

SECTION 2

MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

2.1 Overview

A variety of options exist for limiting consumption of contaminated fish. This section provides a description of options commonly employed to reduce fish contamination risks. The focus of this section is on evaluating the options from the perspective of the agency responsible for fish advisories. Some considerations discussed in this section include:

- the feasibility of program implementation — the match between the human, material, and financial resources available to an agency and those required to carry out a program; and
- the efficacy of various options — the degree to which a program obtains compliance with advisories on the part of fish consumers.

Information on the experiences of some actual programs are presented, including the relative success or failure of some options, difficulties in implementation, and other aspects of developing programs. Section 3 provides additional information on this topic with a focus on how options impact the target population or area: economically, socially, culturally, and nutritionally.

No single approach is appropriate for all circumstances. Each location and population of concern vary and require programs designed to address specific local needs and resources. In addition, agencies vary in the resources available to develop programs. EPA does not recommend one or a small group of options as preferable. Rather, they suggest that decision-makers consider all relevant information and choose those options that best serve the needs of fish consumers in their areas.

In evaluating how to approach fish contamination problems, it may be useful for state, local, and tribal risk managers to review the roles and responsibilities of the federal government. The responsibilities of the federal government regarding commercial fish are presented to clarify the distinction between federal oversight of commercial fish versus non-federal responsibilities for non-commercial fish.

Information on remedial responsibilities and activities of the federal government that may impact fish contamination are discussed at the end of this section to provide

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

additional information on options for reducing contaminant exposures. The discussion includes federal statutes and regulations that may be used to address fish contaminants (directly or indirectly). Sources of additional information on laws and activities related to air, soil, food, and water pollution, and hazardous waste are provided, including hotline numbers at EPA.

2.2 Program Goals

Program goals include the overall objectives of a fish advisory program. They may include a description of geographic areas and populations to be addressed, the targeted reduction in exposure and risk, and other objectives related to contamination reduction. Goals will typically be defined by the specific characteristics of a contamination problem in an area. The goals may depend on the scope of the programs required. The program scope is defined in terms of the number of people who must be reached and the degree of efficacy required to achieve an acceptable level of risk. Goals such as full compliance by all pregnant women may be more stringent when risks are high. The efficacy requirements of a program may depend on how critical it is that the targeted populations comply with recommended changes in their consumption habits.

The goals an agency establishes, along with the need for effective advisory programs and subsequent resource requirements, are linked directly to the scope of the contamination problem in terms of risk and numbers of people exposed. In general:

elevated exposure and risks ----> *more restrictive advisories* ----> *greater resource requirements*

The staffing and other resource requirements of a fish advisory program are contingent on the program goals.

When risks are anticipated to be high, significant effort may need to be invested to ensure widespread compliance with recommendations. Information may need to be disseminated through various media and with significant support (e.g., a hot line number, local presentations, press releases, fact sheets).

The exposure and risk levels are determined through sampling and analysis programs (discussed in Volume I) and risk assessment (discussed in Volume II and in Supplements 1 and 2 of this volume). These sources provide guidance on obtaining and using fish contamination data with consumption pattern information to estimate exposure. From this information, risks are estimated for various population subgroups, which are then evaluated for advisory program need. Methods used to map affected populations and other relevant information are

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

provided in Supplement C to Volume II.

Program goals may also reflect the objective of minimizing an advisory's negative on targeted populations and areas. These negative impacts are discussed in Section 3 and include economic, cultural, nutritional and other potential impacts that may result from fish consumption restrictions.

Program goals are usually constrained by available resources. Because resources are often limited, risk managers must decide who has the greatest need to be reached and what level of program activity will be directed at each of the targeted populations.

2.3. Options for Limiting Consumption

This section focuses on aspects of fish advisory programs directly related to the agency's activities. Options and their feasibility and efficacy are described from the agency's point of view. The feasibility of an option depends on the requirements of an option in relation to the resources of an agency. To evaluate this, it is useful to consider various factors including:

- staffing,
- costs of materials and facilities,
- already-existing program materials,
- inter- and intra-agency support, and
- other considerations.

The requirements of individual fish advisory program options merit separate evaluations to determine program feasibility. Such evaluations are often qualitative because it is usually not possible to precisely quantify the scope, level of professional involvement, and expenditure of resources for each option.

As indicated above, federal agencies have significant responsibilities for commercial fisheries. States, local governments, and tribal agencies (referred to collectively in this section as agencies) have primary responsibility for non-commercial fishing. These responsibilities may be carried out through various departments, including those of:

- environmental protection,
- health,
- fisheries, or
- other public agencies or governing units.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

A fish advisory program may be part of a larger program responsible for other related activities including education, pollution prevention, clean-up of contaminated waterbodies, etc. In some areas the health department may be responsible for determining fish advisory levels while the department of environmental protection may implement the programs at the local level and be responsible for enforcement. During new program development, decision-makers may wish to determine those agencies best able to enact program components and allocate responsibilities accordingly.

An option's resource requirements will depend significantly on the scope of the contamination problem and the programs goals. Resource requirements will also depend on the extent to which agencies can use existing information sources and the resources of related agencies or groups performing similar activities. The level of effort and costs required can be reduced somewhat through:

- careful targeting of sampling and analysis programs, the use of consumption limits provided in Volume II,
- obtaining population data from census data bases, and
- identifying readily available sources for other needed information.

Cooperation between health and environmental agencies, community groups, local colleges and universities with relevant program areas, and local health professionals may reduce resource requirements for developing advisories and disseminating information. For example, the state of New Hampshire has involved community groups in the collection of fish samples, thereby saving the state staffing and transportation costs.

Some aspects of program development, such as planning, require time and expertise primarily from within the agency, although support from local professionals may also be sought in this area. Establishing an advisory group of volunteers with expertise in related fields may provide an inexpensive method to gain local support and obtain necessary information. Under most circumstances, involving the local target population will provide essential information and facilitate cooperation in the establishment of effective programs. Although this is easier for local programs to carry out, state programs may also encourage local involvement coordinated through local governments, health departments, school departments, or community groups.

Detailed studies have not been conducted on the resource requirements or efficacy of fish advisory options across programs and states. Consequently, much of the information in this section has been obtained through conversations with state, local, and tribal staff, and other affected parties. Program reports were also reviewed. Although most information provided below is site specific and frequently

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

anecdotal in nature, we have attempted to include information that has overall relevance to option evaluation and is not specific to single areas and groups. We welcome comments and information on the options discussed in this volume and recommendations for other options to be considered. Most of the data on and about options for reducing health risks associated with consuming contaminated fish have been developed relatively recently. An exchange of information on this topic will provide a more complete basis for decision-making in the future.

Table 2-1 provides a list of options for limiting consumption of contaminated fish. Options are arranged according to the type of activity and in order of the severity of restriction (e.g., limiting a catch is listed before banning fishing).

The options fall into four main categories of activities: no action, development of fish advisories, catch and release restrictions, and fishing bans. Within these categories, a spectrum of activities may be carried out.

The options considered in fish advisory program development are critical to the nature of the final program. A limited number of options can be considered by those developing new programs. Decision-makers must consider any specific constraints that restrict their choices before considering the advantages and disadvantages of the various options. Risk managers may be operating under some constraints regarding their options for reducing fish-related risks, or they may have wide latitude in establishing programs. For example, some agencies may have the authority to restrict fishing access if sufficient risks can be demonstrated. In other areas, options may be limited to notification and education. Options may also be limited by budgetary or other conditions. The choice of which options to consider is one of the critical decisions noted in Section I.

