



Ministry for the
Environment
Manatū Mō Te Taiao

**Ministry for the Environment
Recreational Water Quality Assessment Software**

BatheWatch User Guide

Prepared for the Ministry for the Environment by

National Institute of Water & Atmospheric Research

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Recreational Water Quality Assessment Software User's Guide

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Introduction

Background Information

The Ministry for the Environment (MfE) has recently revised and published the Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas (2003)¹. The aim of the guidelines is to:

- assist councils to monitor recreational waters within their jurisdictions for both public health and state of the environment monitoring purposes
- facilitate the introduction and acceptance of the new guidelines and assist councils and water managers with their implementation.

BatheWatch is the name for software developed to assist in the assessment and monitoring of recreational areas bounded by water areas. Using BatheWatch, the user can perform either a marine or freshwater assessment.

Both assessments are performed in almost identical fashion, but they are based on different underlying assumptions. This manual describes the two assessments in separate subsections. Preceding those subsections is a section explaining the primary concepts central to both assessments.

Features of the Recreational Grading Process

Suitability for Recreation Grade (SFRG)

This software performs a beach recreational assessment entitled Suitability for Recreation Grade (SFRG). For a more in-depth discussion of the SFRG assessment, please refer to MfE (2002)². An SFRG is derived from the merging of two input sources: a grade derived from data collected at the beach site and the recording of visual observations of the attributes of the beach and its surroundings and any potential contaminant influences.

There are a number of factors that contribute to a final SFRG. A summary of the process is shown in the following diagram².

¹ Ministry for the Environment. 2003. Microbiological Water Quality Guidelines for Marine and Freshwater Areas. Wellington, New Zealand.

² *ibid.*

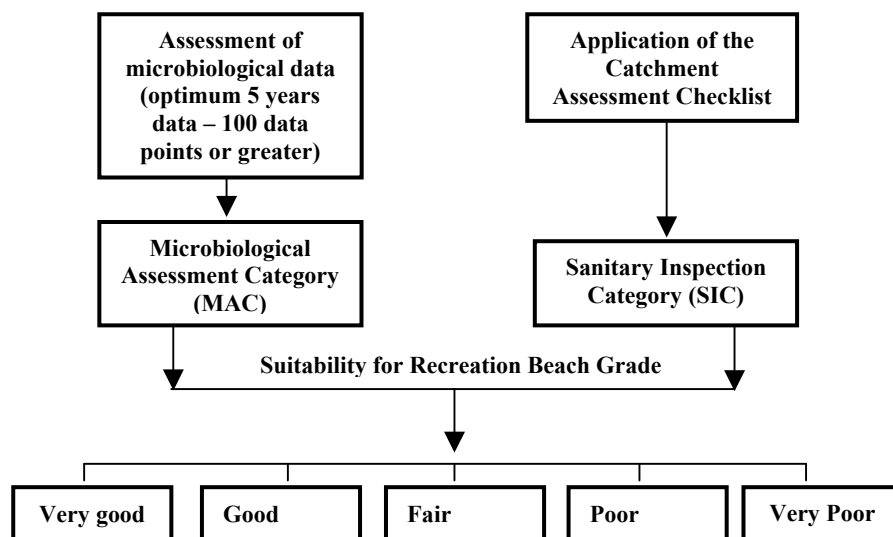


Figure 1. Summary of the grading process

Sanitary Inspection Category (SIC)

This category is based on a Catchment Assessment Checklist (CAC), a formal series of mandatory and optional questions to be answered for each site. This list identifies principal microbiological contamination from faecal sources and assigns a category according to risk. Categories include: very low, low, moderate, high, and very high. Essentially, the checklist is a series of tick boxes with some text fields for additional information.

Microbiological Assessment Category (MAC)

The Microbiological Assessment Category is derived from the 95th percentile (calculated using the Hazen Method – see description of this method in the technical section) of five years of historical data and a minimum of 100 data points. Sites may be graded on however many data points are available (minimum of 20) but the results of sites graded with less than 100 points should be considered interim and the software marks them as such. The purpose of the MAC is to give an indication of general water quality over an extended period, allowing for variations in climatic conditions.

Before You Start

Getting Help

Any problems or inquiries relating to this software should be directed to the BatheWatch helpdesk line. The email address is bathewatch@mfe.govt.nz – please include ‘BatheWatch helpdesk’ as the subject to help us process your inquiry.

System Requirements

This software is designed to run on Windows 98, Windows NT 4, and any newer version of Windows. It may also work on Windows 95 but because Microsoft no longer supports Windows 95 development, it is not possible to resolve any issues that may arise on that system.

