499	6.39	< 0.158	< 0.315	< 6.31	< 2.10	< 165	< 0.158	< 4.21
NLA12_MN-132	Clear	< 0.300	< 0.898	< 1.50	< 0.300	< 0.700	< 1.50	< 0.150	8.19	< 0.150	< 0.300	< 6.00	< 5.79	< 60.0	< 0.150	< 4.00
NLA12_MN-135	Lindgren	< 0.299	D 1.73	< 1.49	1.56	< 0.697	< 1.49	1.32	10.2	< 0.149	< 0.347	< 5.97	< 1.99	< 270	< 0.149	< 3.98
NLA12_MN-136	unnamed	< 0.308	< 0.308	< 1.54	< 0.308	< 0.718	< 1.54	< 0.154	0.622	< 0.154	< 0.308	< 6.16	< 2.05	< 61.6	< 0.154	< 4.10
NLA12_MN-136 Blank		< 0.301	1.32	< 1.50	< 0.304	< 0.701	< 1.50	< 0.150	5.23	< 0.150	< 0.301	< 6.01	< 2.00	< 60.1	< 0.150	< 4.01
NLA12_MN-137	Cucumber	< 0.310	K 16.0	< 1.55	< 0.770	< 0.723	< 1.55	< 0.309	17.7	< 0.155	< 0.320	< 6.20	< 11.8	< 62.0	< 0.210	< 4.14

Lake number	Lake name	Alprazolam (ng/L)	Amitriptyline (ng/L)	Amlodipine (ng/L)	Benzoylecgonine (ng/L)	Benztropine (ng/L)	Betamethasone (ng/L)	Cocaine (ng/L)	DEET (ng/L)	Desmethyl-diltiazem (ng/L)	Diazepam (ng/L)	Fluocinonide (ng/L)	Fluticasone propionate (ng/L)	Hydrocortisone (ng/L)	10-hydroxy-amitriptyline (ng/L)	Meprobamate (ng/L)
NLA12_MN-138A	Tenor	< 0.297	< 0.792	< 1.49	< 0.297	< 0.694	< 8.42	B 0.377	5.1	< 0.149	< 0.308	< 5.94	< 4.61	< 59.4	< 0.149	< 3.96
NLA12_MN-141	East Red River	< 0.307	< 0.519	< 1.54	< 0.307	< 0.717	< 1.54	B 0.219	B 29.4	< 0.154	< 0.307	< 6.15	< 2.68	< 83.3	< 0.162	< 4.10
NLA12_MN-143	unnamed	< 0.312	1.62	< 1.56	0.466	< 0.729	< 1.56	1.18	9.55	< 0.156	< 0.321	< 6.25	< 2.08	< 187	< 0.156	< 4.16
NLA12_MN-144	unnamed	< 0.291	< 0.865	< 1.46	< 0.291	< 0.680	< 4.86	< 0.146	125	< 0.146	< 0.349	< 5.83	< 5.36	< 58.3	< 0.146	< 3.89
NLA12_MN-145	Terrapin	< 0.314	0.789	< 1.57	< 0.314	< 0.733	< 1.57	< 0.157	8.94	< 0.157	< 0.314	< 6.28	< 4.42	< 62.8	< 0.157	< 4.19
NLA12_MN-147	Wilbur	< 0.286	K 0.515	< 1.43	< 0.286	< 0.668	< 1.43	< 0.143	B 311	< 0.143	< 0.286	< 5.72	< 2.58	< 57.2	< 0.143	< 3.82
NLA12_MN-150	Spree	< 0.296	K 0.972	< 1.48	< 0.472	< 0.691	< 1.48	B 0.280	14.2	< 0.148	< 0.296	< 5.92	< 8.77	< 59.2	< 0.148	< 4.22
