



WATER
SECURITY
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DOCUMENT

WATER SECURITY GUIDANCE DOCUMENT

PART 3 SECTION 7 BOIL WATER ADVISORY PROTOCOL (BWAP)

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PART 3 SECTION 7
BOIL WATER ADVISORY PROTOCOL (BWAP)**

ABSTRACT

A step-by-step guide for government regulatory officials and water suppliers involved in the decision to issue and rescind boil water advisories.

This protocol is based on the thesis “**Boil, Boil, Toil and Trouble: The Trouble with Boil Water Advisories in British Columbia**” by Renuka Grover. The full thesis is available at: <http://hdl.handle.net/2429/33790>.

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BACKGROUND: KEY ISSUES AND CONTEXT

Boil water advisories (BWAs) are public notifications of drinking water quality and are used as temporary, precautionary measures to protect the public from possible waterborne illnesses. In many Canadian jurisdictions, BWAs have been in place for months to years, leading to the concern that their use can be a substitute to the action needed for their removal. With lengthy or on-again-off-again BWAs, there is concern that the public will become complacent and not comply with the BWA. Research on BWAs is scarce, and little evidence is available to support practical decision-making by the two groups of key players responsible for BWA management – government regulatory officials and water suppliers.

The decision-making process has been found to be inconsistent from one decision-maker to the next, both within and across regulatory authorities. BWAs are handled on a case-by-case basis for the most part. This approach has both advantages and disadvantages.

The management of each BWA case within the context of the water system's unique circumstances allows decision-makers to consider what is likely best for the specific water system in question. Treating all water systems the same way would be a rigid approach; there needs to be some sensitivity to context. However, at present some of the diversity of approaches is not because of differences between systems but rather differences between decision-makers. Some decision-makers issue BWAs as a precaution and others only as last resort. Some consider numerous factors before making decisions; others do not. Some have years of experience in issuing BWAs and with specific water systems; others do not. There is the potential for such personal preferences and experiences (or the lack thereof) to affect sound decision-making.

Inconsistent approaches can therefore be problematic from a fairness perspective. This concern was raised in the Ombudsman's report on drinking water in British Columbia (Office of the Ombudsman 2008). The public should be able to rest assured that their drinking water is being managed in the best possible way, regardless of the type or size of their water system or where they live.

PURPOSE OF THE PROTOCOL

Part III of this Guidance Document focuses on managing risks to water security. The purpose of this protocol is to guide the overall management of boil water advisories, by acting as an information resource and by introducing a basis for consistency. It includes steps to take and factors to consider taking into account when deciding to issue and rescind boil water advisories.

INTENDED USERS

This tool is primarily intended for regulatory officials and water suppliers involved in the management of boil water advisories.

DESCRIPTION OF PROTOCOL

The BWA protocol defines and describes the three main types of public notifications, and the circumstances in which each should be issued. It also recommends steps for regulatory officials and water suppliers to take for issuing and removing BWAs.

This protocol functions to support decision-makers with adaptive procedures such that decisions to issue and rescind BWAs can be structured across roughly similar yet unique situations. The protocol may be used together with other related and jurisdiction-specific policies, regulations and guidance material; however, this protocol is subsidiary to any provincial/territorial and federal laws, directives, policies or regulations based on the management of BWAs. For information on what regulations apply in specific jurisdictions, the appropriate regulatory authority should be consulted.

The contents of the protocol have been partially adapted from resource materials from the local/regional authority, provincial and federal levels:

- *Guideline for Issuing and Rescinding a Drinking Water Public Notice (2007)*. Health Protection, Environmental Health Services, Fraser Health Authority.
- *BC Drinking Water Officer's Guide (2007)*. Drinking Water Leadership Council, Ministry of Health Services, Province of British Columbia.
- *Guideline for Boil Water Notice Decision Process (2009)*. Public Health Protection Management Team, Northern Health Authority.
- *Guidance for Issuing and Rescinding Boil Water Advisories (2009)*. Federal-Provincial-Territorial Committee on Drinking Water, Federal-Provincial-Territorial Committee on Health and the Environment, Health Canada.
- *Issue Paper: Drinking Water Public Notification Policy and Guideline Recommendation (2005)*. Zibin S., Sigalet, E., Interior Health Authority.