Restricting the options from which a program may choose may significantly affect the risk reduction capabilities of a program because the options have differing potentials for reducing risk.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-1. Options for Fish Advisory Programs

- No action
- Fish consumption advisory
 - General guidance
 - Quantitative guidance
- Catch-and-release
 - Voluntary
 - Mandatory
- Fishing ban
 - Voluntary
 - Mandatory

Anticipated impacts of the options including those on nutrition, local culture, and the economy are discussed in Section 3. A methodology for considering adverse impacts of options in contrast to benefits of fewer health risks is discussed in Section 4.

Because fish contamination, local conditions, and population characteristics are unique to each area, risk managers may choose to implement different policy options for different waterbodies within the same jurisdiction. Consequently, risk managers may want to consider a variety of options under different circumstances. The use of various options allows programs to be tailored to local needs and, ultimately, to be most effective. Many states have used a variety of strategies to address fish consumption, depending on specific area characteristics. The approach taken in Washington State illustrates this point.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Example: Washington State

The state of Washington has experienced a steady decline in salmon runs over the past fifty years, but a notable and sharp decrease over the last few decades. These recent declines have resulted in a wide variety of fishing restrictions posted throughout the region for management of fish stocks. For example, some waters are closed completely to fishing certain species whose population is endangered. Other waters are catch and release only for both management and public health concerns. Others are open but with strong peer pressure by increasingly knowledgeable fishers, including sportfisher associations, environmental groups and tribal organizations, to selectively harvest fish that are out-competing the native species most valued for recreational and cultural reasons.

With the increased visibility of declining runs, individuals have become more receptive to the need for management strategies protecting the long-term harvest of preferred species. Familiarity with management restrictions designed to allow fish stock regrowth has also made individuals more responsive to restrictions due to public health concerns. Strong emphasis was placed on using restrictions as an interim step for managing fish contamination hazards among community representatives consulted on this issue. They emphasized that preventing water contamination in the first place should be the primary goal (Coombs, 1994; Cole, 1994; Watanabe, 1994).

Although fishing restrictions in this case were employed to allow fish stock regrowth, similar strategies can be employed to limit exposure to contaminated fish.

Many tribal affiliates have indicated that some options for limiting the consumption of contaminated fish would be unacceptable. Fishing bans and catch and release restrictions are contrary to the fishing-based cultures of many of these communities. Both sport fishing organizations and the sport fishing public may also be opposed to certain options that limit access to fishing grounds. Further details about these concerns are discussed in Section 3.

Fish advisory programs, while existing for many years in some areas, are a relatively new undertaking for many risk managers. The options discussed below may prove effective in some areas and not in others. Their success or failure may depend on numerous factors discussed in this and subsequent sections. Because programs can evolve over time, they should change as better ways are found to reach their goals and as circumstances and populations change. Risk managers

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

may wish to test the efficacy of multiple advisories and determine which strategies use resources most effectively and are most appropriate for various audiences. (This is discussed in Volume IV: Risk Communication.) By maintaining a flexible approach to developing or modifying programs, risk managers are best able to respond to the changing needs of the populations they serve.

2.3.1 No action

The least resource-intensive action for agencies to undertake is to having no fish consumption policy. Under this option, agencies allow unlimited fish consumption, issue no health warnings, permit fishing, and, if necessary, consider discoveries of adverse human health impacts on an individual basis.

This option should be considered when contamination and health risk data indicate that no action is required. The "no action" option is not recommended as a strategy to conserve resources unless sampling and analysis data are available that indicate this is an appropriate approach.

2.3.1.1 Feasibility and Efficacy

A policy of no action may be most appropriate in areas of consistently low fishing activity and low contamination (as determined by a sampling and analysis program). A brief review of the sampling results in relation to the screening values provided in Volume I may indicate minor or minimal risk.

Exercising this option in areas with limited fishing activity in the absence of sampling and analysis data may pose health risks to local fishers if high contamination levels exist. Volumes I and II both provide information on how risk managers may evaluate the likelihood that contamination exists (e.g., proximity of the waterbody to industrial sources, agricultural run-off, known contaminated areas). Long-range transport from industrialized areas to non-industrialized areas is known to occur with mercury contamination and with other contaminants. Consequently, risk managers should consider obtaining sampling data for all waterbodies where fishing occurs. If the data indicate low or no contamination in some areas, less frequent sampling may be planned for those areas.

In areas of high fish contamination, particularly where adverse health effects are likely to occur, having no policy may incur significant risks to fishers and their families and has the potential to confuse and anger the public. It also minimizes public awareness of fish contamination and related issues (e.g., water pollution risks) (NY DEC, 1985).

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Example: Midwest High-Risk Fishing Population

In one midwestern state, community groups are aware of the fish contamination problem in their areas. In a substantially contaminated area, the director of a large community organization was consulted for this document regarding fish advisories. Waterbodies in this urban area are surrounded by industry, landfills and transportation routes. Runoff from agricultural lands also eventually reaches the waterbodies, and both runoff and air emissions from numerous other point and non-point sources are discharging into the water.

The director indicated that the state and city have not put up signs at major community fishing sites. The advisories are not distributed or available to either the fishing or consuming population (each is a distinct population) through means that are readily accessible to area communities. Advisory information, provided by the state with fishing licenses, is not readily accessible to the low-income minority fishers, who typically do not obtain licenses primarily for economic reasons. The director also noted that a large low income black population fishes the polluted waters, and the catch is distributed widely through local (illegal) fish markets and shared with extended family, friends, and neighbors. The director felt that signs were not posted because the agencies were concerned about panicking the community. The community perceives, however, the lack of regulatory attention as a reflection of the agency's indifference to their well being.

Further consultation with state staff on this issue indicated that the state develops advisories based on a widespread sampling program. Elevated contaminant levels had been detected in the areas of concern and signs were posted in the past. This practice was discontinued due to extreme displeasure from local park authorities. Although additional information was not available from park authority personnel, the attraction that this area has for many tourists and seasonal fishers, both of whom contribute substantially to the local economy, may have played a role in the no-posting policy.

As this example illustrates, the lack of effective action in this case may minimize costs and certain negative advisory impacts (e.g., discouraging recreational fishers). Conversely, it generates an entirely new set of problems that may undermine the fundamental attitudes towards, and trust of, governmental agencies on the part of affected communities. Inattention to these types of problems may lead community members and leaders to the conclusion that their health and other concerns are not a priority for local agencies and political leaders.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

In general, a "no action" policy maximizes fish consumption and its associated nutritional and other benefits (see Section 3). It also minimizes costs and effort required by governmental bodies and requires no specific governmental structure, planning, or empowerment. Local circumstances will determine the advisability of this option. If strong business interests are tied to maintaining current fishing levels, a "no action" policy may have significant support from the business community and, consequently, to some politicians and agency staff. Alternatively, if the affected populations in contaminated areas are environmentally aware and health conscious, such a policy may incur substantial risk to the agency. It is not recommended that agencies base their choice of options solely on political factors, although, in reality, they are usually considered. Risk managers may want to consider potential health risks and benefits as primary considerations in determining whether the option of "no action" is appropriate for a water body.

2.3.2 Fish Consumption Advisories

Fish consumption advisories are designed to reduce risks to fish consumers by providing information that will lead them to voluntarily restrict their fish consumption to healthy levels. The advisories provide information to the public warning of potential health hazards associated with consuming contaminated fish. These advisories generally include qualitative guidance on minimizing risk, and may or may not provide specific meal consumption guidelines. The advisories may take many forms, from posting warnings near waterbodies, to booklets and public service announcements. The various ways to communicate fish advisories are discussed in Volume IV on risk communication. The following discussion covers two major categories of advisories: general advisories, which provide non-quantitative information, and quantitative advisories, which provide specific meal consumption limits. Information on advisories developed by agencies nationwide may be of interest to risk managers. A summary of all current advisories was recently compiled by EPA: *National Listing of Fish Consumption Advisories*, on five disks in a PC format. They can be obtained from EPA's Office of Water.

