

**Communicating the Risks of
Consuming Fish from Onondaga
Lake to Multicultural Groups:
Guidelines for NGOs,
Governmental Bodies, and Other
Stakeholders**

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**Onondaga Lake: Environmental
Background**

Onondaga Lake is one of the most recreationally utilized water bodies in Central New York, with over one million visitors annually (14). A few of the many attractions include picnicking, boating, kayaking, fishing, and trails used for walking or biking, a skate park, playgrounds, as well as historic sites and museums (14). Despite evidence and awareness of high pollution levels in the area, the history and recreation sites continue to attract visitors from a variety of locations. Onondaga Lake holds a rich and extensive indigenous history; Native American cultures first settled along the shoreline, and created agriculture and village life until the later arrival of European populations (9). Indigenous and multiethnic communities continue to inhabit the areas surrounding Onondaga Lake and Onondaga County, and many use the lake for subsistence purposes including fish consumption.

Onondaga Lake is approximately four and a half miles long, one mile wide, and is located in Central New York, just north of the City of Syracuse in Onondaga County. It is linked to many other bodies of water as it combines with the Oneida River to form the Oswego River, and flows into the Seneca River and moves north into Lake Ontario in the City of Oswego (9). The major tributaries and inputs to the lake include Nine Mile Creek, Onondaga Creek, Ley Creek, Bloody Brook, Harbor Brook, and the Metropolitan Syracuse Sewage Treatment Plant (METRO). This network of water bodies allows for a flow of materials and species between and throughout the system. Although much of the pollution is centralized at Onondaga Lake,

contaminants have also been detected in the connecting bodies of water as well.

Pollution in Onondaga Lake dates back to the early 1800s. By 1828, the Oswego Canal, which ran along the eastern shore of the lake, became the primary supply and shipping route for the salt industry, and over time most of the southern half of the shoreline was involved in salt manufacturing processes (9). Salt and limestone deposits quickly became important for the development of many industrial processes in Syracuse, each with their own environmental impacts (9). In 1884, the Solvay Process Company began producing soda ash along the shore of the lake, and was responsible for dumping approximately six million pounds of waste comprised of chlorine, sodium, and calcium into Onondaga Lake on a daily basis, before it was eventually shut down in 1986. During this period, these chemicals accumulated at the bottom of the lake in the sediments. Salty wastes have continued to leach into the water from the waste beds located along the Nine Mile Creek (22). The Allied Chemical and Dye Corporation (later Honeywell) began production of chlorine in 1946 with the mercury-cell process. It is estimated that between 1946 and 1970, 165 thousand pounds of mercury were discharged into the lake (22). The activities of both the Solvay Process Company and Allied Chemical have left harmful levels of mercury and other chemicals in the water and sediments. In 1970 harmful levels of mercury were detected in fish, and a fishing ban was put into effect.

Fish have been contaminated at unhealthy levels since approximately 1946 (9). The high levels of pollutants detected have led to increased concern for the safety of visitors who frequently enjoy recreational activities involving the water. One particular concern is the adverse health effects that may result from the consumption of fish from Onondaga Lake.

Mercury is only one of the many contaminants found in Onondaga Lake fish. Some of the other harmful compounds that are found in fish include chlorinated benzene, dioxin, BTEX compounds (benzene, toluene, ethylbenzene, xylenes), PCBs (polychlorinated biphenyls), and PAHs (polycyclic aromatic hydrocarbons). These toxins are predominant in the sediments along the bottom of the lake, the water, as well as the surrounding soils and waste beds lining the western shore of the lake (11). Today, methyl mercury is the contaminant of highest concern that is present in the lake. It has been measured in fish from

Onondaga Lake at levels that go far beyond federal and state standards. Scientists have estimated that approximately seven million cubic yards of lake-bottom sediments are contaminated as a result of the mercury discharges from Allied Chemical from 1946 to 1970 (11). Chlorine, sodium, and calcium also remain due to the actions of the former Solvay Process Company and the continued flow of salt wastes reaching the lake (22). All of these chemicals are present, at some level, in the fish species of the lake that are consumed by many anglers and their family members. Amongst these anglers, there are a variety of ethnic groups who rely on the lake for subsistence purposes. Fish is an excellent form of protein, polyunsaturated fatty acids (omega-3), calcium, zinc, and iron, and it is estimated that in the future, fish will become an even more important source of protein than it is today (18). It has been determined that some fish in the lake contain higher levels of contaminants than others, and current fishing advisories work to provide anglers and subsistence users with the proper information and knowledge necessary to inform them which fish are unsafe to consume.