Although the protocol materials and resources are specific to BWAs, the information could be extended to other forms of public notifications on drinking water quality.

A STEP-BY-STEP GUIDE TO APPLYING THE PROTOCOL

THE THREE MAIN TYPES OF PUBLIC NOTIFICATIONS

Knowing when to issue a BWA - or any type of public notification - first requires awareness of the different types of public notices.

For consistency in terminology, it is recommended that decision-makers in each province/territory adopt terms defined in relevant provincial policies and legislation. For instance, the terms used in the BC Drinking Water Officer's Guide should be used in BC (as shown in bold in Table 1).

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Table 1: Relevant terminology used for issuing public notices

	Do not drink advisories (Do not use water notices, Do not use, Do not use advisories)	Boil water notices (Boil water advisories, Boil water orders)	Water quality advisories (Drinking water advisories, Water quality notifications, Drinking water notifications)
When to issue?	When there is a risk that cannot be adequately addressed by issuing a water quality advisory or by boiling the water (and in some cases, boiling would worsen the water quality); the water is not safe for domestic use.	When there is a known or potential threat to drinking water that is microbiological (bacterial, viral or parasitic) in nature. The risk can be adequately addressed by boiling the water as a short-term form of treatment. A boil water order is a legal written order and formalized version of a boil water advisory requiring water supplier to operate under boil water conditions.	When there is some level of threat particularly affecting a subset of the general population (susceptible individuals) and not necessarily everyone; the threat is not significant enough to require a boil water advisory or do not drink advisory.
Common reasons to issue	<ul style="list-style-type: none"> • Chemical contamination or exceedances (such as unacceptable levels of naturally occurring nitrates, lead or arsenic) • Accidents – such as chemical spills • Acts of vandalism, sabotage or bioterrorism that may affect water supply • Natural disasters, such as earthquakes or mudslides • For precautionary purposes when there is some unknown threat that will require time to determine. 	<ul style="list-style-type: none"> • Waterborne outbreak conditions • Bacteriological quality of water is below the accepted standard (presence of E.coli in water and/or repeated trends of total coliform) • No treatment in place at water system • Water system treatment breakdown • Inadequate disinfection at water system • High turbidity 	<ul style="list-style-type: none"> • Chemical exceedances (such as high sodium or high iron levels, which may affect individuals on a sodium-restricted diet or infants, respectively) • Water is not aesthetically pleasing (colour, odour) • Medium-to-high turbidity

PART 1: ISSUING AND REMOVING BWAS: A GUIDE FOR GOVERNMENT REGULATORY OFFICIALS

Table 2: Summary table outlining the recommended steps to the decision, issuing and removing of BWAs for regulatory officials¹

Step	
1	Identify Threat to the Drinking Water Supply that May Require a BWA
2	Initiate Communication with Water Supplier and Required Personnel
3	Review Water System File and Assess Risk <i>*Checklist A</i>
4	Conduct Site Inspection
5	Consult and Communicate to Reach a Decision
6	Issue BWA <i>*Checklist B and C</i>
7	Confirm Issuance of BWA
8	Develop Removal Criteria
9	Keep Everyone in the Loop
10	Meet Removal Criteria <i>*Checklist D</i>
11	Rescind BWA <i>*Checklist E</i>
12	Review BWA

** See the Checklist section of this document (page 17) to view the checklists referenced in the table above and in the text below.*

Note: Especially in events where time is of the essence, steps 1 – 5, which take place prior to the actual issuing of the BWA, should be attempted promptly so as to not unintentionally delay the issuing of the advisory. The amount of time spent on each step and whether the completion of one step is necessary before proceeding linearly onto the next step is discretionary and dependent on the type of threat and situation on hand.

