



# SAMPLE P R O F I L E S

Lake Winnipeg Stewards Questionnaire



## Lake Winnipeg Stewards Questionnaire

**1. What is your name?**

Allan Kristofferson

**2. What is your occupation in relation to Lake Winnipeg?**

I am the Managing Director of the Lake Winnipeg Research Consortium Inc. (LWRC).

**3. How did you come into your current occupation/work? (What is your educational background? Where/what did you study? Who were your mentors/teachers? This is to help students from a variety of backgrounds and educational levels identify with individuals involved in Lake Winnipeg.)**

Very little is known of Lake Winnipeg from a scientific perspective. Having had a close connection with Lake Winnipeg since my childhood, I saw an opportunity to increase our scientific understanding of the lake, so, along with a number of others with interest in the lake, we formed the Lake Winnipeg Research Consortium in 1998. The goal of the LWRC is to facilitate multidisciplinary research on the lake, and to promote educational opportunities for students where possible. Upon retirement from the Federal Fisheries Department, I became the Managing Director. I earned a B.Sc. in Zoology and a M.Sc. and Ph. D. in Ichthyology (study of fishes) from the University of Manitoba.

**4. Are there any early life experiences that drew you into your current work?**

I grew up in Gimli on the shore of Lake Winnipeg. Commercial fishing was an important part of the community, and I became interested in fish as a result. I wanted to pursue a career that involved fish and fishing, so, after studying biology at the University of Manitoba, I became a fisheries biologist.

**5. How did you become involved in working on Lake Winnipeg issues?**

I started working on Lake Winnipeg with the Provincial Fisheries Department in the early 1970s, and went on to complete my M.Sc. on lake whitefish in the lake. Following that, I became employed with the Federal Fisheries Department and spent 30 years working on Arctic char fisheries in the Canadian Arctic. I became aware of the development of problems with water quality in Lake Winnipeg by talking to commercial fishers that I knew. I wanted to get involved in this and was nearing retirement, so I and others formed the LWRC.

**6. Please describe a typical day on the job.**

I conduct my business from an office in Gimli. My job is to ensure that the entire operation runs smoothly. On a typical day, this includes dealing with funding issues, crew and vessel requirements, science needs, educational programs, preparing presentations, and, on occasion, interviews with media and others.

**7. What do you like about your job?**

It gives me a sense of satisfaction that I am doing something that will help to deal with the challenges facing the lake and the people who rely on it for business and pleasure.

**8. Why are you a steward of Lake Winnipeg/how do you take care of the lake?**

The activity I am involved in will give us a better understanding of what is happening within the lake. Scientific information that is produced as a result of our work will provide everyone (e.g., government and private citizens) with the ability to make better decisions about what is done in the watershed and how it affects the water quality in the lake.

**9. What do you think is the biggest issue surrounding Lake Winnipeg? What can we do?**

I think the biggest issue surrounding Lake Winnipeg is the lack of awareness by most of the 6.6 million people who live in its watershed of the serious nature of this eutrophication issue. Many are not aware of a problem at all, and many of those who know there is a problem do not understand its nature. We need to educate these people so that they will change their behaviour in order to reduce their nutrient inputs to the watershed.

**10. What advice/tips would you give to young people wanting to be proactive on the issues surrounding Lake Winnipeg (as a future scientist, Manitoba citizen, etc.)?**

First and foremost, everyone needs to know and accept that they are part of the problem. They need to understand the nature of the problem so that they will know what they need to do differently to help turn it around, and they must be willing to do so. People have different interests. Those interested in science can pursue a career that will put them in a position to get involved in the science directly. There is much we do not yet understand, and the more we understand, the better we will be able to protect the lake from this and future threats. There is a need for more education (teaching), more outreach (media), support of government (civil service, politicians), etc.

**11. Please add any other information you feel relevant to our young people learning about Lake Winnipeg.**

Lake Winnipeg is so very important to so many people. We each have a responsibility to protect it, whether we are directly affected by its problems or not.