2.3.2.1 General Fish Consumption Advisories

General fish consumption advisories provide qualitative guidance on reducing risk through selective fishing, preparation, and cooking techniques. Specific information may be provided on the safest or most hazardous species and sizes of fish to consume. For example, smaller, younger fish within a species tend to be less contaminated than older, larger fish. Numerous state fish advisories recommend keeping smaller fish for eating and releasing larger fish. For those individuals choosing to consume larger fish, recommended practices often include eating smaller meals and freezing part of the catch to space meals out over time (ND DOHCL, 1992, MO DOH, 1993).

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Other information related to specific species or categories of fish may be conveyed. For example, prey species tend to be less contaminated with bioaccumulative contaminants than predatory fish, and lean species tend to have fewer fat-soluble contaminants than fatty species (See Supplement A). The North Dakota fish advisory recommends eating more prey species like perch, sunfish, and crappie than large predator species like walleye or northern pike (ND DOHCL, 1992). Using guidance regarding fish species and size, risk managers may encourage fishers to practice selective fishing or catch-and-release fishing to decrease their probable dose of fish contaminants.

Information on where fish contaminants are found in the fish body may also be provided. Studies have indicated that exposure to certain fish contaminants may be decreased by proper trimming and cooking techniques. Supplement A to Volume II discusses studies in detail. Several states include discussions of these techniques in their fish advisories, as well as diagrams indicating appropriate fish tissues to be trimmed (s.f., MN DOH, 1992, MO DOH, 1993). Some also list particular species for which trimming is recommended. New York, for example, suggests trimming fatty tissues from smallmouth bass, brown trout, lake trout, coho salmon, and striped bass (NY DEC, 1985). They also advise not eating "grossly diseased fish" or fish liver.

Advisories may contain specific health information regarding contaminants, such as a description of adverse effects known or suspected of being associated with contaminants, along with recommendations to limit consumption. Risk managers may elect to provide information regarding the benefits of fish consumption (discussed in Section 3) with information regarding health risks. Qualitative or quantitative information on health risks may be appropriate, depending on the audience and goals of the program. Section 5 in Volume II contains a description of potential health effects, including developmental toxicity, neurotoxicity, and other types of organ toxicity. EPA risk values and a breakdown of especially susceptible subgroups in the population are provided in the same section for each target analyte.

Risk managers may provide a synopsis of potential health risks in the form of a "fact sheet" to give the consumer the most complete information available regarding contaminants to which they are being exposed. General qualitative descriptions of potential health effects, similar to those in many community "Right to Know" programs, may be included. Volume IV provides additional guidance on methods to communicate risk-related information.

Fish advisory information may be provided to the general fishing population if risks are expected to be widespread. When risks are known to be greater for some subpopulations, more specific guidance may be given to these groups. For

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

example, if mercury is known to exist at levels posing risks to children and women of reproductive age, advisories may be designed specifically to reach these audiences. Information may be disseminated to health care providers, schools, agencies issuing fish permits, etc., as well as to fish consumers, to facilitate distribution and provide resources for explaining potential impacts of consumption. When planning fish advisory programs risk managers may want to consider the requirements that may be placed on their staff if consumers call for clarification or additional information.

Fish advisories may also be of a very general nature and simply recommend that certain waterbodies be avoided or the fish taken from them be limited. Limiting overall fish consumption by some segments of the population may be recommended, without providing specific information on waterbodies, seasonality, or other issues discussed above.

2.3.2.2 Feasibility and Efficacy

General advisories may be the least resource- and labor-intensive option for limiting exposure to fish contaminants, depending on the scope of the program and the type of information conveyed. Consequently, a general fish advisory program may be appropriate if resources are extremely limited. The development of this type of advisory may or may not require agencies to obtain site, consumer, or fish species-specific information, depending on the type of information the agency wishes to convey. If a program targets a small group or provides only very general information through limited sources, the advisory program may be relatively inexpensive and have limited staff requirements. Alternatively, programs providing substantial information through a variety of media to a large number of subpopulations will require more resources.

The efficacy of general advisories depends in large part on adequate education and outreach to fish consumers. Alliances with other local and state agencies and community groups may facilitate information distribution. Many states currently issue the fish advisories with fishing licenses to fishers who apply for the permits; this is another useful mechanism for disseminating information. Volume IV contains guidance on risk communication, including different strategies spanning a range of resource requirements.

General advisories may be most useful in cases where risks from eating contaminated fish have been and are expected to continue to be relatively low. In these cases, general health advisories provide information allowing consumers to make decisions regarding exposure to fish contaminants. In low risk situations, inappropriate decisions by consumers on how much fish to eat do not generally pose a significant hazard. However, misinterpretation could be hazardous to

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

fishers who consume very large quantities of fish. Conversely, general guidance regarding fish preparation is less subject to misunderstanding on the part of the consumer, and may be useful under appropriate circumstances. Where contamination data indicate that risks from consuming even small amounts of fish are relatively high, general health advisories may be insufficient to protect consumers from developing adverse health effects.

2.3.2.3 Quantitative Advisories

In addition to the type of information provided in the general advisories described above, risk managers may also develop advisories containing specific information regarding meal consumption limits. Quantitative fish consumption advisories provide fish consumers with site-specific, species-specific, and sometimes size-specific (within species) information on the maximum amount of fish that can be safely consumed within a given time period.

The introduction to a fish consumption advisory may describe the contaminants found in local sport fish, where the contaminants accumulate in fish tissues, and methods for minimizing exposure to these contaminants (MN DOH, 1992, GLSFATF, 1993). Specific fish consumption advice follows in a descriptive narrative or in a table and/or map (s.f., NY DEC, 1985, MN DOH, 1992, MO DOH, 1993). As discussed under general advisories, above, information may also include:

- types of health risks associated with elevated consumption,
- groups within the population who are at particular risk and why (as discussed under general advisories above),
- sources of additional information, and
- recommended food preparation methods.

Most states issuing advisories now use a risk-based approach. The EPA method described in detail in Volume II of this series uses a risk-based approach to calculate the recommended meals per month, based on contaminant level and the risks associated with each target analyte. Advisory levels have been calculated for all target analytes for various meal sizes (4 ounces to 16 ounces) and for adults and children. Methods are provided to also make adjustments for various body sizes and for different assumptions regarding toxicity and meal size.

State fish consumption advisories currently vary widely in the complexity of the information provided and in the methodology used in their development. Missouri's and Minnesota's state fish consumption advisories are described below for illustrative purposes. In addition, details from a number of state fish consumption advisories are given in Table 2-2 below. As Table 2-2 shows, many states have

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

developed a tiered approach providing different advisories for various population subgroups. Subgroups considered in these advisories have included:

- short-term recreational fishers,
- seasonal fishers,
- long-term fishers,
- subsistence fishers,
- general adults,
- young children,
- women of childbearing age,
- pregnant or nursing women, and
- children under certain ages.

Agencies may wish to consider the characteristics of their target populations to determine how best to structure their consumption advisories, based on risks to various subgroups and potential impacts of fish consumption restrictions.

Example: Missouri's Fish Advisory

Missouri's proposed fish advisory provides the simplest advice of the four state fish advisories listed in Table 2-2. It gives general guidance on fish consumption over wide regions of the state, and only mentions specific species and waterbodies where they represent exceptions to this advice. Consumption advice is based on two broad groups of fish: fatty fish (catfish, carp, buffalo, drum, suckers, and paddlefish), and non-fatty fish (bass, sunfish, crappie, and walleye). Advice is given for three consumption rate categories: no restrictions, eat only one pound per week or less, and do not eat any fish. Pregnant women and children are advised to consume "less" contaminated fish than general adult fishers (MO DOH, 1993).