As of 2012, there is a biological monitoring program in Onondaga County that “measures the number and types of fish, aquatic plants, macroinvertebrates, phytoplankton (algae), zooplankton, and zebra mussels,” that are present in the lake. This program has recently determined that due to ongoing cleanup efforts, the lake is currently able to support a diverse biological community through the migration of various species from nearby lakes (8).

Fishing and Health

Anglers from all over the Syracuse region from various cultural backgrounds enjoy the largemouth and smallmouth bass from Onondaga Lake, and both are recognized as abundant species of fish found there (8). However, the current fishing advisory for Onondaga Lake states that anglers should refrain from consuming individuals of these species over fifteen inches (17). The size of the fish is very important since larger fish tend to have accumulated a greater amount of harmful chemicals in their tissues (bioaccumulation). Larger fish also tend to be older and have had more time to ingest and accumulate higher amounts of chemical contaminants over time

(13). Beyond the regulations for the bass, the New York State Department of Health (NYSDOH) has advised people to only eat four meals per month of brown bullhead and pumpkinseed fish, also found in abundance in the lake (these are considered the least contaminated sportfish), as well as up to one meal per month of any fish species found in the lake that are not specifically mentioned in the advisory (8). Additionally, the NYSDOH advises women of childbearing years as well as any children under the age of fifteen to completely avoid eating any species of fish from the waters of Onondaga Lake or the Seneca River up to Lock 24 (Baldwinsville) (17).

Women, children, and any individuals who choose to consume large amounts of fish from Onondaga Lake face health risks caused by the various chemical contaminants. For example, PCB exposure can impact sperm quality in men, increase the time to pregnancy for women, and cause menstrual cycle changes. Elderly men and women, ages forty-nine to eighty-six, may face decreased memory and learning abilities, and in children, PCBs can impact birth weights, cause a decrease in short-term memory, and negatively impact their ability to learn (13). Methyl mercury, which is the most common form of mercury found in fish, is known to harm the nervous system, and there is serious concern over possible interruptions in the development of the nervous system in unborn children. Increased exposure to methyl mercury can lead to permanent damage to the brain, kidneys and fetus if the mother consumes too much . (13). Elements such as chromium, sodium and calcium detected in the lake may also lead to other disorders including, but not limited to, neuronal defects and nasal septa defects (18) It is important that groups who choose to rely on the lake for subsistence fishing are informed of the possible health risks they face through consumption of the fish. Although there is a basic advisory available for Onondaga Lake, it may not be efficiently and effectively reaching the multiethnic and multilingual communities here.

Syracuse: A Multicultural City

Over the last decade, many refugee groups have immigrated to the United States, and Syracuse in particular, from a number of places throughout the world. Syracuse, along

with many other cities across the Northeast and Midwest that are former centers of manufacturing, are frequently selected as resettlement destinations for refugees. The U.S. population is generally becoming increasingly diverse, particularly within urban centers such as the City of Syracuse (5). A large number of immigrants have arrived in Syracuse from countries such as Burma, Bhutan, Sudan, Somalia, Bosnia and Herzegovina, Iraq, Liberia, and Iraq (16). Within these populations, various languages and dialects are spoken, and each group holds a specific set of beliefs, customs, and traditions. Qualitative research and communication with various stakeholders in Syracuse have revealed that beyond the English-speaking population, there is a large multiethnic community at a high risk of health issues resulting from overconsumption of fish from Onondaga Lake. This community most recently (as of 2012) includes various groups such as minorities from Burma (Karen, Chin), and to a lesser extent, the Hmong, Vietnamese, Bhutanese, and Spanish-speaking groups (mostly Puerto Rican).

The Karen people come from South-East Asia in Burma, and due to the civil wars that the Karen have been fighting against the Burmese military regime for over sixty years, more than one hundred and forty thousand Burmese Karen chose to flee to Thailand (21). From there, between 2005 and 2010, about sixty-five thousand refugees resettled in countries such as America, Canada, and Australia. Of these refugees, a large number of Karen have chosen to resettle in the U.S. (21). The Hmong originated in Laos and resettled in Thai refugee camps during the spring of 1976, and most Hmong chose to resettle, once again, in the United States between 1979 and 1980 (20). Today, it is estimated that the Hmong population in the United States has grown to approximately three hundred thousand (3).