**12. Please add any other information you feel relevant to young people wanting to obtain careers working in science.**

Young people wanting to obtain careers in science should become aware of the many different types of careers available, such as in government, academia, and private industry. This will provide information on the type and extent of education needed to secure a particular position of interest. Talking with those involved in such careers will help, and obtaining summer employment within a particular career will be very valuable in giving students “hands-on” experience in what it is actually like before they make a career choice.

**13. Please add any additional information you feel is relevant.**

Don't rush a career choice, but don't be afraid to switch if the first choice is not what you expected. Above all, once you have found a career of interest, be positive about your ability to achieve the level of expertise necessary to do an excellent job, and enjoy all aspects of it. That way, it won't seem like work!

## Lake Winnipeg Stewards Questionnaire

**1. What is your name?**

Dr. Eva Pip

**2. What is your occupation in relation to Lake Winnipeg?**

Research scientist

**3. How did you come into your current occupation/work? (What is your educational background? Where/what did you study? Who were your mentors/teachers? This is to help students from a variety of backgrounds and educational levels identify with individuals involved in Lake Winnipeg.)**

I have a B.Sc. (Hons) and Ph.D. from the University of Manitoba, and I also held a post-doctoral fellowship from the Natural Sciences and Engineering Research Council of Canada (NSERC). My doctoral thesis was on freshwater ecology/physiology, and focused on how water chemistry is linked to aquatic community composition and structure. However, none of my mentors or supervisors were interested in Lake Winnipeg.

**4. Are there any early life experiences that drew you into your current work?**

Yes, I have always been interested in aquatic organisms, and I think that this started when I began collecting shells when I was five years old. This grew into a lifetime obsession.

**5. How did you become involved in working on Lake Winnipeg issues?**

I always loved this lake, and I was saddened to see how it was being neglected and abused.

**6. Please describe a typical day on the job.**

When I am out on a sampling day in the field: I wake up at about 4:30 a.m., load up my truck with my equipment and canoe, and head out. Sampling needs to be done regardless of the weather, as the lake will not wait for anybody. It is very pleasant when the day is nice, but not so good when it is pouring and the bugs are bad. I spend the whole day visiting my sampling sites, collecting water samples and specimens, and recording measurements such as temperature, pH, oxygen concentrations, underwater light intensities, etc., in my waterproof field notebook. I will typically take 15 minutes to eat my lunch, which is always a cheese sandwich and a thermos of tea—my standard field lunch for the past 50 years! I come back to the lab when it is already dark. I have to unload my samples and put them away in the fridge or freezer. If there are bacterial samples such as *E. coli* to analyze, these must be inoculated onto media immediately, since they cannot be stored, and put away into the incubator to grow so they can be counted and identified later. Then I head home (I live in eastern Manitoba) and usually arrive back at around midnight. If I am sampling farther away, such as around the north basin of the lake, I will sleep in my truck overnight. During winter, I spend my days in the lab going through the samples I have collected, together with my students and research assistants. We do a lot of water chemistry: we analyze for basic things like nitrogen, phosphorus, alkalinity, chloride, sulphate, total dissolved solids, suspended solids, as well as metals such as cadmium, copper, and lead. We also look at the toxins produced by blue-green algae, and we do a lot of work on the plants and, particularly, the snails and clams that are found in the lake, as they tell us a lot about the health of the lake. Some years, we also sample the lake in winter. This involves going out all day on a snowmobile with a dogsled attached and cutting holes in the ice, through which we can lower our sampling equipment. There have been a few times when I have fallen through the ice, but have lived to tell about it.

**7. What do you like about your job?**

I love being outdoors, and I love being able to find out new things that nobody has known before.

**8. Why are you a steward of Lake Winnipeg/how do you take care of the lake?**

I believe that *somebody* has to be an advocate for Lake Winnipeg, since the politicians and other people who are supposed to be doing it, are definitely *not* doing it! Personally, I take care of the lake by refusing to have a cottage. In the 50 years that I have been working in this business and the thousands of cottages that I have observed, I firmly believe that it is not possible for a cottage to have no adverse impact on the environment. It is wasteful and greedy to have two residences when much of the world's population has none, and cottages are usually located in places where the environment is the most vulnerable and fragile.