NLA12_MN-152	61-0091	< 0.309	< 0.309	< 1.54	6.92	< 0.720	< 1.54	4.11	6.35	< 0.154	< 0.309	< 6.17	< 2.06	< 141	< 0.154	< 4.12
NLA12_MN-153	Bear	< 0.292	K 0.574	< 1.46	< 0.321	< 0.682	< 1.46	0.237	B 6.83	< 0.146	< 0.292	< 5.84	< 3.58	< 145	< 0.146	< 3.89
NLA12_MN-157	Glorvigan	< 0.285	3.87	< 1.43	1.04	< 0.666	< 1.43	< 0.143	B 7.51	< 0.143	< 0.285	< 5.71	< 4.85	< 278	< 0.181	< 3.81
NLA12_MN-158	unnamed	< 0.304	2.82	< 1.52	< 0.542	< 0.709	< 1.52	< 0.190	4.82	< 0.152	< 0.304	< 6.07	< 10.6	< 60.7	< 0.152	< 4.05
NLA12_MN-158 Blank		< 0.304	< 0.304	< 1.52	< 0.304	< 0.710	< 1.52	< 0.152	< 0.608	< 0.152	< 0.304	< 6.08	< 2.03	< 60.8	< 0.152	< 4.05
NLA12_MN-160	unnamed	< 0.298	0.636	< 1.49	< 0.298	< 0.696	< 1.49	0.466	12.4	< 0.149	< 0.298	< 5.96	< 1.99	< 221	< 0.149	< 3.98
NLA12_MN-162	Waymier	< 0.296	< 1.94	< 1.48	< 0.296	< 0.691	< 3.06	< 0.148	7.52	< 0.149	< 0.296	< 5.92	< 8.87	< 281	< 0.205	< 3.95
NLA12_MN-163	unnamed	< 0.290	< 0.348	< 1.45	< 0.290	< 0.676	< 1.45	B 0.623	57	< 0.145	< 0.290	< 5.79	< 3.49	< 57.9	< 0.145	< 3.86
NLA12_MN-167	unnamed	< 0.298	< 0.298	< 1.49	1.34	< 0.696	< 1.49	1.52	9.8	< 0.149	< 0.404	< 5.96	< 1.99	< 112	< 0.149	< 3.97
NLA12_MN-170A	unnamed	< 0.287	< 0.533	< 1.44	< 0.287	0.698	< 2.59	< 0.144	10.1	< 0.144	< 0.287	< 5.74	< 1.91	< 330	< 0.144	< 3.83
NLA12_MN-171	unnamed	< 0.281	< 3.08	< 1.40	< 0.434	< 0.655	< 4.68	< 0.170	5.84	< 0.140	< 0.281	< 5.62	< 7.81	< 158	< 0.140	< 3.85
NLA12_MN-171 Blank		< 0.300	< 0.300	< 1.50	< 0.300	< 0.699	< 4.99	< 0.150	1.2	< 0.150	< 0.300	< 5.99	< 2.00	< 59.9	< 0.150	< 3.99
NLA12_MN-177	unnamed	< 0.312	1.89	< 1.56	2.17	< 0.728	< 1.56	2.11	9.11	< 0.156	< 0.323	< 6.24	< 2.08	< 114	< 0.156	< 4.16
NLA12_MN-181	unnamed	< 0.299	K 1.00	< 1.50	< 0.299	< 0.698	< 1.50	< 0.150	2.46	< 0.150	< 0.299	< 5.99	< 2.00	< 257	< 0.157	< 3.99
NLA12_MN-206	unnamed	< 0.290	K 1.03	< 1.45	< 0.458	< 0.676	< 1.45	< 0.145	3.49	< 0.145	< 0.306	< 5.79	< 6.55	< 57.9	< 0.145	< 5.50

* Currently receives treated domestic wastewater.