The language and cultural barriers that come with resettlement in foreign countries pose many challenges related to communicating health risks to members of these communities. In order to effectively convey these risks, it is important that fish advisories, and any information related to possible health risks, are available in a variety of languages in addition to English. These languages include Burmese, Spanish, and potentially Hmong and Vietnamese as well as a variety of others. By offering translations, it will be easier for multiethnic groups to

understand the dangers they face through the overconsumption of fish from Onondaga Lake, and allow them to make informed decisions about their health.

Case Studies

Onondaga Lake is not the only large body of water with health issues related to consumption of contaminated fish. Lake Ontario is known to provide the most contaminated fish of all of the Great Lakes. These fish contain PCBs, dioxin, and mirex at levels that are much higher than those recommended by the Food and Drug Administration (1). Throughout all of the Great Lakes, there are high levels of contaminants including PCBs and DDT compounds, which, as determined by the United States Environmental Protection Agency, are highly carcinogenic to humans and can lead to other extreme health risks (19). Many human epidemiology studies have found that there is a direct link between sport fish consumption in Lake Michigan, maternal or fetal PCB levels, and the harmful reproductive and developmental impacts that follow from overconsumption (19). Throughout the Great Lakes region, sport fish advisories are available and recommend less consumption of particular fish species and sizes that are recognized as having high levels of chemical contaminants. These advisories also include advice on cleaning and cooking methods that reduce the PCB and other fat-soluble contaminant levels in the fish as well as graphics and diagrams to help individuals understand the information provided (19; 4).

The Madison Environmental Justice Organization (MEJO) administered a fish advisory project in the heavily urbanized Dane County, Wisconsin in order to determine the most effective ways to communicate risks to various groups including Hmong, Karen and Spanish-speaking communities in the area. Fish advisories were created to warn anglers about the levels of mercury, PCBs and other chemical contaminants present in fish tissues (15). Various groups here consume large amounts of fish from the area, and it was well known that minority and lower-income groups were not being reached by the government risk communication strategies (15). Between 2007 and 2009, MEJO worked to create and raise money for language-appropriate signs that could be placed in popular shoreline fishing

locations along Dane County waterways. These signs were translated into Hmong, Spanish, and English and included fish consumption advice about the local species that anglers most commonly consumed (15). MEJO worked to raise funds for thirty-two signs placed in various fishing locations in May 2009. After completing a survey of the shoreline anglers, it was determined that only 38.5% of nonwhites in the area had heard of the advisory information before reading the signs. However, the individuals who did read the signs found them easy to understand and agreed that they were very important (15). Beyond the fish advisories, it was evident that whites were more aware of the dangers related to overconsumption of fish through mass media such as internet web pages, newspapers, or television stations, which may not have been available in languages other than English. Lower income multiethnic communities also have less access to many of these mass media communication technologies (15). Therefore, translated versions of the fish advisory signs are important to reaching out to the nonwhite community who may not have access to or understand these various forms of media.

Based on this study administered by MEJO, recommendations for future risk communication surrounding health issues from subsistence fishing include creating and posting signs made of non-metal, durable material that are translated into multiple languages pertaining to specific fishing sites. Beyond this, it is pivotal to reach out to and communicate risks to shoreline anglers through the distribution of brochures explaining health risks, effective communication with at-risk community groups, as well as the creation of strategies with in-person, long-term community outreach and engagement approaches (15). These recommendations are important for the effective risk communication of health issues related to subsistence fishing that can be applied to the current issues surrounding fish consumed from Onondaga Lake.

Further recommendations provided by organizations in the Great Lakes area include the use of classroom lessons administered in a variety of languages as well as the distribution of translated brochures. The Minnesota Department of Health has also recommended that staff at health clinics be trained to understand and address the health issues that are associated with the exposure to particular chemicals found in fish, giving them

the ability and the opportunity to educate patients about the risks. By integrating consumption advice into the general medical environment, it is possible to increase awareness that subsistence anglers have about their own health.

The Illinois-Indiana Sea Grant states that placing advertisements on public transportation is an effective way to communicate risks to all community groups. Further suggestions include holding training sessions for health and nutrition educators who communicate with underserved populations, presenting talks and exhibits at professional health and nutrition conferences, providing educational materials and healthy fish preparation demonstrations at festivals and events within the community, as well as supplying educational materials about fish consumption at popular community centers, libraries, and health clinics. Direct communication and interaction with members of the community will prove to be an effective way of reaching out to all members, including multiethnic groups.