¹ The information provided in this section primarily used the Fraser Health Authority's Guideline for Issuing and Rescinding a Drinking Water Public Notice (2007) as a guide, but has been adapted specifically for BWAs, rather than for all public drinking water notifications.

STEP 1 - IDENTIFY THREAT TO THE DRINKING WATER SUPPLY THAT MAY REQUIRE A BWA

Determine whether there is a potential or confirmed threat to the drinking water supply. The threat can be any situation, condition, or thing that renders the water unsafe for consumption. Awareness of a threat may occur via notification from the laboratory, from the water supplier, from a member of the public, or by an on-site water system inspection, for instance. Threats may include:

- A drinking water sample is not in compliance with relevant provincial or territorial legislation;
- There is no water treatment and/or disinfection in place at the water system or the treatment system is malfunctioning due to mechanical failure;
- Unexpected and unacceptable changes to water quality are observed, such as high turbidity;
- The water system is not being properly maintained. This could be when a new or previously un-permitted water system is discovered and there is no water supplier or no trained or competent water supplier onsite to maintain daily water system operations (e.g. water quality monitoring);
- There is epidemiological evidence indicating water from the system as a possible source of a waterborne disease outbreak.

Moderate to high-risk, time-sensitive events may require decision-makers to proceed towards a course of action more quickly than low-risk events. Moderate to high-risk events include:

- waterborne disease outbreaks;
- laboratory reports of E.coli in multiple water samples collected from different locations with no evidence of sampling error;
- interruption or loss of water treatment;
- unfiltered surface water systems with unacceptable raw water turbidity;
- zero or negative pressure due to water main break or loss of source; and
- tampering and introduction of a harmful substance into the water system.

Low-risk events - primarily from inconclusive water bacteriological results - include:

- the potential for sampler error;
- no evidence of operational and maintenance issues or loss of disinfectant residual at the time of water sampling;
- a water system with no history of poor water quality; and
- no evidential change to water quality (e.g., turbidity or colour).

STEP 2 - INITIATE COMMUNICATION WITH WATER SUPPLIER AND REQUIRED PERSONNEL

Make contact with the water supplier to inform him/her about the identified potential risk to drinking water, possible causes, and to initiate dialogue on next steps. Review the water supplier's water sampling protocol and arrange to have follow-up water samples taken immediately by the water supplier for confirmatory testing. Inform appropriate managers, the medical officer of health and any other required personnel about the threat to the drinking water system.

Having an incident response team established prior to and in preparation for such events, as recommended by the Federal-Provincial-Territorial Committee on Drinking Water, would expedite the effective exchange of information. Such a team may include professionals experienced in water quality monitoring, drinking water regulation, source water protection, treatment plant operation, water distribution, and public health surveillance.

STEP 3 - REVIEW WATER SYSTEM FILE AND ASSESS RISK

Collect and compile risk assessment information about the water system. Consider what is known and unknown about the situation. Refer to *Checklist A: Water System Risk Assessment*.

STEP 4 - CONDUCT SITE INSPECTION

If additional or confirmatory information is needed for risk assessment, you may conduct an onsite water system inspection, if there is sufficient time.

STEP 5 - CONSULT AND COMMUNICATE TO REACH A DECISION

Once sufficient information about the water system and the risk posed to water users has been compiled, consult with the manager, medical officer of health, and other colleagues, as appropriate. Discuss the situation with the water supplier.

Given that the main purpose of a BWA is to protect public health from a confirmed or possible microbiological threat to drinking water – where boiling the water is sufficient to render the water potable – decide whether issuing of a BWA would be the correct action to take, and not some other form of public notification.

STEP 6 - ISSUE BWA

Review proposed course of action and request the water supplier to initiate action immediately. The water supplier should be notified of the issuing of a BWA by the best means (written notice, email, telephone, fax or in-person). In the case of noncompliance, issue a formal boil water order to the water supplier.