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-2. Comparison of EPA and Sample State Fish Consumption Advisories						
Advisory Component	EPA	Great Lakes	Minnesota	Missouri	New York	North Dakota
Consumption categories:						
Unlimited consumption	x	x	x	x	x	x
Restricted consumption	0.5 through 17 meals per month 1 through 10 meals per 10 days	One meal/week One meal/month One meal/two months	1 or 2 1/2-lb ^a meals/week 0.5, 1, or 2 meals/month 1 meal/yr	General adults: ≤1 lb/wk Pregnant or nursing women and young children: <1 lb/wk	≤ One 1/2-lb meal ^a per month	One 1/2-lb meal ^a /day 1 through 6 meals/week 1 through 4 meals/month
No consumption	x	x	x	x	x	x

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-2. Comparison of EPA and Sample State Fish Consumption Advisories						
Targeted fisher populations						
By exposure duration	<p>Short-term recreational fishers: eat non-commercial fish regularly 10 days/yr</p> <p>Seasonal fishers: eat non-commercial fish regularly 10 days to 3 mo/yr</p> <p>Subsistence fishers: eat non-commercial fish regularly 3 mo/yr or more</p>	-- ^b	<p>Vacation fishers: eat non-commercial fish regularly 1-3 wks/yr</p> <p>Seasonal fishers: eat non-commercial fish regularly 3 wks to 3 mo/yr</p> <p>Annual fishers: eat non-commercial fish regularly 3 mo/yr or more</p>	--	--	<p>vacation fishers</p> <p>seasonal fishers</p> <p>long-term fishers</p>
By sensitivity to adverse health effects	<p>General adults</p> <p>Young children</p> <p>Women of childbearing age</p>	-- ^b	<p>General adults</p> <p>Young children and women of child-bearing age</p>	<p>General adult fishers</p> <p>Pregnant or nursing women and young children</p>	<p>General adult fishers</p> <p>Women of childbearing age, infants, and children under 15</p>	<p>General adult fishers</p> <p>Women who are pregnant, breast-feeding, or plan to become pregnant, and children under the age of 15</p>

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-2. Comparison of EPA and Sample State Fish Consumption Advisories						
Information contained in consumption guidelines						
Specific recommendations to sensitive populations?	Yes	No ^b	Yes	Broadly	Yes	Yes
Species-specific recommendations?	Yes	Yes	Yes	Two broad categories: 1. low-fat fish and trout 2. fatty fish	Yes	Yes
Recommendations by fish length?	Possible	Yes	Yes	No	Yes	Yes
Recommendations by location?	Yes	Yes	Yes	Yes, broadly	Yes	Yes
Includes map?	No	No	No	Yes	No	No
<p>Sources: GLSFATF, draft 1993; MN DOH, 1992; MO DOH, 1993; ND DOHCL, 1992; NY DEC, 1985.</p> <p>^a Meal size of 1/2 lb is scaled to a 150 lb (70 kg) person.</p> <p>^b Although the Great Lakes Sport Fish Advisory Task Force doesn't have separate consumption guidelines for different fisher populations, it has based its advisory on several adverse health endpoints (reproductive, neurologic, immunologic and cancer) and on the most sensitive populations, in an effort to be protective of the sensitive populations while providing an extra margin of safety to less sensitive sport fish consumers (GLSFATF, 1993).</p>						

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Example: Minnesota's Fish Advisory

Minnesota's fish consumption advisory represents the most complex advisory of those examined. Consumption guidelines are given in tables by specific waterbodies, fish species, and fish lengths (in five-inch increments).¹ Separate guidance is given for fisher populations with varying exposure periods (vacation, seasonal, and year-round fishers) and sensitivities to adverse health endpoints (general adults versus women of childbearing age and children). In addition, advisories indicate the contaminants on which the consumption advice is based.

Minnesota's advisories employ simple symbols (e.g., squares and circles) and various degrees of shading to incorporate a substantial amount of information into a readable format.

While detailed advisories can provide specific guidance on the most appropriate consumption for each waterbody and population group, the approach may have drawbacks for some population groups, particularly if information is conveyed primarily in written form. Kathy Bero of the Lake Michigan Federation (Bero, 1994) noted that advisories providing detailed information will not necessarily reach the urban fishers who may have low literacy rates or inadequate English skills. This population also includes many people who are at or below the poverty level and fish to supplement their food supply, not merely for recreation. Overly-complicated advisories are less likely to be followed very carefully by these particularly high risk populations (personal communication with Kathy Bero, 1994). In addition, some fishers do not obtain fishing licenses, particularly those who are economically disadvantaged. Consequently, fish advisory information distributed with fishing licenses may not reach these fishers.

2.3.2.4 Feasibility and Efficacy

Although fish consumption advisories require more time and resources than general health advisories to develop, they also provide consumers more site- and species-

¹ Providing fish consumption limits by fish length is more expensive because of the additional sampling and analysis required. Greater accuracy is provided, however, since fish contamination within species is often correlated with fish size and length.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

specific information and give specific quantitative guidance. They are less likely than general advisories to be misinterpreted regarding the "safe" levels of consumption, and provide consumers with specific consumption goals.

A variety of types of information are required to develop quantitative advisories:

- contamination in edible fish tissues (obtained from sampling and analysis programs discussed in Volume I);
- cancer potencies and/or Reference Doses (or other risk values) of the contaminants of concern (see Volume II);
- local non-commercial fish preparation and meal consumption patterns obtained from local surveys if possible (see Supplement A to Volume II);
- average body weights of non-commercial fish consumers (see Volume II); and
- contributions to exposure from other sources such as air, water, and other foods (see Supplement A to Volume II).

Various information sources exist for most of the data required to develop fish advisories. While collecting all of the above data may not be feasible for many programs, combining existing data sources and local information may enable well-targeted programs to be conducted with relatively limited resources. For agencies wishing to obtain the maximum guidance from EPA, thereby minimizing their staffing requirements, the approach described below uses the information contained in this series to develop quantitative fish advisories. It is still recommended, however, that some local information be collected regarding fish contamination and consumption patterns.

As discussed above, Volume II provides a detailed description of how to calculate risk-based consumption limits and includes meal consumption limit tables for the 23 target analytes. Information is also provided on methods for calculating consumption limits for multiple species diets and for multiple contaminant exposures. The information in Volume II may be used in conjunction with contamination data from local sampling programs and local fish consumption surveys (or the consumption data provided in Supplement A) to select appropriate consumption limits. The consumption limits may then be used with other types of information such as benefits of fish consumption (discussed in Section 3) and other potential impacts of limiting consumption on the population to establish health advisories.

If risk managers choose to use the meal intake limits listed in Volume II, they should

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

consider that these limits were not modified for exposure to other sources of the same contaminants (due to the highly variable nature of such exposures). Estimating total exposure and relative source contributions are discussed in Supplement A of this volume. Adjustments to intake limits should be made based on local exposure conditions and take into account all likely sources of contamination. If non-fish source contributions are not considered in areas with contaminants in other media, fish consumers may be exposed to unsafe total exposures even though the fish exposures alone may not pose risks. Risk managers may choose to focus on the most highly exposed individuals, or average exposures to non-fish sources.

Note that while exposure reductions can theoretically be made in any contaminated media, fish consumption may be the only source that can be readily reduced. It may not be possible to reduce air or water contaminant levels quickly, while fish advisories have the potential for rapid exposure reduction in a population. Because fish consumption may contribute significantly to overall exposure for some population groups, modified consumption patterns may reduce overall exposure considerably.