Finally, the Wayne County Conservation District provides additional recommendations. Due to language barriers as well as literacy issues, the message of risk communication must be available in a universal fashion so that all members of the community may understand it. It is also recommended that local partners be used to convey the information, which helps increase credibility and trust in the information presented. In order for proper changes to take place, receivers must respect the source and channel by which the message and warning is being delivered, and must be able and willing to follow the proposed action provided by the source (10). The Karen, in particular, are known to trust and respect authoritative figures such as teachers, pastors, priests, and educated individuals (12). Therefore, messages about healthy fish consumption provided through these sources would be an effective way of presenting this information. There must also be an emphasis on communicating with school-age children, who become fluent in English at a young age by following an English-speaking curriculum in schools (3). Therefore, it is much easier to communicate risks initially with children in the hopes that they will take the information presented to them home to their parents. School-age children and adults must be trained on identifying types of contaminated fish, proper cooking and

cleaning techniques in preparing fish, and the proper disposal techniques of fish skin and fat.

Recommended Strategies

When determining how to communicate risk with multiethnic groups in Syracuse, it is important to determine commonalities between all individuals and groups, while also considering the distinctions between the groups (10). The following suggest how to reach all members of the various ethnic groups in the Syracuse area. First, it is pivotal to develop relationships and collaborate with other not-for-profit organizations in order to develop and create multilingual fish advisory signs and strategies that will effectively communicate healthy fish consumption recommendations. Some of the key nonprofit organizations in Syracuse that may help this cause include InterFaith Works, Hopeprint, and Catholic Charities. Through increased support in the nonprofit sector, there are possibilities for development of further communication and education techniques as well as an increased number of brochures and fish advisory signs that can be translated and distributed on a wider scale to reach a larger number of groups.

Another avenue of communication can be accessed through educational institutions. This includes classrooms, English as a Second Language (ESL) classes, as well as after school programs. Classroom settings are vital for reaching out to young children who can convey the message to their elders. Many elder members of the multiethnic community who have given up on rebuilding their lives in the United States rely on the education of their children for building the future of their ethnic groups in a new country (20). Therefore, they are likely to listen to the words that their children learn in school. An educational institution that could be helpful with outreach is the Syracuse City School District.

Government agencies at all levels are also essential for providing fish advisory information as well as funding for research and advisory distribution to the public pertaining to risks associated with fish consumption from Onondaga Lake. The New York State Department of Health works to update fishing advisories on any changes associated with particular species that should not be consumed from Onondaga Lake. In

May of 2007, the New York State Health Department released alterations to New York's health advisories as part of the annual guide for chemicals in sportfish and game (17). These updated advisories not only covered Onondaga Lake, but also included information pertaining to surrounding lakes throughout New York State, applying to 135 New York State waters (17).

The Onondaga County Department of Water Environment Protection also works to monitor Onondaga Lake and measure the changing pollution levels. The Ambient Monitoring Program (AMP) has become Onondaga County's program used to evaluate and follow changes in the pollution levels of the lake. This program is another way in which the Onondaga Government Agencies are able to monitor and track the chemicals present in the lake and make changes and improvements to the water treatment strategies currently taking place. Through improvements in water treatment, the quality of water in the lake may be improved, which will in turn lead to improvements in the levels of chemicals present in the lake and the aquatic species found here.

The Environmental Protection Agency (EPA) is also very involved in the cleanup efforts at Onondaga Lake and has supplied funding for efforts toward managing the state of the lake. The Onondaga Lake Partnership was developed in order to focus on environmental restoration, conservation, and overall management of Onondaga Lake. The partnership includes support from the EPA, the State of New York, Onondaga County, as well as the City of Syracuse. Therefore, the ideas and interests of federal, state, local, public and private groups are included. Any funding that is provided for projects is distributed throughout federal and non-federal groups (23), and therefore focuses on the goals and objectives of all levels of government involved.

At local, state, and federal levels, government organizations are working to improve upon the current conditions of Onondaga Lake while also informing the public on health concerns associated with the overconsumption of contaminated aquatic species in the lake. This is vital for reaching out to and educating members of the community of actions that are being taken, as well as the current state of the lake.