**9. What do you think is the biggest issue surrounding Lake Winnipeg?  
What can we do?**

The biggest issue is public apathy. If more people took the time to educate themselves about the impact that their actions have on the lake, and if more people expressed their concerns to their government, maybe we could see some changes. But for many things, it is already too late. For example, we can never put back all the species that have already disappeared from the lake.

**10. What advice/tips would you give to young people wanting to be proactive on the issues surrounding Lake Winnipeg (as a future scientist, Manitoba citizen, etc.)?**

Get informed about the things that we are doing that are harming the lake. Start making changes in your own life/family/school.

**11. Please add any other information you feel is relevant to our young people learning about Lake Winnipeg.**

Our young people, ultimately, are the only hope that Lake Winnipeg has. The older generations have blown their chance.

## Lake Winnipeg Stewards Questionnaire

**1. What is your name?**

Dr. Gordon Goldsborough

**2. What is your occupation in relation to Lake Winnipeg?**

I am a member of the Department of Biological Sciences at the University of Manitoba. I am a wetland scientist, interested in the dramatic ecological changes that have occurred in the Netley-Libau marsh located on the south shore of Lake Winnipeg.

**3. How did you come into your current occupation/work? (What is your educational background? Where/what did you study? Who were your mentors/teachers? This is to help students from a variety of backgrounds and educational levels identify with individuals involved in Lake Winnipeg.)**

I received B.Sc. (Honours) and Ph.D. degrees from the University of Manitoba, did a post-doctoral fellowship at the University of Alberta, and taught at Brandon University before coming to the University of Manitoba in 1996, as Director of the University's Delta Marsh Field Station adjacent to Delta Marsh and Lake Manitoba. My doctoral advisor, who had a major hand in my decision to go into my field of study, was Dr. Gordon Robinson, who is also a member of the Department of Biological Sciences at the University of Manitoba.

**4. Are there any early life experiences that drew you into your current work?**

I took an undergraduate-level course in biology of algae, which, at that time, was a required course that I did not expect to enjoy, but did so immensely. On the basis of that experience, I changed my career plans (which at one time were to go into forestry) to instead become an aquatic ecologist.

**5. How did you become involved in working on Lake Winnipeg issues?**

I was asked by Dr. Frank Baldwin (a retired medical scientist living near the Netley-Libau marsh) to look into the dramatic ecological changes in the marsh that he had witnessed through his many years of experience there. We were shocked at what we found, and were gradually drawn into further studies that are still ongoing today.

**6. Please describe a typical day on the job.**

Every day is different—that's what I enjoy most about my job, along with the flexibility that it affords (basically, I decide what I do each day; it is generally not dictated to me by others). One day might be teaching classes of university students. Another might be attending a meeting of scientists or resource managers. Yet another might be leading a public meeting relating or giving a public presentation. Still another might be spent in an airboat cruising around a marsh. And another might be spent hunched over a computer keyboard, analyzing data, and writing scientific articles or applications for research funding.

**7. Why are you a steward of Lake Winnipeg/how do you take care of the lake?**

I am interested in healthy coastal wetlands because, when they do their job, they remove nutrients and therefore prevent them from passing into the lake. By restoring the ecological function of the Netley-Libau marsh, we can reduce the impacts of the Red River on water quality in Lake Winnipeg.

**8. What do you think is the biggest issue surrounding Lake Winnipeg? What can we do?**

Lake Winnipeg is the “end of the pipe” for an enormous watershed covering several Canadian provinces and American states. Getting participation from all the relevant stakeholders will be crucial to the restoration of Lake Winnipeg. Therefore, I think that wider public education about the Lake Winnipeg issue, and the watershed concept in general, is critically important.

**9. What advice/tips would you give to young people wanting to be proactive on the issues surrounding Lake Winnipeg (as a future scientist, Manitoba citizen, etc.)?**

Lake Winnipeg water quality is affected by the contaminants put into water flowing into it from the watershed. Anything that people can do to reduce their consumption of water, and therefore their production of “gray water” containing contaminants will help. Every citizen should take part in a personal water audit to track their own water consumption and, where



possible, strive to reduce it. Every litre of water that is not consumed is one less litre of contaminated water entering Lake Winnipeg.