Risk assessors and managers may develop highly specific meal consumption limits. The choice of what information to convey and to whom is a decision to be made based on the target population's information needs. Presenting various levels of information has advantages and disadvantages. Missouri's fish consumption advisory, as discussed above, has the advantage of being sufficiently straightforward and general so that a fisher could readily memorize the information it contains. In addition, the recommendations are based in part on regional hydrology and fish species characteristics; individuals fishing in areas for which no advisories are available could use this information to potentially lower their exposure. Because the meal consumption advice is written in simple prose, the advisory may also be more readily used by non-native English speakers who might not understand how to use more complex advisories.

One agency has reported that advisories must reduce a great deal of information into a concise, understandable format without losing the technical basis for the recommended dietary consumption (ND DOHCL, 1991). As the authors of North Dakota's fish consumption advisory warned, "advisories containing extensive details for consumption advice can be overwhelming...and become impractical if ignored by the public" (ND DOHCL, 1991).

More complex advisories, such as the Minnesota advisory described above, provide more information that fish consumers may use to maximize their benefits from eating fish while minimizing their risk of developing adverse health effects. The Minnesota advisory program uses extensive site- and species-specific data, as well

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

as up-to-date toxicological data and methodology so that the accuracy of consumption recommendations is expected to be high. The advisory's complexity, however, may make it less readily memorized or generalized to new areas, and it may confuse fishers not accustomed to interpreting tables. To address this concern, Minnesota also provides brochures using a simpler format and are very accessible to any literate population. The Minnesota advisory program reflects a significant time investment in the development of advisories conveying a large amount of information in a readable format and different types of advisories.

Risk managers may have to choose the type of information to communicate to the public and select the most relevant information to include (i.e., an advisory which uses an average meal size). Risk managers may wish to consider developing advisory materials with varying levels of detail so that materials can be provided to groups according to their level of interest and understanding (see risk communication discussed in Volume IV).

As voluntary activities, fish consumption advisories may be more readily supported by the public than mandatory advisory programs (i.e. prohibiting fishing in an area). The efficacy of quantitative fish consumption advisories is determined by the extent to which:

- the advisories accurately reflect local conditions and potential health risks, and
- non-commercial fish consumers use them appropriately.

Even when fish consumption advisories portray health risks accurately, non-commercial fish consumers may not follow the advisories if they are not readily available, too difficult to follow, and/or ignored. Effective risk communication is critical to making this (or any voluntary policy option) work.

In summary, the resources required to develop quantitative fish consumption advisories are greater than those required to develop more general health advisories, and often require expertise in quantitative and health areas. Resources needed for public education will probably be similar to those for general advisories; however, quantitative information may require more explanation by staff and require more detailed risk communication efforts. As noted above, the extent to which resources outside a program can be used in developing and maintaining it may have a significant impact on the resources required and on the feasibility of conducting various aspects of a program. A program's efficacy will depend on the effort directed at outreach and the appropriateness of the materials for the target audience.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

2.3.3. Catch and Release

Catch and release programs have been used in some areas to address concerns regarding health risks of contaminated fish for sport fishers. A catch-and-release fishing policy allows fishers to catch fish as a recreational activity, but encourages or requires them to release the live fish once they have caught them. As part of this policy, risk managers may additionally choose to:

- require a special permit to catch-and-release fish, or
- allow catch-and-release fishing only in a supervised tournament setting.

Example: New York's Catch and Release Program

Catch and release programs have been used in New York State where sampling and analysis programs indicate that fish in specific waterbodies are sufficiently contaminated so as to pose a public health threat if consumed at all. A report from the New York State Department of Environmental Conservation (NY DEC) suggests that risk managers may choose to recommend or enforce zero consumption, though still allowing catch-and-release fishing or fishing for trophies (NY DEC, 1985).

According to NY DEC, fishers generally accept and respect the intent of enforced catch-and-release regulations New York State has promulgated for species management purposes, especially when contrasted with outright fishing bans. However, their state report indicates that such strategies require both agency and fisher efforts and cooperation:

Enforcement [of fishing bans] is difficult at best, and enforcement of catch and release fishing is not expected to be much more successful. Since a high percentage of fishing activities take place in remote areas, the effectiveness of enforced catch and release fishing is highly dependent on considerable peer pressure and self-policing. (NY DEC, 1985).

One potential variation on this option would be to require fishers to obtain state fishing permits for catch-and-release fishing. This practice allows risk managers an opportunity to provide educational materials when the permits are issued, thereby ensuring that fishers are fully aware of up-to-date health advisory information. The likelihood that fishers will comply with the catch-and-release

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

regulations therefore increases. This option would have the same public health objectives as catch-and-release fishing without a special permit, but would increase the knowledge of people fishing legally. Requiring a permit would, however, add an administrative burden to both authorities and the public (NY DEC, 1985).

Another variation on this option is to allow fishing in highly contaminated fisheries only at structured tournaments. The agency would then have an opportunity to inform every registered angler of the health risks of eating contaminated fish, making enforcement of catch-and-release fishing much easier (NY DEC, 1985). This policy would likely require regulation to be effective, since it mandates that fishers join tournaments and pay a fee to fish. The policy significantly favors both competitive tournament fishing and fishers belonging to organized tournament-oriented fishing organizations over fishers who do not meet tournament fishing criteria. Such restrictions could have the effect of placing private organizations in the position of managing a public resource (NY DEC, 1985). The NY DEC expressed the concern that:

Many [anglers] would consider a tournament-only regulation as an unacceptable, unreasonable, and unfair attempt to satisfy special interest groups. This would promote and aggravate violations to the law and would reduce the credibility of the Department as to its professional, unbiased implementation of sportfishing regulations (NY DEC, 1985).

Still, this policy may be preferable to a total fishing ban in highly contaminated non-commercial fisheries.

2.3.3.1 Feasibility and Efficacy

The efficacy of voluntary catch-and-release options depends on the degree to which effective risk communication and education has taken place. It will also depend on the impact of non-governmental factors, such as traditional activities, economics, and nutritional needs (see Section 4). While quantitative and general fish advisories seek to limit consumption, catch-and-release programs are designed to eliminate consumption (of at least some species from some sources). This option may provide too great a hardship or disruption in lifestyle for some fishers and may, therefore, not be accepted for reasons beyond the control of many fish advisory programs. These types of constraints, often related to negative program impacts, are discussed in detail in Section 3.

Effective use of catch-and-release programs involves extensive public education to ensure that fishers both understand the underlying rationale for such policies and

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

recognize their own interests in supporting such a program. If fishers do not see the utility of the restrictions, they are unlikely to comply and are likely to incur health risks from consuming highly contaminated fish.

Voluntary Programs.

The feasibility of voluntary catch-and-release options is similar to that of the quantitative fish advisory program. Fewer resources are required by catch-and-release programs to develop and communicate complex fish consumption limits than by quantitative fish advisory programs. On the other hand, more resources may be required to convince fishers of the importance of avoiding fish consumption. With a greater change in behavior required by this option, risk communication activities may require greater effort.

Involuntary Programs.

The characteristics of voluntary catch-and-release programs described above are applicable to involuntary programs. In addition, involuntary programs require labor-intensive activities and physical barriers (e.g., fences). Enforcement staffing and access restrictions are critical to this type of program. The extent of enforcement and related activities will largely determine both the efficacy and costs associated with such a program. The feasibility of these options depends on the availability of human and other resources to carry out the required activities. Due to the highly resource-intensive nature of these options, they may be most appropriate in very limited areas, but would probably be too resource-intensive for large or numerous waterbodies. An involuntary catch-and-release program will likely have greater resource demands than general advisory programs or voluntary catch-and-release programs. The specific requirements will depend on the goals and scope of the program.

The need for an involuntary catch-and-release program may be greatest where cultural or economic factors create significant pressure to continue fishing but not necessarily fish consumption, and contamination levels pose significant health risks.