Table 8: Pharmaceuticals List 5 continued

Lake number	Lake name	Methyl-prednisolone (ng/L)	Metoprolol (ng/L)	Norfluoxetine (ng/L)	Norverapamil (ng/L)	Paroxetine (ng/L)	Prednisolone (ng/L)	Prednisone (ng/L)	Promethazine (ng/L)	Propoxyphene (ng/L)	Propranolol (ng/L)	Sertraline (ng/L)	Simvastatin (ng/L)	Theophylline (ng/L)	Trenbolone (ng/L)	Trenbolone acetate (ng/L)	Valsartan (ng/L)	Verapamil (ng/L)
NLA12_MN-101	Long	< 10.3	< 14.6	< 1.45	< 0.145	< 3.87	< 23.2	< 95.4	< 0.387	< 0.291	< 1.94	< 0.387	< 19.4	< 58.1	< 3.87	< 0.532	< 4.12	< 0.145
NLA12_MN-102	Spring	< 7.78	< 11.2	< 1.50	< 0.185	< 4.00	< 6.00	< 58.8	< 0.400	< 0.300	< 2.00	< 0.400		< 60.0	< 4.00	< 0.466	< 4.00	< 0.150
NLA12_MN-103	Lookout	< 12.2	< 16.9	< 1.56	< 0.217	< 4.17	< 6.25	< 20.8	< 0.417	< 0.312	< 2.08	< 0.417	< 20.8	< 62.5	< 4.17	< 0.312	< 4.17	< 0.156
NLA12_MN-104	Fairy	< 3.96	< 8.02	< 1.48	< 0.158	< 3.96	< 5.93	< 19.8	< 0.396	< 0.297	< 1.98	< 0.396	< 19.8	< 59.3	< 39.6	< 0.297	< 3.96	< 0.148
NLA12_MN-105	Becoosin	< 4.21	< 4.46	< 1.58	< 0.314	< 4.21	< 56.1	< 216	< 0.421	< 0.316	< 2.11	< 0.421		< 63.2	< 4.21	< 1.02	< 4.21	< 0.158
NLA12_MN-106	Darling	< 4.25	< 7.93	< 1.59	< 0.186	< 4.25	< 6.37	< 21.2	< 0.425	< 0.319	< 2.12	< 0.425	< 21.2	< 63.7	< 4.25	< 0.319	< 4.25	< 0.159
NLA12_MN-106 Duplicate		< 14.5	< 11.1	< 1.57	< 0.182	< 4.18	< 6.28	< 20.9	< 0.418	< 0.314	< 2.09	< 0.418	< 20.9	< 62.8	< 4.18	< 0.314	< 4.18	< 0.157
NLA12_MN-107	Cokato	< 6.65	< 12.2	< 1.49	< 0.153	< 3.96	< 8.91	< 73.5	< 0.396	< 0.297	< 1.98	< 0.396		< 59.4	< 3.96	< 0.297	< 3.96	< 0.149
NLA12_MN-108	Long	< 19.0	< 6.79	< 1.49	< 0.149	< 3.97	< 8.68	< 40.4	< 0.397	< 0.298	< 1.98	< 0.397		< 59.5	< 3.97	< 0.298	< 3.97	< 0.149
NLA12_MN-109	Richey	< 12.8	< 20.0	< 1.55	< 0.155	< 4.14	< 6.20	< 203	< 0.414	< 0.310	< 2.07	< 0.414	< 20.7	< 76.8	< 4.14	< 0.407	< 4.14	< 0.155
NLA12_MN-110	Crow Wing	< 4.09	< 14.2	< 1.53	< 0.153	< 4.09	< 31.7	< 164	< 0.409	< 0.307	< 2.04	< 0.409	< 20.4	< 62.8	< 4.09	< 0.307	< 4.09	< 0.153
NLA12_MN-111	Snail	< 4.08	< 10.4	< 1.53	< 0.153	< 4.08	< 6.13	< 91.2	< 0.408	< 0.306	< 2.04	< 0.408		< 61.3	< 4.08	< 0.306	< 4.08	< 0.153
NLA12_MN-112	Eagle	< 17.1	< 16.6	< 1.57	< 0.236	< 4.18	< 6.27	< 20.9	< 0.418	< 0.314	< 2.09	< 0.418	< 20.9	< 62.7	< 4.18	< 0.314	< 4.18	< 0.157