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In communication with the water supplier, the regulatory official should indicate how to inform the water users about the BWA and what specific information or instructions they should be given. Direct the water supplier to prepare the BWA notice and submit a copy to the regulatory authority for review prior to disseminating. The water supplier should confirm by what means the BWA will be communicated to the water users. Alternatively, clearly and directly indicate to the water supplier what the BWA message should include. This may especially be required in the case of small water systems, where the water suppliers may not have the experience, resources, and know-how to develop an effective strategy and message to communicate the BWA to water users. *Refer to Checklist B: Creating the BWA Message.*

Prohibit the use of language that nullifies or defeats the purpose of the notice. Ensure the language is not too technical and encourages broad understanding of the BWA message.

Decide on the best means to disseminate the information to the all water users and the general public, according to the water system in question. The use of multiple methods is recommended. *Refer to Checklist C: Ways to Disseminate the BWA message.*

Inform support staff and agencies affected by the BWA, such as other health unit facilities, Nurse lines, etc. The regulatory authority's website should be immediately updated with information about the BWA. It is recommended that at least the following information be provided online on the regulatory authority's website:

- Name and location of water system
- Date the BWA is issued/effective
- Why the BWA was issued (the reason, the threat)
- What specific actions will determine when the BWA can be lifted (the criteria for removal)
- Up-to-date information regarding the current status of the BWA (updated as soon as new information is available or progress is made)

STEP 7 - CONFIRM ISSUANCE OF BWA

Verify with water supplier that the BWA has been communicated to the water users. Furthermore, verify that the issuance has been clearly communicated by checking media reports, directly contacting select water users, onsite visits, or other means.

If there is any reason to believe that the water supplier has not adequately complied with the requirement to inform the water users of the BWA, initiate action to inform the water users yourself. If you need to implement further compliance activity, take appropriate action as per relevant legislation.

STEP 8 - DEVELOP REMOVAL CRITERIA

Once a sound rationale for issuing a BWA has been developed, and the BWA is communicated in a timely manner, formulate removal criteria and develop a timeline by which required corrective actions should be taken and the BWA lifted. The timeline should be realistic and created in conjunction with the water supplier and with consideration of the water system's unique circumstances.

Note: A BWA should not be removed without approval of the appropriate regulatory authority.

STEP 9 - KEEP EVERYONE IN THE LOOP

Arrange to discuss the BWA and progress made with the water supplier on a regular basis. Schedule the next follow-up phone call at each meeting. Maintain a set minimum frequency of follow-up and communication to ensure progress in addressing the BWA is made.

Ensure the water supplier is reminding the water users about the BWA frequently and informing them of progress/updates since the issuance. Keep public postings updated and refresh them as needed.

Ensure that the regulatory authority's website has up-to-date information about the BWA at all times.

STEP 10 - MEET REMOVAL CRITERIA

To ensure progress towards the BWA's removal is maintained, it is important to follow the timeline that indicates what steps need to be taken by the water supplier to remove the BWA.

Once the water supplier has informed you that the threat has been eliminated or corrected, review the removal criteria and decide whether the BWA can be lifted.

Refer to Checklist D: BWA Removal Criteria.

STEP 11 - RESCIND BWA

Compile information indicating that the risk to drinking water is no longer in place. Consult with managers, medical officers of health and other required personnel to discuss removal of BWA.

Authorize water supplier to remove the BWA and inform water users. Have the water supplier develop and submit the BWA removal message for your review. Alternatively, clearly and directly indicate to the water supplier what the BWA removal message should include. This may be required especially in the case of small water systems, where the water suppliers may not have the experience, resources and know-how to develop an effective strategy and no-

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tice communicating the removal of the BWA to water users. Once an approved message has been created, the water supplier should immediately inform the water users in the most appropriate means. *Refer to Checklist E: Creating the BWA Removal Message.*

Notify support staff and agencies of the BWA's removal, and update the regulatory authority's website.