The efficacy of involuntary catch-and-release options depends on both education and enforcement. Even highly intensive enforcement actions probably cannot limit access to waterbodies completely. Consequently, the degree to which fishers understand and agree with efforts to limit consumption and risks will have an impact on the effectiveness of a program.

As noted above, negative impacts of such restrictive programs may be significant. The feasibility and efficacy of both the voluntary and involuntary programs may be

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

affected by factors that will mitigate the negative effects. These might include the proximity of other safe fishing sources, easy access to other sources of inexpensive food (e.g., supplementation with food programs), and coordinating program activities with local people to maintain community and traditional activities. These issues are discussed more fully in Section 3.

2.3.4 Fishing ban

This document focuses on fish advisories, which entail voluntary compliance with recommended practices. In determining the most appropriate course of action regarding fish contamination problems, however, some risk managers may choose to consider a ban on fishing in highly contaminated areas. This policy is discussed briefly in this document because it may be a component of an overall fish advisory program or an essential activity necessitated by circumstances.

Fishing bans have regulatory aspects and generate issues not considered in detail in this series. Consequently, readers may wish to consult other sources and discuss fishing bans with risk managers who have implemented this type of action.

A fishing ban may involve banning fishing through closing waterbodies to fishing and/or banning the possession of contaminated fish. A fishing ban, in this discussion, is distinct from a fish advisory in that restrictions on fishing are not voluntary. In a fish advisory, risk managers may recommend no consumption based on health risks and other considerations. This information would be handled, as other fish advisory information is handled, through risk communication activities. In the case of a fishing ban, fishing would be prevented through some active means. A variety of options may be exercised to implement this type of policy including restricting access to contaminated waterbodies, posting signs and levying fines when fishing occurs, or providing monitoring restricted of waterbodies to prevent fishing from occurring.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Example: Fishing Bans in New York, Missouri, and Massachusetts

The New York DEC, for example, uses fishing bans to close recreational fisheries when they ascertain with 95 percent statistical certainty that contaminant levels exceed guidelines for the target contaminant (e.g., PCBs). Once a fishery is closed, New York requires that sampling and analysis data show significant decreases in contamination before they will reopen it, in order to prevent confusion arising from frequent opening and closing of the same fishery. Risk managers might also choose not to reopen a fishery until contamination levels decrease to the point that fish are once again safe to eat, since some fishers may mistake a catch-and-release policy for an indication that they can safely consume the sport fish (NY DEC, 1985).

Missouri has also used fishing bans. They recently changed their advisory in a certain waterbody from a total ban to unlimited consumption based on several years of sampling and analysis data. Massachusetts has also implemented total fishing bans in heavily contaminated fishing areas. These bans applied to both commercial and non-commercial fishing.

The authority required to enforce such a policy may require enabling legislation. Health officials in Massachusetts used the authority given to the health department to prevent the public from imminent hazard as legal justification for taking restrictive action. Due to the justifications they presented for their actions, a legal challenge to their actions was not successful. Most health departments have similar authority and are required to take action when information is received regarding imminent hazard to the public.

2.3.4.1 Feasibility and Efficacy

Banning fishing entirely where significant risks to human health exist is the most effective way to limit consumption of highly contaminated non-commercial fish (NY DEC, 1985). The feasibility of such an action depends largely on intensive use of human and other resources in the restricted areas and will be affected significantly by educational efforts and resulting public attitudes. The resource requirements are obviously greater if contamination occurs in a large water body or in a number of areas.

The New York DEC has found that both the general public and non-commercial fishers in particular do not widely support sport fishing bans as a means to protect public health. Because non-commercial fishing is a largely self-regulated activity,

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

government intrusion is resented and enforcement is difficult and very staff-intensive. The New York DEC proposed the option of prohibiting the possession of contaminated fish in 1985 and found an overwhelmingly negative response among anglers toward a ban on the possession of contaminated fish (NY DEC, 1985).

Fishing bans are not advisable when they are used to simplify more complicated quantitative data for high risk populations. In many instances, although the communication of advisory information is complicated, individuals relying on fish as a basic nutritional and economic food source are not being shut out completely through the advisory process, as they are with fishing bans. The trust that can be established between community groups and regulatory agencies is already tenuous. Placing a ban on fishing when some fish consumption can be considered safe severely inhibits fishers' willingness to trust the agencies' recommendations in other arenas.

Risk managers may determine that some fish species are highly contaminated within a single waterbody while others are safe to eat. Many states, including Connecticut, New York, and Rhode Island, have enforced a closed fishery for striped bass. Increased problems may arise, however, if large fisheries shared by more than one state or province are covered by conflicting policies.

The efficacy of a ban on fishing depends on both the level of effort regarding enforcement and education and on local circumstances that affect the fishers interest in and ability to comply. As noted for the catch-and-release options above, negative impacts of such restrictive programs may be significant and include economic and nutritional hardships as well as disruption of community or traditional activities. Both feasibility and efficacy may be positively affected by features in the program's design that mitigate the negative impacts of restrictions. These features might include the proximity of other safe fishing sources, easy access to other sources of inexpensive food (e.g., supplementation with food programs), and the coordination of program activities with local people with regard to maintaining community and traditional activities. These issues are discussed more fully in Section 3.

Although fishing bans would usually be viewed as actions of last resort, only to be used in areas where fish are highly contaminated and the risk of adverse health effects is great, risk managers may choose this or a similar policy that aims to provide maximum assurance against consumption of contaminated non-commercial fish.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

2.3.5 Summary

Fish consumption policies differ in efficacy, feasibility, and/or economic costs. Table 2-3 summarizes some functional aspects of implementing the options discussed in the preceding section. These aspects include relative costs, staff requirements, anticipated efficacy, and whether regulatory authority is required. As noted above, this section includes only a discussion of issues surrounding the feasibility and efficacy of implementing these policies. Often, the feasibility and efficacy of an option is limited by the budget and/or staffing available to risk managers. Some policies, such as quantitative fish consumption advisories, require significant initial resources for the sampling and analysis program but may not require substantial staffing to implement. Others, such as fishing bans, require substantial ongoing staffing to be effective.

The ranges of feasibility and efficacy listed in Table 2-3 reflect the differing levels of effort that could be employed by risk managers for any given policy, depending on the goals and scope of the programs. For example, a catch-and-release fishing policy may require few resources and have little effect if the risk communication is limited to posting. Conversely, the same policy may require substantial resources for patrolling and public outreach and be much more effective in reducing risk. Intensive efforts to prevent consumption of highly-contaminated non-commercial fish may be prohibitively expensive, both to the authorities upholding the policy and to local economies supported by fishing. Conversely, attempts requiring very little resource expenditure may provide such limited information or reach so few individuals that many fishers may unknowingly consume dangerous quantities of contaminated sport fish.

Table 2-4 provides a template that risk managers can use to enter information regarding the various options under consideration. The options discussed in this section are all listed in the template; however, it is assumed that risk managers may consider only some of these options or may consider others that are not listed. Risk managers may consider the resources available to their programs, as well as the likely outcome, in terms of likelihood of accomplishing program goals, to define the potential options for their programs. The potential impacts of these options on target populations and other groups external to the agency also play a critical role in defining the best options and the success of a program. These impacts are discussed in the next section.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-3 Feasibility and Efficacy of Risk Management Options²						
Risk Management Options		Feasibility			Efficacy	
		Staffing	Funding	Regulatory Authority Required	Consumer Education	Source-specific Risk Reduction
No action required		N/A	N/A	no	none	none
Fish consumption advisory	General guidance	moderate	moderate	no	moderate	low to moderate
	Quantitative Guidance	moderate to high	moderate to high	no	moderate to high	moderate to high
Catch and release	Voluntary	low to high	low to high	no	low to high	low to high
	Mandatory	high	high	yes	low to high	high
Fishing ban	Voluntary	moderate to high	low to high	no	low to high	low to high
	Mandatory	high	high	yes	low to high	high

² The information provided on the options is based on a program of average scope and with moderate efficacy requirements. If a program is very large or small or if the program requires a very high level of compliance (efficacy) the resource requirements and efficacy will be correspondingly modified.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-4 Template for Risk Management Options						
Risk Management Options		Feasibility			Efficacy	
		Staffing	Funding	Regulatory Authority Required	Consumer Education	Source-specific Risk Reduction
No action						
Fish consumption advisory	General guidance					
	Quantitative Guidance					
Catch and release	Voluntary					
	Mandatory					
Fishing ban	Voluntary					
	Mandatory					

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

2.4. Outreach and Education

Outreach and education are critical components of any program designed to limit contaminated fish consumption. In most cases risk reduction strategies will use guidance and advisories rather than regulatory approaches. Consequently, the implementation of programs will rely heavily on effectively communicating to the public both what the recommended actions are (consumption limits, fish preparation methods, etc.) and why these actions are important to consumers.