## Lake Winnipeg Stewards Questionnaire

**1. What is your name?**

Gregg J. Brunskill

**2. What is your occupation in relation to Lake Winnipeg?**

During 1968–74, I was a limnologist studying Lake Winnipeg, from the Fisheries Research Board/Freshwater Institute in Fort Garry. I am now a retired chemical oceanographer, having worked on the coastal seas of northern Australia, New Guinea, and Indonesia.

**3. How did you come into your current occupation/work? (What is your educational background? Where/what did you study? Who were your mentors/teachers? This is to help students from a variety of backgrounds and educational levels identify with individuals involved in Lake Winnipeg.)**

Undergraduate, B.A. 1959–63, Augustana College, Sioux Falls, South Dakota, Major in Biology, Minor in Chemistry.

Graduate, Ph.D. 1963–1967, Cornell University, Ithaca, N.Y., Major in Biogeochemistry, Minors in Geology and Psychology. Thesis in Limnology and Geochemistry

**4. Are there any early life experiences that drew you into your current work?**

Mostly serendipity. I grew up in western South Dakota, where there isn't much water. The newspapers thought Lake Erie was dying, so they gave us money to find out what was happening in the Canadian Great Lakes.

**5. Please describe a typical day on the job.**

I gather the eggs, water my gardens, pick sweet corn and watermelons and mangoes and jackfruits and passionfruits, read and listen to music. I am now retired, living on a rural property in north Queensland, Australia. While I was working on Lake Winnipeg in 1969, it was a rough job, trying to get all the people and equipment to work on the CGS Bradbury, running 24 hrs/day, mostly in rough weather.

**6. What do you like about your job?**

I like adventure, creating new ways to measure the natural world processes, trying to understand how the world works, and seeing exotic corners of the world. Hnaua, Berens River, George Island, Grand Rapids are exotic places that interested me on Lake Winnipeg. I also learned that I liked working on big ships, and that I didn't get seasick.

**7. Why are you a steward of Lake Winnipeg/how do you take care of the lake?**

I have several publications that help explain how Lake Winnipeg operates, and I continue to be involved in the Lake Winnipeg Foundation affairs.

**8. What do you think is the biggest issue surrounding Lake Winnipeg? What can we do?**

Reduce agricultural runoff of farm wastes and industrial toxic substances to the Red, Assiniboine, Saskatchewan, and Winnipeg Rivers. Protect the fishery, and the scenic values of the shorelines.

**9. What advice/tips would you give to young people wanting to be proactive on the issues surrounding Lake Winnipeg (as a future scientist, Manitoba citizen etc)?**

Study geology, physics, chemistry, biology, environmental economics, Manitoba history, and even limnology. Support the Lake Winnipeg Foundation at <[www.lakewinnipegfoundation.org/](http://www.lakewinnipegfoundation.org/)>.

**10. Please add any other information you feel is relevant to our young people learning about Lake Winnipeg.**

Allan, R.J., & G.J. Brunskill. "Relative atomic variation (RAV) of elements in lake sediments: Lake Winnipeg and other Canadian lakes." *Interactions between sediments and freshwater: Proceedings of an International Symposium, Amsterdam, September 6-10, 1976*. Ed. H.L. Golterman. The Hague: Junk & Wageningen, PUDOC, 1977. 108-120 (print).

Brunskill, G.J. *Rates of Supply of Nutrients, Nitrogen and Phosphorus to Lake Winnipeg*, Manitoba, Canada: Int. Ver. Theor. Angew Limnol. Verh., 1973. 18:1755-1759.

Brunskill G.J., Elliott S.E.M., & Campbell P. *Morphometry, Hydrology, and Watershed Data Pertinent to the Limnology of Lake Winnipeg*. Winnipeg, MB: Western Region Department of Fisheries and Oceans, Canadian Manuscript Report of Fisheries & Aquatic Sciences No. 1556, April, 1980. v +23

Brunskill, G.J., & B.W. Graham. *The offshore sediments of Lake Winnipeg*. Can. Fish. Mar. Serv. Manuscr. 1979. Rep. 1540: v + 75.