Language is understood as the largest barrier to employment and social adjustment for many multiethnic groups in the United States when first resettling. It is challenging for individuals to learn English due to social isolation, difficulty in learning English on the job, unavailability of programs, and problems with accessing any existing programs (20). However, through attending ESL courses, individuals of various ethnicities are able to learn the English language in the hopes that they will be provided the skills necessary to help them find jobs. Incorporating a lesson about healthy fish consumption recommendations at Onondaga Lake into various ESL courses is an effective way that this message may be delivered. Existing ESL courses in the Syracuse area include “Bob’s School” with the Syracuse City School District.

After school programs for children are also possible avenues for reaching out to younger generations. Interactive lessons in classroom-style settings are effective ways to explain any complicated concepts while allowing students to reach out to teachers about any questions they may have (2). Therefore, there is better opportunity for the message to be understood and absorbed through verbal communication and an interactive explanation of risks.

Health and medical clinics are also great pathways for effectively communicating health risks. These clinics include hospitals, doctor’s offices, maternity clinics, as well as child care facilities. Close communication with community-based health organizations, health care and nutrition education officials, and staffers is essential for communicating the severity of health risks linked to overconsumption of fish from Onondaga Lake (2). Health care professionals are credible and respectable sources for providing multiethnic groups with the knowledge necessary to make decisions pertaining to proper fish consumption habits. These are also excellent places to distribute health advisory brochures; here, people are more inclined to be worried about health risks, and are therefore more likely to be interested in any suggestions related to improving their health status. Women’s health clinics and maternity clinics are extremely important gateways, as many women have agreed that they are more likely to pay attention to fish advisory brochures when they are informed that there are risks to

their children and unborn children (2). Examples of key health institutions in the Syracuse area include the Poverello Health Center, the Upstate Medical University’s Refugee Clinic, and the Syracuse Community Health Center.

Another consideration is religious institutions. Religion plays a significant role in the customs, values, and traditions that many multiethnic groups continue to follow and carry with them after resettlement. For many of these groups, food is also recognized as a significant part of culture; it holds a considerable place in many of the social functions such as ceremonies and rituals, food habits and special dishes, and is a prominent expression of cultural identity. Fishing, in particular, is a way in which elders are able to transfer knowledge from generation to generation. It is an activity that aids in sharing and social bonding throughout families and communities of various ethnicities (6). It is evident that fishing, as an activity and a source of food, is important for maintaining the culture and traditions of multiethnic groups. A variety of churches and places of worship allow groups of different ethnicities to meet in order to follow particular religious practices together. The Hmong, for example, rely on interpreters in the church to aid them with the exchange of information and participation that would not be possible otherwise (20). The church is an important gateway for multiethnic communities to continue to follow religious practices, become better educated about the fish they consume, and interact with members of the community who share similar cultural and traditional values. There are many of these institutions in the Syracuse area.

Reaching out to and communicating with and through these assorted organizations and institutions will help to effectively portray the health risks involved with fish consumption to the growing population of at-risk communities in the Syracuse area. Although the ultimate goal of any health advisory is to increase exposure of health risk information, it is the way in which this information is presented that is key to how the information is received (4). All of these institutions mentioned share the same attributes of providing trustworthy and educated information coming directly from a credible source and channel of communication. This is pivotal in encouraging

multiethnic groups to trust the information, and become informed and knowledgeable about the dangers they may put themselves or their family members in.

Onondaga Lake Fish Advisories

Other than fish advisories, additional ways to address the overconsumption of fish that have been used in the past include bans on fishing, or instructions on the processing of certain fish. However, these approaches have been abandoned due to the restrictions placed on individuals from fishing as a recreational activity (4). Fish consumption advisories are not to be viewed as regulations. In fact, they are to be understood as recommendations that are issued in order to help protect the health of the general public (7). They are meant to educate and inform the community about healthy fish consumption and allow individuals to make their own decisions about how they choose to use the information provided. However, it is important that all members of the community are able to completely understand, absorb, and trust the information provided through the advisories.

The fish advisories for Onondaga Lake are extremely important for reaching out to all members of the community, including all multiethnic groups who rely on the lake for both sport and subsistence fishing. However, surveys have shown in many cases that it is the non-whites who tend to fish more often, eat more fish meals of larger serving sizes, and consume more fish on an annual basis compared to the white population; the existing forms of advisory communication are not successfully reaching non-whites and people of lower levels of income and education (6; 19). Therefore, in order to communicate more effectively with the multiethnic community, advisories must be translated into languages that can be understood by groups beyond the English-speaking population. In Syracuse, these languages include Hmong, Burmese, and Spanish.