NLA12_MN-113	North Ash	< 16.5	< 16.1	< 1.51	< 0.151	< 4.02	< 19.3	< 97.3	< 0.402	< 0.301	< 2.01	< 0.402	< 20.1	< 66.5	< 4.02	< 0.301	< 4.05	< 0.151
NLA12_MN-114	Woodcock	< 4.04	< 11.5	< 1.52	< 0.197	< 4.04	< 44.1	< 250	< 0.404	< 0.303	< 2.02	< 0.404	< 20.2	< 102	< 4.04	< 0.303	< 4.04	< 0.152
NLA12_MN-115	Round	< 10.9	< 9.11	< 1.50	< 0.154	< 4.01	< 6.01	< 20.0	< 0.401	< 0.300	< 2.00	< 0.401	< 20.0	< 60.1	< 4.01	< 0.300	< 4.01	< 0.150
NLA12_MN-115 duplicate		< 16.4	< 7.36	< 1.56	< 0.168	< 4.15	< 6.23	< 20.8	< 0.415	< 0.311	< 2.08	< 0.415	< 20.8	< 62.3	< 4.15	< 0.311	< 4.15	< 0.156
NLA12_MN-116	Nokomis	< 11.8	< 11.6	< 1.49	< 0.149	< 3.96	< 16.4	< 58.9	< 0.396	< 0.297	< 1.98	< 0.396	< 19.8	< 59.4	< 3.96	< 0.314	< 3.96	< 0.149
NLA12_MN-118*	South	< 13.2	< 13.3	< 1.58	< 0.234	< 4.21	< 36.6	< 167	< 0.421	< 0.316	< 2.10	< 0.421		< 122	< 4.21	< 0.316	5.01	< 0.158
NLA12_MN-119	Big Stone	< 15.7	< 12.2	< 1.49	< 0.166	< 3.98	< 5.98	< 19.9	< 0.398	< 0.299	< 1.99	< 0.398	< 19.9	< 59.8	< 3.98	< 0.299	< 3.98	< 0.149
NLA12_MN-120	Flat	< 7.97	< 2.28	< 1.50	< 0.169	< 4.00	< 24.6	< 88.2	< 0.400	< 0.300	< 2.00	< 0.400		< 59.9	< 4.00	< 0.300	< 4.00	< 0.150
NLA12_MN-121	Norway	< 23.6	< 15.4	< 1.50	< 0.234	< 3.99	< 5.99	< 20.0	< 0.399	< 0.299	< 2.00	< 0.399	< 20.0	< 59.9	< 3.99	< 0.299	< 3.99	< 0.150
NLA12_MN-122	Jennie	< 11.5	< 10.5	< 1.59	< 0.159	< 4.24	< 6.36	< 62.7	< 0.424	< 0.318	< 2.12	< 0.424		< 63.6	< 4.24	< 0.318	< 4.24	< 0.159
NLA12_MN-123	unnamed	< 18.5	< 9.43	< 1.47	< 0.147	< 3.91	< 5.87	< 69.6	< 0.391	< 0.293	< 1.96	< 0.391	< 19.6	< 58.7	< 3.91	< 0.293	< 3.91	< 0.147
NLA12_MN-123 Duplicate		< 4.41	< 1.50	< 1.50	< 0.150	< 4.00	< 6.00	< 72.9	< 0.400	< 0.300	< 2.00	< 0.400	< 20.0	< 60.0	< 4.00	< 0.300	< 4.00	< 0.150

Lake number	Lake name	Methyl-prednisolone (ng/L)	Metoprolol (ng/L)	Norfluoxetine (ng/L)	Norverapamil (ng/L)	Paroxetine (ng/L)	Prednisolone (ng/L)	Prednisone (ng/L)	Promethazine (ng/L)	Propoxyphene (ng/L)	Propranolol (ng/L)	Sertraline (ng/L)	Simvastatin (ng/L)	Theophylline (ng/L)	Trenbolone (ng/L)	Trenbolone acetate (ng/L)	Valsartan (ng/L)	Verapamil (ng/L)
NLA12_MN-126	Diamond	< 16.6	< 11.4	< 1.49	< 0.149	< 3.97	< 5.95	< 98.8	< 0.397	< 0.297	< 1.98	< 0.397	< 19.8	< 59.5	< 3.97	< 0.297	< 3.97	< 0.149
NLA12_MN-127	unnamed	< 3.94	< 17.6	< 1.48	< 0.150	< 3.94	< 49.1	< 144	< 0.394	< 0.295	< 1.97	< 0.394	< 19.7	< 59.0	< 3.94	< 0.295	< 3.94	< 0.148