Brunskill, G.J., D.W. Schindler, S.E.M. Elliott, & P. Campbell. The attenuation of light in Lake Winnipeg waters. Can. Fish. Mar. Serv. Manus, 1979. Rep. 1522: v + 79

[Note: all of these publications should be available at the Freshwater Institute Library in Winnipeg.]

**11. Please add any other information you feel relevant to young people wanting to obtain careers working in science.**

Study geology, physics, chemistry, biology, environmental economics, and even limnology in a good university, and find good people to work with in research projects.

## Lake Winnipeg Stewards Questionnaire

**1. What is your name?**

My name is Lyle Lockhart.

**2. What is your occupation in relation to Lake Winnipeg?**

I am retired. I came to be interested in Lake Winnipeg because of my work as a Research Scientist at the Freshwater Institute (1971–2001).

Since 1995 we have spent most of our summers fixing up an old cottage at Ponemah and so I had both professional and personal interests in the lake.

**3. How did you come into your current occupation/work? (What is your educational background—where/what did you study? Who were your mentors/teachers? This is to help students from a variety of backgrounds and educational levels identify with individuals involved in Lake Winnipeg).**

I completed a B.A. (1965) and M.Sc. (1967) in biology and Ph.D. (1971) in biochemistry (University of Western Ontario) and was offered work at the then quite new Freshwater Institute here on the U of M campus. Biochemistry is a mixed discipline with quite a lot of chemistry and relatively little biology but I already had the biology part. My work at the Freshwater Institute was on the presence of contaminants in water and aquatic organisms and the biological effects on those aquatic organisms. I was an adjunct professor at U of M and taught an undergraduate course in Environmental Toxicology along with graduate students.

**4. Are there any early life experiences that drew you into your current work?**

I grew up near the north shore of Lake Erie and was always interested in that. I used to ride my bike to Port Stanley and fish from the pier there; I could usually fill my tin bucket with perch in a couple of hours. On moving to Winnipeg, I was surprised how little scientific interest there seemed to be in Lake Winnipeg but I had almost no opportunities to work on it until the 1990s.

**5. How did you become involved in working on Lake Winnipeg issues?**

I had a small project on effects of the Pine Falls pulp mill on the reach of the Winnipeg River from Pine Falls to Traverse Bay. The results were quite striking and I wanted to extend the work into the lake. My first opportunity to do that came in 1994 with a geological cruise of the Namao.

**6. Please describe a typical day on the job.**

I don't have to go to work any more. Usually I spend a good bit of time on scientific literature in two areas, material relevant to Lake Winnipeg and to Evolution in general. And on other hobby interests.

**7. What do you like about your job?**

Being retired is one of the best times of life as long as health holds up. For the first time, I can study whatever I want, not something that I have been able to find research money to do.

**8. Why are you a steward of Lake Winnipeg/how do you take care of the lake?**

I have been working a lot of volunteer hours for the Lake Winnipeg Foundation. I was one of its founding directors and served as chair of its education committee. Now I am chair of its scientific committee. I hope soon to be able to give up that role and just be a member of the foundation and the science committee and avoid everlasting meetings. I want to spend more time getting relevant literature catalogued and onto our embryonic website (see <[www.lakewinnipegfoundation.org](http://www.lakewinnipegfoundation.org)>).

**9. What do you think is the biggest issue surrounding Lake Winnipeg?**

There are several issues for the lake. I usually group them into biological ones, chemical ones, physical ones, and political/economic ones. Probably the most serious immediate biological issues are the algal bloom that seems to be becoming both larger and more frequent and the invasions of the lake by new species. The algal problem is related to the chemical inputs, particularly of phosphorus which in turn are related to changing precipitation patterns and ever-growing land drainage networks. Most of the physical/chemical/biological problems of the lake are related to political and economic issues that arise from having so many different jurisdictions with different interests involved in managing the watershed.

**10. What advice/tips would you give to young people wanting to be proactive on the issues surrounding Lake Winnipeg (as a future scientist, Manitoba citizen etc)?**

I think young people should try to experience a lake if they can. If they experience it, I hope they will come to both love and respect it. The key is the value they place on the lake. All the rest will flow from the kinds of values they form, not just about the lake but about the planet as a whole. As far as formal education goes, pretty well any of the sciences will be helpful regardless of the careers they follow.