STEP 12 - REVIEW BWA

Complete a full review or record of the BWA event. Determine if any changes in approach to the management of the water system are needed. Make necessary improvements to the water system's emergency response plan as needed. This is a key component of an adaptive management and governance approach (see *Part III, Section 6, Fostering Good Governance Practices*).

**PART 2: ISSUING AND REMOVING BWAS:
 A GUIDE FOR WATER SUPPLIERS ²**

Table 3: Summary table outlining the recommended steps to the decision, issuing and removing of BWAs

Step	
1	Identify Threat to the Drinking Water Supply that May Require a BWA
2	Initiate Communication with Regulatory Official and Required Personnel
3	Assess Risk *Checklist A
4	Consult and Communicate to Reach a Decision
5	Issue BWA *Checklist B and C
6	Develop Removal Criteria
7	Keep Everyone in the Loop
8	Meet Removal Criteria *Checklist D
9	Rescind BWA *Checklist E
10	Review BWA

* Refer to the Checklist section of this document (page 18) to view the checklists referenced in the table above and in the text below.

Note: Especially in events where time is of the essence, steps 1 – 4, which take place prior to the actual issuing of the BWA, should be attempted promptly so as to not unintentionally delay the issuing of the advisory. The amount of time spent on each step and whether the completion of one step is necessary before proceeding linearly onto the next step is discretionary and dependent on the type of threat and situation on hand.

**STEP 1 - IDENTIFY THREAT TO THE DRINKING
 WATER SUPPLY THAT MAY REQUIRE A BWA**

Determine whether there is a potential or confirmed threat to the drinking water supply. The threat can be any situation, condition or thing that renders the water unsafe to drink. You may come to know about a threat to drinking water via notification from the laboratory, from the regulatory authority, from a water user or from your own observations of the water system.

² The information provided in this section primarily used the Fraser Health Authority's Guideline for Issuing and Rescinding a Drinking Water Public Notice (2007) as a guide, but has been adapted specifically for BWAs, rather than for all public drinking water notifications.

A threat to drinking water may include the following situations:

- A drinking water sample is not in compliance with relevant legislation in your province or territory;
- There is no water treatment and/or disinfection in place at the water system or the treatment system is malfunctioning due to mechanical failure.
- Unexpected and unacceptable changes to water quality are observed, such as high turbidity;
- The water system is not being properly maintained. This could be if your water system is new or was previously un-permitted and was recently discovered by the local health authority. A well-maintained water system requires a trained and certified water supplier on site to maintain daily water system operations – such as water quality monitoring. If you lack training or are unsure how to manage the water system, your water system may not be considered well maintained and drinking water from the system may not be safe for consumption;
- There is epidemiological evidence indicating water from the system as a possible source of a waterborne disease outbreak.

STEP 2 - INITIATE COMMUNICATION WITH REGULATORY OFFICIAL AND REQUIRED PERSONNEL

Once you identify or become aware of a potential risk to the drinking water, contact your designated regulatory official to inform him/her about the threat, possible causes, and to initiate dialogue on next steps. Review your water sampling protocol with the regulatory official and arrange to have follow-up water samples taken immediately for confirmatory testing.

Inform required personnel, following your emergency response and contingency plan, such as managers, supervisors, community water system President, as deemed appropriate.

STEP 3 - ASSESS RISK

Collect and compile risk assessment information about the water system for consideration into the decision on whether issuing a BWA would be the best course of action to take. Consider what is known and unknown about the situation to develop rationale. Refer to *Checklist A: Water System Risk Assessment*.

If the regulatory official requests additional or confirmatory information about the water system, you may need to conduct a complete risk assessment of the water system. If the regulatory official plans to conduct an onsite water system inspection, make yourself readily available for the visit and provide as much detailed information and assistance as you can.