NLA12_MN-130A	Net	< 13.0	< 16.1	< 1.72	< 0.189	< 4.59	< 26.2	< 93.5	< 0.459	< 0.344	< 2.29	< 0.459		< 68.8	< 4.59	< 0.391	< 4.59	< 0.172
NLA12_MN-131	unnamed	< 19.0	< 15.3	< 1.58	< 0.195	< 4.21	< 6.31	< 21.0	< 0.421	< 0.315	< 2.10	< 0.421	< 21.0	< 63.1	< 4.21	< 0.315	< 4.21	< 0.158
NLA12_MN-132	Clear	< 12.8	< 3.50	< 1.50	< 0.150	< 4.00	< 9.98	< 81.0	< 0.400	< 0.300	< 2.00	< 0.400		< 60.0	< 4.00	< 0.367	< 4.00	< 0.150
NLA12_MN-135	Lindgren	< 30.6	< 17.2	< 1.49	< 0.290	< 3.98	< 5.97	< 19.9	< 0.398	< 0.299	< 1.99	< 0.398	< 19.9	< 59.7	< 3.98	< 0.299	< 3.98	< 0.149
NLA12_MN-136	unnamed	< 4.10	< 1.54	< 1.54	< 0.154	< 4.10	< 6.16	< 20.5	< 0.410	< 0.308	< 2.05	< 0.410	< 20.5	< 61.6	< 4.10	< 0.308	< 4.10	< 0.154
NLA12_MN-136 Blank		< 4.01	< 12.4	< 1.50	< 0.150	< 4.01	< 37.5	< 20.0	< 0.401	< 0.301	< 2.00	< 0.401	< 20.0	< 60.1	< 4.01	< 0.301	< 4.01	< 0.150
NLA12_MN-137	Cucumber	< 24.0	< 34.6	< 1.55	< 0.251	< 4.13	< 51.3	< 69.1	< 0.636	< 0.310	< 2.07	< 0.413		< 62.0	< 4.13	< 0.367	< 4.13	< 0.155
NLA12_MN-138A	Tenor	< 28.1	< 3.20	< 1.49	< 0.220	< 3.96	< 5.94	< 43.4	< 0.421	< 0.297	< 1.98	< 0.396		< 59.4	< 3.96	< 0.783	< 3.96	< 0.149
NLA12_MN-141	East Red River	< 4.10	< 5.87	< 1.54	< 0.154	< 4.10	< 12.7	< 114	< 0.410	< 0.307	< 2.05	< 0.410	< 20.5	< 61.5	< 4.10	< 0.307	< 4.10	< 0.154
NLA12_MN-143	unnamed	< 13.3	< 13.8	< 1.56	< 0.245	< 4.16	< 6.25	< 20.8	< 0.416	< 0.312	< 2.08	< 0.416	< 20.8	< 62.5	< 4.16	< 0.312	< 4.16	< 0.156
NLA12_MN-144	unnamed	< 13.9	< 9.36	< 1.46	< 0.146	< 3.89	< 45.7	< 132	< 0.389	< 0.291	< 1.94	< 0.389	< 19.4	< 68.7	< 3.89	< 0.375	< 3.89	< 0.146
NLA12_MN-145	Terrapin	< 9.54	< 8.04	< 1.57	< 0.157	< 4.19	< 6.28	< 66.4	< 0.419	< 0.314	< 2.09	< 0.419		< 62.8	< 4.19	< 0.314	< 4.19	< 0.157
NLA12_MN-147	Wilbur	< 8.65	< 10.0	< 1.43	< 0.143	< 3.82	< 10.3	< 54.4	< 0.382	< 0.286	< 1.91	< 0.382	< 19.1	90.6	< 3.82	< 0.286	< 3.82	< 0.143
NLA12_MN-150	Spree	< 5.16	< 6.94	< 1.48	< 0.301	< 3.95	< 34.6	< 81.5	< 0.395	< 0.296	< 1.97	< 0.395		< 59.2	< 3.95	< 0.798	< 3.95	< 0.148
NLA12_MN-152	61-0091	< 13.7	< 6.93	< 1.54	< 0.228	< 4.12	< 6.17	< 20.6	< 0.412	< 0.309	< 2.06	< 0.412	< 20.6	< 61.7	< 4.12	< 0.309	< 4.12	< 0.154
NLA12_MN-153	Bear	< 21.0	< 12.1	< 1.46	< 0.146	< 3.89	< 21.4	< 81.8	< 0.389	< 0.292	< 1.95	< 0.389	< 19.5	< 58.4	< 3.89	< 0.292	< 3.89	< 0.146