Various approaches for carrying out risk communication activities are discussed in Volume IV in this series: Risk Communication. The volume contains information on evaluating the nature of the population of concern and their characteristics, a variety of strategies for effectively reaching the population with clear information using various media (newspaper, schools, etc), and methods for evaluating a communication program's effectiveness. Readers are urged to consult this volume in planning their fish advisory programs.

2.5 Federal Programs and Additional Resources

In response to requests from state, local and tribal and community group staff consulted for this project, information is provided in this section which can be used to address remediation concerns. The overall goal of many agencies is to have waterbodies and fish that are sufficiently contaminant-free that advisories are no longer necessary. Efforts are ongoing at all levels of the government to address this goal through cleanup efforts, pollution prevention and restrictions on the entry of toxic materials into waterbodies. Although it is beyond the scope of this document to list location-specific programs underway, this section provides a summary of various federal laws and programs relevant to fish contamination.

The applicability of the information provided in this section will depend on the source of the pollutants found in fish. For example, in cases where long-range transport is causing mercury deposition, the Clean Air Act is relevant (a summary of the laws is provided below). Where the pollutant sources are local industrial discharges, however, the Clean Water Act is appropriate. Areas adjacent to hazardous waste sites may fall under Comprehensive Emergency Response, Clean-Up and Liability Act (Superfund). Pesticide contamination may fall under the above acts; in addition, the Federal Pesticide, Insecticide, and Rodenticide Act requires regulation of pesticides in a manner that does not pose unreasonable health or environmental risks. The Community Right to Know Act may be used to obtain information regarding local sources of pollutants.

Agencies and departments outside EPA are involved in various areas that may

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

impact the extent of fish contamination. The Agency for Toxic Substances and Disease Registry (ATSDR) is involved with assessing the public health concerns from hazardous waste sites. The Army Corps of Engineers, a division of the Department of Defense, is involved with the dredging of contaminated sediments in conjunction with the EPA; contaminated sediments are of concern to consumers of bottom fish, and resuspension of contaminated sediments may pose hazards to consumers of all fish in the area. In addition, the Department of Energy is also involved in clean-up efforts that may directly or indirectly affect the concentrations of fish contaminants in areas of concern.

A variety of programs within these and other federal agencies are currently involved in regulating releases, cleaning up waste sites, and monitoring the release of toxic materials. Most federal agencies involved in this type of work have regional offices which can respond to questions regarding specific local problems. Staff of the regional offices work directly with state environmental and health agencies. Many also work with local, tribal, and community groups to address contamination problems. Table 2-5 contains a listing of relevant statutes and programs with a brief description of the purpose and function of the regulations. This table can be consulted to determine which agencies are most likely to have responsibility for a particular pollutant source.

Table 2-6 contains a listing of hotline numbers and other resources staffed by EPA or EPA contractors. Staff on these lines can provide state, local, and tribal risk managers information on government programs, send written materials, and provide referrals to other staff within agencies who can address specific or local questions. General information, applicable on a national level, regarding federal regulations, guidelines, and programs, is available through national information clearinghouses maintained by offices within federal agencies. The following section summarizes applicable federal statutes and regulations that address releases of toxic materials, clean-up of contaminated waterbodies, sediments, and land sites, and targeted maximum levels of pollutants in various media.

Risk Managers are also encouraged to fully explore the local, state, tribal, and regional resources available through agencies, advocacy groups, industry groups, universities and other groups. These groups often have ongoing grants, privately funded activities, and other resources which may be of assistance to fish advisory programs.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-5. Environmental Statutes and Programs Potentially Relevant to Fish Contaminants

Statute and Program Descriptions

CAA	Clean Air Act The CAA was enacted in 1970, with revisions in both 1977 and 1990, was designed "to protect and enhance the nation's air resources." The CAA has several key provisions used to protect air quality. It establishes National Ambient Air Quality Standards for primary and secondary air pollutants, developed State Implementation Plans to give states the responsibility for achieving these standards, and provided technology based emission limitations for regions that are not in attainment.
CAAA	Clean Air Act Amendments The 1990 amendments to the CAA resulted in a number of changes, including specific provisions to address acid rain and the phase-out of chlorofluorocarbons (CFCs), added technology-based regulations of toxic air pollutants. The CAA and its Amendments may be of interest to resource managers who are concerned about long-range pollutant transport into waterbodies that are frequently fished.
CERCLA (Superfund)	Comprehensive Emergency Response, Clean-Up and Liability Act Superfund was enacted in 1980 to provide funding and enforcement authority for cleaning up thousands of hazardous waste sites in the United States and responding to hazardous substance spills in all media. Base funding for these activities comes from specialized taxes on petro and chemical industries, crude oil, and vehicle manufacturers. A revolving fund was also established, making responsible parties liable for the complete costs. Hazardous substances include those indicated in any of the other major federal statutes, and action is triggered by the non-permitted release of any concentration of a listed substance. Superfund was re-authorized in 1986 by the Superfund Amendments and Re-authorization Act (see SARA).

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

CWA

Clean Water Act

The CWA, originally created in 1972 as the Federal Water Pollution Control Act until renamed and amended in 1977, was designed to restrict both the degradation of water resources by the discharge of pollutants and the transport of pollutants through waterways. In 1987, extensive amendments were added to remediate waters that exceeded minimum discharge standards to assure water quality. A wide spectrum of water-related issues are covered through the CWA for numerous chemicals. In addition, this act relies on the application of best practicable technology for water treatment. It also provides a permit mechanism to regulate the volume and nature of discharges, relying on technology-based effluent limitations on point sources (best available technology for toxics and best conventional technology for other compounds) and water-quality effluent limitations if water quality is not maintained. Though never specifically mentioned, wetlands (and consequently both fresh and estuarine fish nurseries) have also been interpreted as protected under the Clean Water Act because they are an integral water resource and a key mechanism for retarding the transport of pollutants through the waterways.

EEO

Environmental Equity Office

This office was created in the early 1990s to address the concern that environmental hazards were more likely to be found in socio-economically disadvantaged communities than in more affluent communities. The EEO primarily encourages every office and division of EPA to address issues of environmental equity within the context of existing contracts and projects, and does not sponsor as many projects directly that deal with the equitable distribution of risk.