STEP 4 - CONSULT AND COMMUNICATE TO REACH A DECISION

Once sufficient information about the water system and the risk posed to water users has been compiled, inform the regulatory official and discuss what actions to take.

Given that main purpose of a BWA is to protect public health from a confirmed or possible microbiological threat to drinking water – where boiling the water is sufficient to render the water potable – decide whether issuing of a BWA would be the correct action to take, and not some other form of public notification.

STEP 5 - ISSUE BWA

Review proposed course of action with the regulatory official. The regulatory official may request that you issue a BWA.

As per jurisdictional legislation, water suppliers are required to provide public notice to water users (with or without request from the regulatory official) when an immediate reporting standard is not met or when there is some threat to the drinking water. The failure of water suppliers to do so will result in the issuing of a boil water order by regulatory officials. Further negligence in complying with the issuing of a BWA and failure to communicate the BWA to water users may result in legal enforcement by regulatory officials.

Activate the water system's emergency response and contingency plan. The BWA should not be removed without approval of the regulatory official.

In communication with the regulatory official, indicate how you will inform the water users about the BWA and what specific information or instructions they will provide. Prepare the BWA notice as will be communicated to the water users and submit a copy to the regulatory authority for review prior to disseminating. Inform the regulatory official how you plan to communicate the BWA to all water users. *Refer to Checklist B: Creating the BWA Message.*

Be careful of the language and tone by which you convey the BWA message to the water users. Prohibit the use of language that defeats the purpose of the notice. Ensure the language is not too technical and encourages broad understanding of the BWA message.

Decide on the best means to disseminate the information to the all water users and the general public, according to the water system in question. The use of multiple methods is recommended. *Refer to Checklist C: Ways to Disseminate the BWA Message.*

STEP 6 - DEVELOP REMOVAL CRITERIA

Once a sound rationale for issuing a BWA has been developed, and the BWA is communicated in a timely manner, formulate removal criteria and develop a timeline by which required corrective actions should be taken and the BWA lifted. The timeline should be realistic and created in conjunction with the

regulatory official and with consideration of the water system's unique circumstances.

Note: A BWA should not be removed without approval of the appropriate regulatory authority.

STEP 7 - KEEP EVERYONE IN THE LOOP

Arrange to discuss the BWA and progress made with the regulatory official on a regular basis. Schedule the next follow-up phone call at each meeting. Maintain a set minimum frequency of follow-up and communication to ensure progress in addressing the BWA is made. Inform the regulatory official when any progress is made, of any updates, questions or concerns.

Ensure that you are reminding the water users about the BWA frequently and informing them of progress and updates since the issuance. Keep public postings updated and refresh them as needed.

STEP 8 - MEET REMOVAL CRITERIA

To ensure progress towards the BWA's removal is maintained, it is important to follow the timeline that indicates what steps need to be taken to remove the BWA.

Once the threat has been eliminated or corrected, inform the regulatory official and proceed towards reviewing the removal criteria and decide whether the BWA can be lifted. *Refer to Checklist D: BWA Removal Criteria.*

STEP 9 - RESCIND BWA

Once authorized by the regulatory official in writing, remove the BWA and inform water users. Develop and submit the BWA removal message for review and approval by the regulatory official. Once an approved message has been created, immediately inform the water users by the most appropriate means. Refer to *Checklist E: Creating the BWA Removal Message.*

Notify support staff and personnel with a need to know about the BWA removal.

STEP 10 - REVIEW BWA

Complete a full review/record of the BWA event. Determine if any changes in approach to the management of the water system are needed. Make improvements to the water system's emergency response plan as needed.

CHECKLISTS

CHECKLIST A: WATER SYSTEM RISK ASSESSMENT³

When deciding to issue a BWA, consider the following:

Water system characteristics:

- What is the source of the water system?
- Is the water source protected?
- How old is the water system infrastructure? Is it well maintained?
- What is the size of the system? How many connections does it have?
- What type of water system is it? What is the system's purpose?
- What type of population is served water from this system? Does the population include high-risk groups, such as elderly, children and/or infants?
- Does the system run year-round or only seasonally?
- Is there any water treatment (filtration, disinfection) in place? Is treatment at point of use/entry or centralized at the water system?