**11. Please add any other information you feel relevant to our young people learning about Lake Winnipeg.**

Young people have the most freedom to form positive values about the environment in general and about a big features of our environment here, namely Lake Winnipeg and the other lakes and rivers - water in general. Young people do not yet have entrenched economic interests that may compromise the values they place on the environment. If there is a conflict between our environment and our incomes, we adults tend to make choices that favour our incomes. If young people already have strong environmental values, I hope they will choose economic activities that are consistent with those early environmental values.

**12. Please add any other information you feel relevant to young people wanting to obtain careers working in Science**

I hope young people will be able to obtain fairly broad educational experiences. I was once asked by a Winnipeg city MLA whether his riding was in the Lake Winnipeg drainage. It never occurred to me that an elected MLA would not be aware of where the rivers and sewers end up. He told me he had never thought about it before. That is the problem. I often give public talks about the problems with Lake Winnipeg and many Manitobans are surprised at the extent of the watershed that drains into Lake Winnipeg. Something must have been lacking in our education about geography. We all need to think about the consequences of our actions and childhood seems a good time to learn that.

## Lake Winnipeg Stewards Questionnaire

**1. What is your name?**

Greg McCullough

**2. What is your occupation in relation to Lake Winnipeg?**

Geographer (doing remote sensing of algae in the lake, and studying geomorphology and hydrology of nutrient transport from the watershed)

**3. How did you come into your current occupation/work? (What is your educational background-where/what did you study? Who were your mentors/teachers? This is to help students from a variety of backgrounds and educational levels identify with individuals involved in Lake Winnipeg).**

I did a B.Sc. in 1968–71; then worked with a landscape architecture and planning firm for a while, then with Fisheries and Oceans Canada for 19 years studying hydrology and sediment and nutrient transport in lakes and streams; then did an M.Sc. in remote sensing, then a Ph.D. in geomorphology/limnology and now do all of these things as a research associate at the University of Manitoba. That's the bare bones description of my education so far.

My first and greatest influence was Bob Newbury—a civil engineer who taught me geomorphology and the importance of finding work that is both a joy and a service. And then Bob Hecky—a limnologist from whom I began to learn just how complex and fascinating every lake is (if you happen to be that way bent).

**4. Are there any early life experiences that drew you into your current work?**

I'd like to say my early playing in puddles, which would be true. But also, chance. I started my B.Sc. in geology, which I very early on grew bored by. And then I found geomorphology and I was off.

**5. How did you become involved in working on Lake Winnipeg issues?**

I was mid-thesis and found opportunities for grants to do remote sensing research on the lake. I jumped in because I could see the value of the work to understanding the lake, and felt that by the time I finished my Ph.D., someone else would be doing it. So I took a few years longer to write up my thesis. Lake Winnipeg paid for it, and has been helping pay for me ever since. (I do have another job, but still find time for a lot of Lake Winnipeg research.)

**6. Please describe a typical day on the job**

Could be a day on the computer analyzing the relationships between numeric data recorded by satellites and concentrations of cyanobacteria sampled in Lake Winnipeg. Or analyzing data sets for environmental factors other than nutrient concentrations that might have affected the relative size of algal blooms in different years—either could occupy days. Or it could be a day on the Namao tending (usually cantankerous) equipment that measures optical properties of lake water and sampling water for chlorophyll and associated parameters at various stations through the day, followed by sub-sampling and filtering the water—preparing subsamples to be sent to various labs for analysis when we return. It could be a day driving around to suppliers picking up hardware—hose, valves, wood, bottles, filter paper, whatever—to make up the sampling gear and building weather-proof housing for equipment and all the rest that has to be done to get ready to do that sampling. And then, there are meetings... Or it could be a day answering email—that's today!

**7. What do you like about your job?**

I love figuring out how things work. But by things, I mean mostly rivers, lakes, the sea—and all of the processes that go on in them. And I enjoy being outside, whether on a ship or beside a stream. Field work is a way to get paid to do what I would do anyway if I had the money.