Some possible issues that arise with creating and sharing fishing advisories with multiethnic communities include the disturbance they may initiate with traditional lifestyles, along with interference with culture and eating patterns (6). For many, fishing is an important part of tradition, which allows individuals to interact with nature and with other generations. For years, multiethnic groups in the U.S. have worked to integrate themselves into mainstream western society.

However, they also work to maintain traditional cultural practices within their households. Oftentimes the only way to maintain these customs is through grandparents and parents educating children on their traditions and the history of their culture (3). Groups may perceive advisories as a way in which organizations are disturbing and controlling the traditions and customs that they have worked to preserve in a foreign country. Additionally, it may not be understood and accepted that any sickness resulting from overconsumption of chemically contaminated fish was caused directly from fish consumption. Overconsumption of contaminated fish poses a long-term or chronic threat that may not impact consumers immediately. Therefore, individuals may not accept that it is the fish that are causing the illness. A traditional Hmong belief is that evil spirits who seize the souls of innocent individuals cause illness. Even if they are informed that it is the overconsumption of contaminated fish that is leading to the illness, they may not be inclined to accept this based on their traditional beliefs (3). If any type of risk communication disagrees with the traditions and beliefs of a particular group, they may come up with and rehearse counterarguments to go against any incoming information or warnings (10). It is important that all anglers understand that the fishing advisories be used as *recommendations*, and not *regulations*, so that individuals are able to make their own, educated decisions surrounding the fish consumption activities of themselves and their families.

The content of the fishing advisories at Onondaga Lake must include recommendations for fish that should not be consumed based on their species type as well as size. Beyond this, it was also determined in a study in the Great Lakes area that the most widely accepted advisory recommendation was cleaning and cooking methods that decrease levels of contaminants in fish species (19). Therefore, along with species and size recommendations, it will be effective to include explanations of proper cooking techniques that will help to decrease the levels of contaminants in any fish that are consumed from the lake. Also, in order to continue the improvements to the health of Onondaga Lake, providing contact information for organizations that are currently working on

cleanup efforts, will inform community members on how they may become involved.

Accordingly, the fishing advisories for Onondaga Lake should include information currently provided by the NYSDOH, which states that women of childbearing years, age fifty and under, and children under the age of fifteen should avoid eating any fish from the waters. Also, based on high mercury levels, anglers are advised not to consume largemouth or smallmouth bass over fifteen inches, and to refrain from consuming any walleye, carp, channel catfish, and white perch. (17). Also, anglers should only consume up to four meals per month of the brown bullhead and pumpkinseed (the least contaminated sportfish in the lake), and one meal per month of any fish not listed in the advisory. Furthermore, if people choose to continue consuming fish from the lake, it is beneficial that the advisories also explain the preparation and cooking techniques that will reduce the level of contaminants in the fish. This is done through properly trimming, skinning, and cooking the fish. The advisories should include the following description of proper cooking and preparation methods: first, the skin should be removed and the fat should be trimmed from the belly flap, the line along the sides, as well as the fat found along the back and under the skin of the fish. The fish should then be cooked through methods such as broiling, grilling, or baking on a rack so that the fat is able to melt and drip off. These techniques allow for a reduction of mercury and other chemicals present in the fish during consumption (13).

Beyond detailed instructions for preparations, it will be effective to incorporate

images and diagrams corresponding with the written information provided. Individuals may not understand how to identify fish species based solely on their species name. A labeled diagram of preparation and cooking techniques will also provide a visual component to the written explanation provided, and will help ensure that the techniques are carried out properly. These images and diagrams will grasp the attention of anglers and work to answer any questions and uncertainties that may be presented through simply reading the text on the advisories.

The reading level of the written portion of the document must also be considered. The writing must be at a level where less educated or older individuals are able to understand the general message that is being delivered (4). Many members of the multiethnic community have not been provided with high levels of education prior to arriving in the U.S. Therefore, even though the advisory is translated to their native language, it is still true that the written language must be kept at an easily understood reading level. The tone in which the advisory is written is also important. In a study related to communicating the risks of fish consumption in the Great Lakes area, a large majority of respondents agreed that an explanatory, cajoling tone was more likely to influence consumption levels within limits recommended by the advisories (4). Through implementing all of these approaches to the fish advisories at Onondaga Lake, there is optimism that all community members will be able to understand the information, as well as follow the recommendations.

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