Sampling Information:

- Where was the last water sample taken?
- What was the sampling procedure?
- How many samples were taken? How many sample results are available?
- If water sample(s) were positive for E.coli or total coliform, were the counts low (example: 1 count E.coli or 10 counts total coliform per 100 mL) or high (example: over 10 counts per 100 mL)? With low counts, sampling error needs to be ruled out.
- Has the system been flushed, disinfected and re-sampled for confirmatory testing? What are the results?
- Was the sample shipped appropriately (within required time-frame)?
- How much confidence do you have in the lab results?
- Was the lab fully capable and certified?
- Have the results been interpreted correctly?

Monitoring Data:

- What monitoring data are available?
 - Chlorine residual records
 - Turbidity records
 - Past bacteriological lab results, trends
- Have there been any public complaints about water quality?
- Is there a known communicable disease outbreak in the community?
- Is there any recent raw water quality events?
- When was the last water system inspection done? By whom?

Operational Factors:

- Is the water supplier certified and/or trained and competent in running the water system?
- What is the history of the water system operations?
- Has this system been on BWA(s) in the past? For what reason(s)?
- Is there a cross connection control program in place?
- Is there an approved Emergency Response and Contingency Plan in place at the water system?

³ The list of factors was heavily influenced by the risk evaluation checklist that included in *BC Drinking Water Officer's Guide* (Drinking Water Leadership Council, Province of British Columbia, Ministry of Health Services; 2007), but was further refined with respect to BWAs.

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Environmental Factors:

- Were there any recent weather events that may have affected water quality?

Other things to think about:

- Are there any other legislative requirements on this system? Systems linked to institutions or businesses may be subject to regulations other than those specific to drinking water (e.g., food handling regulations for restaurants).
- Is potential liability a concern?
- What would be the possible consequences if a BWA is not issued?
- Are concerns over expense or inconvenience to water supplier and/or water users affecting the decision to issue a BWA?

Regulatory Officials should consider factors relevant to their working relationship and history with the water supplier that may influence decision-making:

- From past communication and experience, is the water supplier generally cooperative and compliant?
- If this is the first time dealing with this water system or with the water supplier, could the lack of experience or information be affecting your decision?

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CHECKLIST B: CREATING THE BWA MESSAGE

In creating the BWA message, consider including the following information:

- Name of water system and jurisdiction/regional health authority
- Date BWA issued/effective
- Reason why the advisory is being issued; what the water quality problem or threat is
- What the associated health risks are
- Who is at risk
- What to do to avoid health risk
 - Bring tap water to 1 min of rolling boil before use
 - Use bottled water in place of tap water
 - Treat tap water with household bleach before use
 - Use other household water treatment
 - Use boiled, bottled, or treated water for washing fruits and vegetables
 - Use boiled, bottled, or treated water for food and beverage preparation
 - Use boiled, bottled, or treated water for washing dishes
 - Use boiled, bottled, or treated water for brushing teeth
 - Use boiled, bottled, or treated water for making ice
 - Give pets boiled, bottled, or treated water for consumption
- What corrective action is being taken to end the advisory
- Who to contact for more information and where to get more information
- Additional information for susceptible populations, such as infants and the elderly
- How long the advisory is anticipated to last
- How the water users will be notified of advisory removal
- Any special instructions for landlords with tenants, retail food establishments, day care facilities, schools, hotels, restaurants, spas, swimming pools, etc.