**8. Why are you a steward of Lake Winnipeg/how do you take care of the lake?**

I don't think of myself as a steward (sounds too much like something out of *Lord of the Rings*, where the stewards were failed protectors) but I'll try to answer. The simplest part is that I have developed a capability to monitor the lake using satellite data; that's a tool that we can use to monitor the lake in the future, a way to measure the response of the lake to whatever mitigation strategies we undertake to "fix" it. At the other end of things, I also study relationships between climate, flooding and nutrient loading to Lake Winnipeg's tributary rivers. We may understand a lot about how the lake has changed in response to increased nutrient loading, but we are a long ways from understanding watershed processes well enough to be sure we can lower that loading (other than from urban sewage—that we do know how to do). I hope that my research will contribute to better understanding those processes... and through that, contribute to decisions that will have to be made to control them.

**9. What do you think is the biggest issue surrounding Lake Winnipeg?  
What can we do?**

Nutrient loading. Support decisions to remove phosphorus from sewage—not just in Winnipeg, but in every community. Lobby governments to quit adding phosphorus to your water supply (it's added to reduce deterioration of water lines. Push them to find another way.) Personally: learn where you contribute phosphorus to the watershed—dishwasher detergents, car washes, lawn fertilizers, others—many of those are optional; you can choose to not use them. Most of all, learn about it. Read the Lake Winnipeg Stewardship Board's report—they had lots of ideas. Some you can do, some you can promote.

**10. What advice/tips would you give to young people wanting to be proactive on the issues surrounding Lake Winnipeg (as a future scientist, Manitoba citizen etc)?**

Pretty much what I wrote above. For a future scientist: there are pieces to the puzzle we still haven't figured out. Everything I wrote above seems to do with urban life; yet most of the nutrient loading to Lake Winnipeg comes from the land. We can suggest phosphorus runoff mitigation strategies that may contribute a little, but there is so much more to learn. Lots of room for science, some applied, some pretty basic.

**11. Please add any other information you feel relevant to our young people learning about Lake Winnipeg.**

Remember that it's a pretty complex ecosystem. It's not dying; it's changing. We may or may not be able to reverse that change, but if not, we can still try to manage it. To do either needs knowledge, and time.

**12. Please add any other information you feel relevant to young people wanting to obtain careers working in Science.**

Better be into this for the love of it; the kind of environmental research I do won't likely make you rich.

## Lake Winnipeg Stewards Questionnaire

**1. What is your name?**

Sue Watson

**2. What is your occupation in relation to Lake Winnipeg?**

Research Scientist with Environment Canada

**3. How did you come into your current occupation/work? (What is your educational background-where/what did you study? Who were your mentors/teachers? This is to help students from a variety of backgrounds and educational levels identify with individuals involved in Lake Winnipeg).**

I obtained a B.Sc., and M.Sc. at McGill University in the 1970s. The graduate work focused on Lake Memphremagog, a trans-boundary lake spanning the Vermont/Quebec borders with similar, albeit less severe, issues with inputs of nutrient-rich water at the south end. This lake has several basins, and exhibits a nutrient gradient and associated changes in the species of algae and abundance that predominate. There were frequent summer blooms in the more shallow south basin, which received the majority of nutrient inputs from the southern river inflow and some of the embayments, and a gradual clearing of the water column towards the deeper areas in the north. Similar to Lake Winnipeg, I worked on an interdisciplinary team to understand the causes and correctives of this problem. I continued on at McGill for two more years, working as a research assistant for Dr. J. Kalff, and analyzing the samples he took from a series of African lakes, which we published. Following a 15-year period when I stayed home and raised a family (although stayed peripherally involved in research via co-authored publications), I went on to obtain a Ph.D. at the University of Calgary, where we were living at the time. I specialized in the ecophysiology of algal species outbreaks—i.e., how individual species are able to grow to excess and dominate a community to the near exclusion of others (a ‘bloom’). I focused on algae which are both photosynthetic (fix energy from the sun) and bacterivorous (acquire energy and nutrients by ingesting bacteria as an alternative resource). I became intrigued in the chemical ecology of these and other algae, and why they produce compounds such as taste-odour causing volatile metabolites and toxins. This was the focus of an NSERC Post Doctoral Fellow at the University of Calgary, which was followed by placement with Environment Canada, working on this issue. I initially was located at the University of Calgary as an adjunct faculty member and government scientist, where I conducted research into algal outbreaks, chemical ecology, and nutrient-management related issues in southern Alberta and the mountain parks. As more and more of my work involved the Great Lakes, I relocated to Burlington and now work at CCIW. I work with many different levels of government, industry (including the drinking water industry), academia, and local stewardship groups in Canada, the US, and other countries (including Australian and European partners), as well as academic partners. Recently, Environment Canada has become involved in multidisciplinary research and assessment of Lake Winnipeg and surrounding drainage systems (e.g., Lake of the Woods), which is a major component of our present work.