Installing and Running the Software

The software is distributed from the website of the Ministry for the Environment at:

www.mfe.govt.nz/publications/water/microbiological-quality/analysis-tool/

Recreational Water Quality Assessment Software User's Guide

To use the software, download the file(s) from the web to a location on your computer. The main executable file is called BatheWatch.exe. Double-clicking on this file starts the programme.

If you wish to add an icon to your desktop to allow easier access to BatheWatch, right-click and drag the file from its new location onto the desktop. Select "Create Shortcut(s) Here" from the pop-up menu that appears. The shortcut can also be moved from the desktop to the Start Menu or Quick Launch bar.

On some older operating systems, the following error may appear when you first run BatheWatch:

Ordinal 6880 could not be located in the dynamic link library MFC42.DLL

If so, please download the latest support files from Microsoft, at:

activex.microsoft.com/controls/vc/mfc42.cab

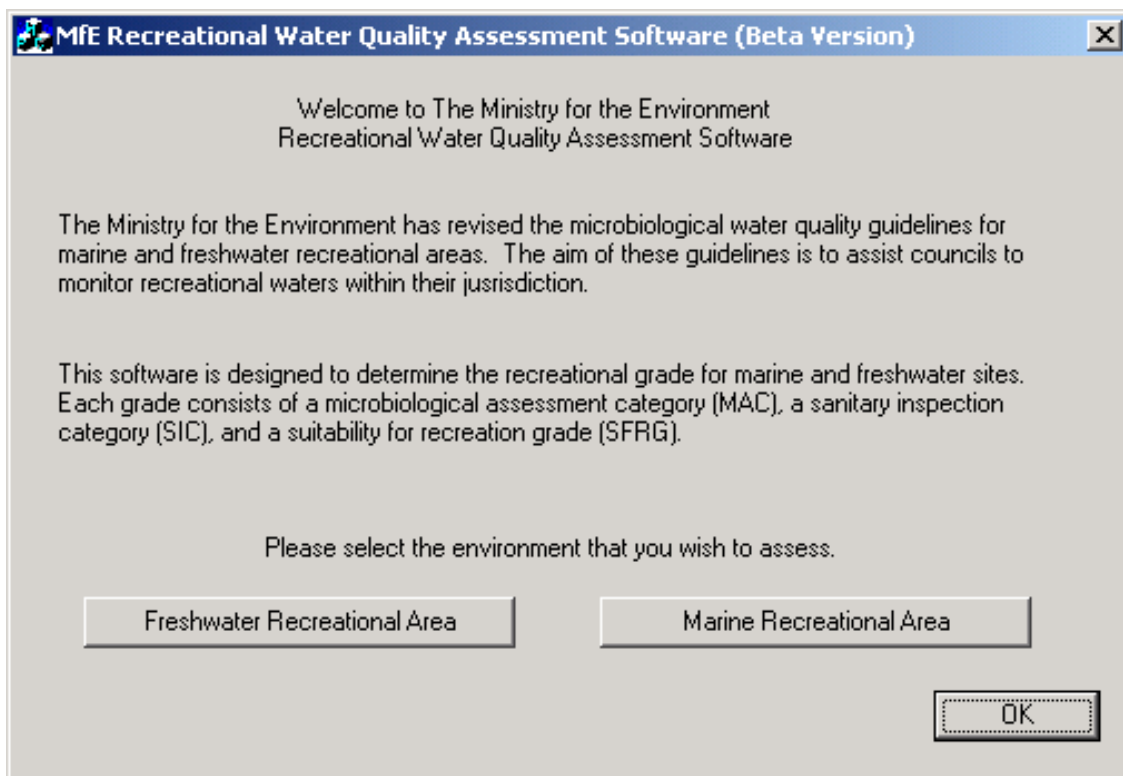
Expand this file (using a tool like WinZip or CabView) and double-click the mfc42.exe file to run it. The latest version of mfc42.dll will be installed. Restart the computer and then you should be able to run BatheWatch successfully.

A Step-by-step Guide to a Marine Beach Assessment

Conducting a Marine Beach Assessment involves completing three procedures. These are:

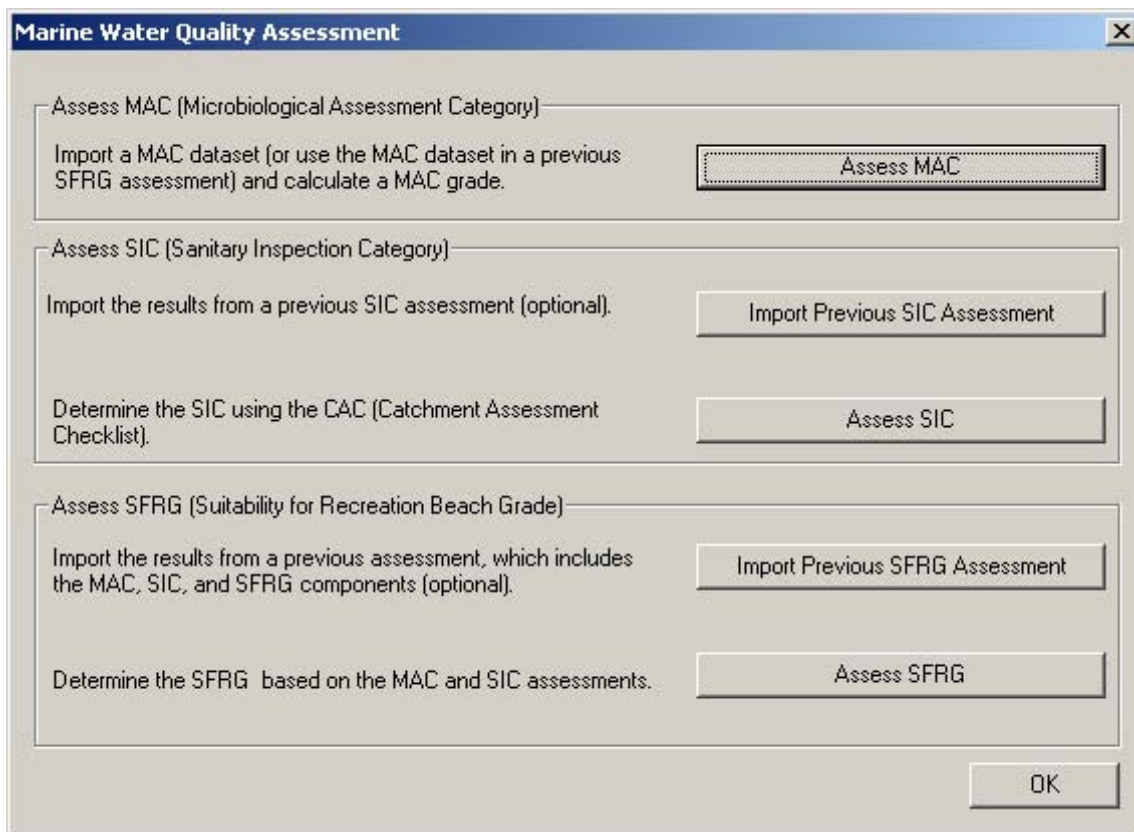
- a MAC (Microbiological Assessment Category) assessment
- a SIC (Sanitary Inspection Category) assessment
- an SFRG (Suitability For Recreation Grade) assessment.

To run the software, double-click the executable file (BatheWatch.exe) or the shortcut you created. The following dialogue box appears:



The instructions in this section of the manual are specific to conducting a marine assessment. You can also choose the “Freshwater Recreational Area” button to perform a freshwater assessment. If you want to perform a freshwater assessment, please read the section entitled *A Step-by-step Guide to a Freshwater Beach Assessment*.

Click on the “Marine Recreational Area” button to open the Marine Water Quality Assessment dialogue.