EO

Executive Order on Environmental Justice

Executive Order 12898 was issued by President Clinton on February 11, 1994, to address environmental justice in minority populations and low-income populations. Within this order, he specifically ordered that all agencies take the principles of environmental justice into consideration when creating regulations. Notably, one issue mentioned directly was his concern for subsistence and recreational fishers who may be consuming contaminated fish.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

- EPCRA** **Emergency Planning and Community Right-to-Know Act**
The Right-to-Know Act was enacted as a freestanding provision of the 1986 Superfund Amendments, and is also known independently as SARA Title III. This act was designed to force states and local communities to develop plans for responding to unanticipated releases; to require notification to local, state, and federal authorities of the release of certain substances beyond a developed reportable quantity (threshold value) determined for hazardous chemicals based on their physical and toxic characteristics; and to require all industries to maintain and submit to local, state, and federal authorities Material Safety Data Sheets on all chemicals of concern.
- FCP** **Fish Contamination Program**
This program, run out of EPA's Office of Water, provides guidance to states, tribes and local agencies for the development of fish advisories. This group maintains the National Listing of Fish Advisories and managed the development of this guidance series.
- FIFRA** **Federal Insecticide Pesticide and Rodenticide Act**
This act requires balancing risks and benefits. EPA is required to register, or license, pesticides on the basis of data that is adequate to demonstrate that their use, according to label directions, will not cause unreasonable adverse effects on people or the environment. Data are required on a wide range of health effects (e.g., cancer, reproductive effects) and effects on wildlife, fish, and plants, including endangered species. In addition, EPA is responsible under Federal Food, Drug, and Cosmetic Act (FFDCA) for setting tolerances (maximum permissible residue levels) for residues in food or feed, for those pesticides whose use involves food or animal feed crops. EPA is also required to establish safe use practices and to release information obtained on the health and ecological effects of pesticides to the public, on request (with the exception of confidential business information).
- RCRA** **Resource Conservation and Recovery Act**
RCRA was created in 1976 to treat, store and dispose of all hazardous waste to minimize the present and future threat to human health and the environment. RCRA imposes full life cycle management controls on hazardous waste by regulating the generation, transport, treatment, storage and disposal of risky chemicals. Subtitle I specifically addresses underground storage tanks, an area of particular concern.

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

SARA

Superfund Amendments and Re-authorization Act

Significant revisions were made to the Superfund regulations in 1986, expanding the scope of the coverage and requirements, but not altering the intentions of the original act. SARA Title III was also created at this time as a freestanding provision also known as EPCRA, in the wake of the Union Carbide hazardous waste disaster in Bhopal, India. SARA Title III addresses the need for communities to have contingency plans for hazardous emergencies and grants rights to the public to know what hazards they might face from industry (including transport and disposal) in their communities (see EPCRA).

TSCA Toxic Substances Control Act

TSCA was created in 1976 to evaluate the potential hazards from chemical substances through manufacturer testing and may impose restrictions in use, storage, transport or disposal of chemicals accordingly. Three classes of chemicals have been regulated in accordance with TSCA: asbestos, polychlorinated biphenyls (PCBs), and chlorofluorocarbons (CFCs).

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-6: Hotlines and Other Resources for Federal Programs Relevant to Fish Advisories

media/focus	statutes/offices	hotlines / resources available
fish	<ul style="list-style-type: none"> • FCP 	EPA's Fish Contamination Program, c/o the Office of Water, (202) 260-7301, provides guidance to the states for developing fish consumption advisories. This group also maintains the National Listing of Fish Advisories.
water	<ul style="list-style-type: none"> • CWA 	EPA's Office of Water, (202) 260-5700, will direct callers with questions about the CWA and any component of it (e.g., questions regarding MCLs for specific chemicals) to appropriate EPA offices.
drinking water	<ul style="list-style-type: none"> • SDWA 	<p>Safe Drinking Water Hotline, (800) 426-4791, helps individuals who are interested in testing their drinking water, interpreting the results from a state laboratory, water treatment and filters, some general information about possible sources of unsafe drinking water and general information about the SDWA. Weekdays, 9:00 am through 5:30 pm, EST, except federal holidays.</p> <p>Ground Water and Drinking Water Resource Center, (202) 260-7786, in EPA's Office of Water, offers publications and referrals.</p>
air	<ul style="list-style-type: none"> • CAA • CAAA • EPCRA 	<p>Air RISC Hotline, (919) 541-0888, provides extensive information regarding the CAA/CAAA, has general information, source-specific trends (e.g., if a particular region that has high fish contamination is heavily populated by pulp and paper mills, general information on that industry's emission trends are available), and information on the criteria pollutants (particulate matter, volatile organic chlorides, nitrous oxides, sulfur oxides, and carbon monoxide).</p> <p>Additional resources offered through the Air RISC Hotline:</p> <p>Office of Visibility and Ecosystems, (919) 541-0877, focusses on visibility - generally considered a measure of particulate matter (primarily heavy metals and residual organics caught up by the other suspended compounds) and ecosystem health.</p>

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-6: Hotlines and Other Resources for Federal Programs Relevant to Fish Advisories

media / focus	statutes / offices	hotlines / resources available
		<p>Carol Jones, (919) 541-5341, contact for tribal air issues.</p> <p>Technology Transfer Network Bulletin Board System, modem access: (919) 541-5742, has extensive information regarding CAA rules, EPA guidance documents and activities.</p> <p>EPCRA Hotline, (800) 535-0202, responds to questions about accidental air releases under CAA §112(r). Weekdays, 8:30 am to 7:30 pm, EST, excluding federal holidays.</p>
hazardous waste		<p>RCRA/CERCLA/EPCRA Hotline, (800) 424-9346, provides general information on these acts, addresses site-specific concerns on superfund sites and emergency response and accidental release sites, and provides information regarding RCRA's underground storage tanks rules. Weekdays, 8:30 am to 7:30 pm, EST, excluding federal holidays.</p> <p>EPCRA Hotline, (800) 535-0202, responds to questions regarding the emergency planning and right-to-know regulations. Weekdays, 8:30 am to 7:30 pm, EST, excluding federal holidays.</p> <p>TSCA Hotline, (202) 554-1404, addresses questions relating to TSCA standards and provides general information as necessary on the primary chemicals regulated under these standards (asbestos, PCBs and CFCs). Weekdays, 8:30 am to 4:30 pm, EST, excluding federal holidays.</p>
	<ul style="list-style-type: none"> • RCRA • CERCLA • SARA • EPCRA (SARA III) • TSCA 	
pesticides		<p>National Pesticide Telecommunications Network, (800) 858-7378 (general public); or (800) 858-7377 (medical and governmental personnel). This service provides a variety of information concerning pesticides, ranging from product information, recognition and management of pesticide poisonings, toxicological profiles, health and environmental effects and cleanup and disposal procedures. Weekdays, 8:00 am to 6:00 pm, CST.</p>
risk communication	<ul style="list-style-type: none"> • FIFRA 	<p>Risk Communication Hotline, (202) 260-5606, is primarily designed to address hazardous waste communication, but some of their information may be useful in other contexts.</p>
environmental equity		<p>Environmental Equity Office Hotline, (800) 962-6215, will address equity concerns and refer callers to the appropriate offices for additional support.</p>
	<ul style="list-style-type: none"> • RCP 	

2. MANAGEMENT OPTIONS FOR LIMITING FISH CONSUMPTION

Table 2-6: Hotlines and Other Resources for Federal Programs Relevant to Fish Advisories

media / focus	statutes / offices	hotlines / resources available
general environmental information from EPA	<ul style="list-style-type: none"> • EO 12898 	<p>Access-EPA (202) 260-2080: The EPA's Public Information Center provides non-technical information and referrals about drinking water, air quality, pesticides, Superfund and other environmental topics. Access-EPA can also be reached via e-mail at public-access@epamail.epa.gov.</p> <p>Department of Defense, general information, (703) 545-6700.</p>
Army Corps of Engineers activities	_____	Department of Energy, general information, (202) 586-5000.
Department of Energy activities	_____	Department of the Interior, general information, (703) 358-1700.
Fish and Wildlife Services activities	_____	ATSDR or the Centers for Disease Control, general information, (404) 639-6304.
Agency for Toxic Substances and Disease Registry activities	_____	