**4. Are there any early life experiences that drew you into your current work?**

A love of the outdoors, water, and a healthy curiosity (which often gets me into trouble!).

I chose to have a family and then challenge myself by launching into a Ph.D. at age 40—it is never too late to set and achieve goals.

**5. How did you become involved in working on Lake Winnipeg issues?**

Recently, Environment Canada has become involved in multidisciplinary research and assessment of Lake Winnipeg and the surrounding drainage



systems (e.g., Lake of the Woods), which is a major component of our present work. I have also been working for some time with scientists at the Freshwater Institute on other water quality related issues.

**6. Please describe a typical day on the job**

There is no such thing! I work on Lake Ontario and embayments, Lake Erie, the St. Lawrence River, Sudbury district lakes, prairie lakes, Lake Winnipeg, and Lake of the Woods, and this requires a lot of management and, often, lab and field work, meetings, and much travelling. I also supervise many students and young people at summer work—term employees, interns, and grad students.

**7. What do you like about your job?**

The different partners and students, the variety and challenge of the different water bodies we work with, and the opportunity to travel and see Canada and other countries in the world and share ideas and learn about issues in these places. We often share many environmental problems.

**8. Why are you a steward of Lake Winnipeg/how do you take care of the lake?**

It is a vital and living ecosystem and a major source of fresh water for Canada. It is now recognized as the 6th Great Lake and, as such, is the most impaired, with more severe water quality problems and over-enrichment of nutrients than even Lake Erie. It is imperative that remedial action is taken, which first requires the identification of the key sources of nutrients and other contaminants and a basin-wide effort to work together in this initiative following a scientifically based action plan.

**9. What do you think is the biggest issue surrounding Lake Winnipeg? What can we do?**

Non-point-source nutrient inputs from the watershed (notably agriculture), historic complacency, the water level regulation by the numerous hydro dams that have fundamentally changed the flushing rates of the lake, allowing more nutrient and sediment deposition to the bottom and accumulation of internal reserves. This high nutrient input has resulted in the recent increased frequency of severe algal blooms and impaired food-web function.

**10. What advice/tips would you give to young people wanting to be proactive on the issues surrounding Lake Winnipeg (as a future scientist, Manitoba citizen, etc.)?**

Become involved and informed, learn about the key issues and why nutrients are a problem, participate in local restoration projects (e.g., wetland restoration, tree planting, practices, and environmentally friendly lifestyle, such as using less water, gas, and hydroelectricity; eating locally; reducing garbage and landfill material; initiating composting, and understanding the potential impacts of garden and other fertilizers, etc.)

**11. Please add any other information you feel relevant to our young people learning about Lake Winnipeg.**

Get active and move to restore and protect your lake! It is a precious and badly battered local and national resource. Join the local groups at [www.lakewinnipegresearch.org](http://www.lakewinnipegresearch.org) and [www.lakewinnipegfoundation.org](http://www.lakewinnipegfoundation.org).

**12. Please add any other information you feel relevant to young people wanting to obtain careers working in science.**

Keep pushing yourself past your comfort zone and challenging yourself—this is the only way to grow and really experience life to its fullest. Take opportunities as they arise! One can always find a reason why not to, and allow oneself to slip into a routine while life and careers pass you by. There is not such thing as a final choice—i.e., even if you take a graduate degree in one area, you can always change course afterwards and follow a completely different (or related) path.