NLA12_MN-157	Glorvigan	< 5.44	< 17.9	< 1.43	< 0.143	< 3.81	< 5.71	< 19.0	< 0.381	< 0.285	< 1.90	< 0.381	< 19.0	< 105	< 3.81	< 0.285	< 3.81	< 0.143
NLA12_MN-158	unnamed	< 17.3	< 23.8	< 1.52	< 0.152	< 4.05	< 61.3	< 192	< 0.405	< 0.304	< 2.02	< 0.405	< 20.2	< 84.6	< 4.05	< 0.304	< 4.05	< 0.152
NLA12_MN-158 Blank		< 4.05	< 2.09	< 1.52	< 0.152	< 4.05	< 6.08	< 20.3	< 0.405	< 0.304	< 2.03	< 0.405	< 20.3	< 60.8	< 4.05	< 0.304	< 4.05	< 0.152
NLA12_MN-160	unnamed	< 18.4	< 15.4	< 1.49	< 0.227	< 3.98	< 5.96	< 19.9	< 0.398	< 0.298	< 1.99	< 0.398	< 19.9	< 59.6	< 3.98	< 0.298	< 3.98	< 0.149
NLA12_MN-162	Waymier	< 21.4	< 22.7	< 1.48	< 0.472	< 3.95	< 63.4	< 206	< 0.395	< 0.296	< 1.97	< 0.395	< 19.7	< 112	< 3.95	< 0.986	< 4.19	< 0.148
NLA12_MN-163	unnamed	< 9.91	< 9.52	< 1.45	0.24	< 3.86	< 8.26	< 76.4	< 0.386	< 0.290	< 1.93	< 0.386		< 57.9	< 3.86	< 0.395	< 3.86	< 0.145
NLA12_MN-167	unnamed	< 6.40	< 11.2	< 1.49	< 0.177	< 3.97	< 5.96	< 19.9	< 0.397	< 0.298	< 1.99	< 0.397	< 19.9	< 59.6	< 3.97	< 0.298	< 3.97	< 0.149
NLA12_MN-170A	unnamed	< 20.0	< 9.10	< 1.44	< 0.144	< 3.83	< 37.6	< 189	< 0.383	< 0.287	< 1.91	< 0.383	< 19.1	< 81.0	< 3.83	< 0.538	< 3.83	< 0.144
NLA12_MN-171	unnamed	< 21.5	< 21.1	< 1.40	< 0.264	< 3.74	< 56.5	< 295	< 0.374	< 0.281	< 1.87	< 0.374	< 18.7	< 81.7	< 3.74	< 0.397	< 3.74	< 0.140

Lake number	Lake name	Methyl-prednisolone (ng/L)	Metoprolol (ng/L)	Norfluoxetine (ng/L)	Norverapamil (ng/L)	Paroxetine (ng/L)	Prednisolone (ng/L)	Prednisone (ng/L)	Promethazine (ng/L)	Propoxyphene (ng/L)	Propranolol (ng/L)	Sertraline (ng/L)	Simvastatin (ng/L)	Theophylline (ng/L)	Trenbolone (ng/L)	Trenbolone acetate (ng/L)	Valsartan (ng/L)	Verapamil (ng/L)
NLA12_MN-171 Blank		< 3.99	< 1.50	< 1.50	< 0.150	< 3.99	< 5.99	< 20.0	< 0.399	< 0.300	< 2.00	< 0.399	< 20.0	< 59.9	< 3.99	< 0.300	< 3.99	< 0.150
NLA12_MN-177	unnamed	< 15.0	< 21.7	< 1.56	< 0.428	< 4.16	< 6.24	< 20.8	< 0.416	< 0.312	< 2.08	< 0.416	< 20.8	< 62.4	< 4.16	< 0.312	< 4.16	< 0.156
NLA12_MN-181	unnamed	< 9.66	< 13.0	< 1.50	< 0.150	< 3.99	< 42.1	< 163	< 0.399	< 0.299	< 2.00	< 0.399	< 20.0	< 79.8	< 3.99	< 0.371	< 3.99	< 0.150
NLA12_MN-206	unnamed	< 5.05	< 25.5	< 1.45	< 0.223	< 3.86	< 7.66	< 43.2	< 0.386	< 0.290	< 1.93	< 0.386		< 57.9	< 3.86	< 0.642	< 3.86	< 0.159

* Currently receives treated domestic wastewater.