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CHECKLIST C: WAYS TO DISSEMINATE THE BWA MESSAGE

- Press release: television, radio, newspaper
- Internet: the local government jurisdiction's website, the water system's website, e-mail, social utility websites (Facebook, Twitter)
- Telephone, short message services (SMS)
- Posting of signs or print notices in clearly visible public locations
- Door to door canvassing of houses/units to verbally and personally inform water users and/or distribute print notices or letters
- Announcements in community meetings

CHECKLIST D: BWA REMOVAL CRITERIA ⁴

- The following should be considered when deciding to lift the BWA:
- The threat to the drinking water and its source has been identified and resolved
- The water quality results are in compliance with relevant drinking water legislations in your province/territory
- Confirmatory water sample testing has been done and the results are satisfactory
- The water system has been returned to normal operating conditions
- Distribution system has been flushed to displace any affected or contaminated water
- Water system operating procedures have been reviewed
- Turbidity and/or heavy run-off events have resolved
- Water treatment has been installed
- There is a trained and certified water supplier on site to operate system
- Water quality surveillance and monitoring is in place
- An approved emergency response plan, with directives on the issuing and removing of BWAs, has been developed
- Full site inspection of the water system has been conducted
- The waterborne outbreak event has ended, as supported by epidemiologic surveillance data

⁴ This list was based on the risk evaluation checklist that was included in the Interior Health Authority's Issue Paper: Drinking Water Public Notification Policy & Guideline Recommendation (2005)

CHECKLIST E: CREATING THE BWA REMOVAL MESSAGE

When creating the BWA removal message, consider including the following information:

- Name of water system and jurisdiction/regional health authority
- BWA removal date
- How the water quality problem or threat was resolved
- What to do to before using tap water
 - Flush all water-using fixtures for 1 minute
 - Run cold water faucets and drinking fountains for 1 min
 - Drain and flush all ice-making machines
 - Drain and refill hot water heater
- Who to contact for more information or where to get more information

RECOMMENDATIONS AND FURTHER AREAS FOR RESEARCH

A water system will be better managed if the relationship between the regulatory official and water supplier is based on mutual understanding and concern for public health; a relationship in which a regulatory office can *convince*, rather than force, a water supplier to issue a BWA. Therefore, there are many benefits to maintaining a healthy working relationship involving communication and trust between the regulatory official and water supplier – whether a BWA is in place or not.

The challenge in decision-making comes in determining whether or not action is truly needed. Ideally, we want to avoid outcomes where a decision was made not to issue a BWA when it was truly needed or a decision was made to issue a BWA when it was not truly needed. Failure to act - or issue a BWA - could lead to disastrous consequences, as was evident from the infamous Walkerton, Ontario tragedy. It is, therefore, generally thought valid for decision-makers to take the precautionary approach to public health decisions in order to avoid such severe consequences. However, there are inevitable consequences to taking action when not required either. The disadvantages to issuing BWAs - or liberally issuing BWAs - include: message fatigue and loss of compliance, creating unnecessary panic among the public, the potential for the public to lose confidence in their water system, and increasing the risk of burn injuries among the public from boiling water. On the other hand, BWAs may enhance the public's awareness of their water supply and water system, serving as a catalyst that triggers further remedial action and improvements to the water system.

Further studies are needed to help provide empirical evidence for the best means by which decisions to issue BWAs should be made. At present, no

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study has investigated the decision-making process behind issuing BWAs in a large sample and across all of Canada. As many water systems have long-standing BWAs in place in lieu of more permanent upgrades to the water system's infrastructure, it may also be of value to collect information on what specific upgrades or actions are effective in improving water systems. Such data and any lessons learned could be used to guide future actions and decisions regarding water system upgrades that work.

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USEFUL WEB LINKS

Health Canada: Boil Water Advisories and Boil Water Orders
<http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/boil-ebullition-eng.php>

Health Canada: Canadian Drinking Water Guidelines:
<http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php>

Health Canada: Guidance for Issuing and Rescinding Boil Water Advisories:
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/boil_water-eau_ebullition/index-eng.php

Health Canada: Water Quality – Reports and Publications:
<http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php>

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