Table 9. GPS coordinates of the lakes included in this study.

Lake number	Lake name	Lat	Long
NLA12_MN-101	Long	47.59161607	-93.3916311
NLA12_MN-102	Spring	47.06932181	-92.0010277
NLA12_MN-103	Lookout	46.43683525	-93.957786
NLA12_MN-104	Fairy	46.70133413	-95.7477213
NLA12_MN-105	Becoosin	47.94625616	-91.3952537
NLA12_MN-106	Darling	45.91672941	-95.3966145
NLA12_MN-107	Cokato	45.10272907	-94.1682553
NLA12_MN-108	Long	47.0713723	-94.6025338
NLA12_MN-109	Richey	47.66729983	-90.9897866
NLA12_MN-110	Crow Wing	46.23697444	-94.3397827
NLA12_MN-111	Snail	45.07360185	-93.1265786
NLA12_MN-112	Eagle	44.18999906	-93.8966752
NLA12_MN-113	North Ash	44.43065079	-96.2902985
NLA12_MN-114	Woodcock	45.23853942	-94.9529376
NLA12_MN-115	Round	46.41918024	-95.8407623
NLA12_MN-116	Nokomis	44.90729392	-93.2424212
NLA12_MN-118 *	South	44.94199729	-94.0319502
NLA12_MN-119	Big Stone	45.40861219	-96.6258425
NLA12_MN-120	Flat	46.97285376	-95.6552126
NLA12_MN-121	Norway	45.30113485	-95.1183421
NLA12_MN-122	Jennie	45.00160888	-94.3323453
NLA12_MN-123	unnamed	45.26728203	-96.3702951
NLA12_MN-126	Diamond	46.98806594	-94.4677977
NLA12_MN-127	unnamed	46.12736399	-96.1321585
NLA12_MN-130A	Net	48.399879	-92.661354
NLA12_MN-131	unnamed	47.64394548	-96.2410577
NLA12_MN-132	Clear	45.52853972	-94.5348822
NLA12_MN-135	Lindgren	45.17625487	-95.1501926
NLA12_MN-136	unnamed	45.86640615	-95.2956878
NLA12_MN-137	Cucumber	47.11718744	-96.0118387
NLA12_MN-138A	Tenor	48.197296	-90.876818
NLA12_MN-141	East Red River	46.39927826	-95.8904023
NLA12_MN-143	unnamed	46.73231349	-96.0758673
NLA12_MN-144	unnamed	46.64984557	-94.1256868
NLA12_MN-145	Terrapin	45.17345079	-92.8215622
NLA12_MN-147	Wilbur	46.01934062	-92.5878331
NLA12_MN-150	Spree	48.02221592	-91.4389544
NLA12_MN-152	unnamed	45.42327454	-95.4750852
NLA12_MN-153	Bear	47.05758109	-95.7825845
NLA12_MN-157	Glorvigan	46.25398301	-95.936627

Lake number	Lake name	Lat	Long
NLA12_MN-158	unnamed	47.6643258	-95.7831355
NLA12_MN-160	unnamed	46.19684275	-94.5748742
NLA12_MN-162	Waymier	47.55977487	-93.0327646
NLA12_MN-163	unnamed	45.47030425	-93.3457461
NLA12_MN-167	unnamed	45.07989028	-94.8138248
NLA12_MN-170A	unnamed	47.913886	-90.50176
NLA12_MN-171	unnamed	45.50795426	-96.5128162
NLA12_MN-177	unnamed	44.26179326	-93.8251618
NLA12_MN-181	unnamed	47.24419803	-95.1290072
NLA12_MN-206	unnamed	48.00841998	-95.4461848