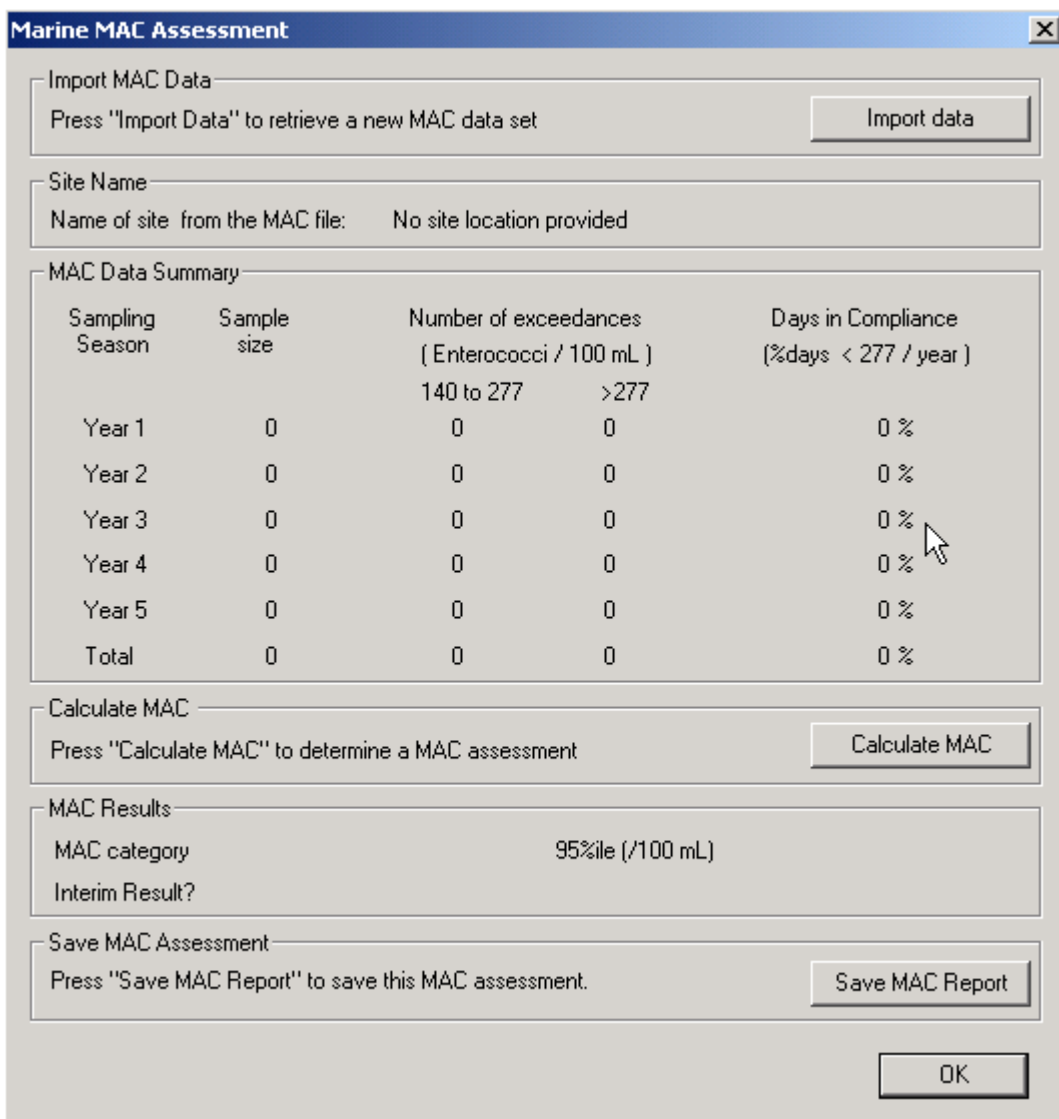


Completing the MAC Assessment

Marine MAC grades are based on the 95th percentile of the number of enterococci per 100 mL. The grades are defined as: A (≤ 40), B (41–200), C (201–500), and D (>500). The MAC assessment requires as input a comma-delimited file that includes the site name, date, enterococci count, depth and method. See Appendix A for more details on how to construct this file.

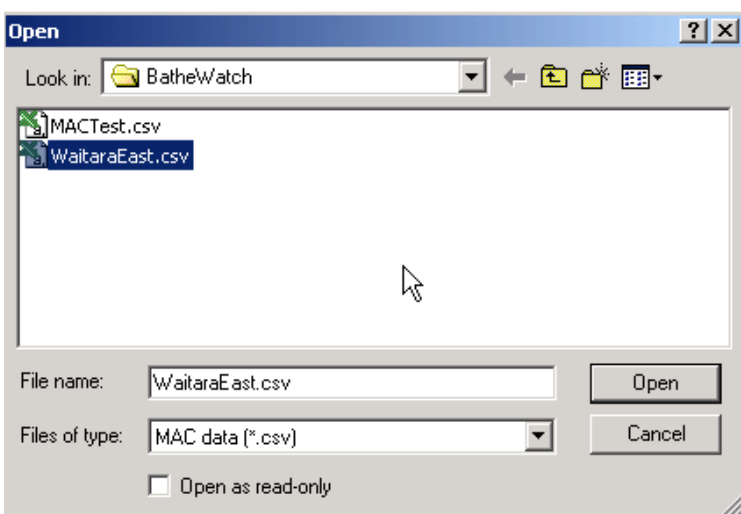
Open the MAC Assessment Dialogue box

Click on the “Assess MAC” button to open the MAC Assessment dialogue box (note that the MAC data are initially shown as zeroes).



Import your data

Click on “Import data” and a standard “Open” dialogue box appears:



MAC files are of type *.csv, which is the comma-delimited format (also known as “comma-separated values”). Select the appropriate data file to import, leave the “Open as read-only” box unchecked, and click the “Open” button. If the data has been accepted, the following dialogue box appears:

Marine MAC Assessment

Import MAC Data
Press "Import Data" to retrieve a new MAC data set Import data

Site Name
Name of site from the MAC file: Waitara East Beach

MAC Data Summary

Sampling Season	Sample size	Number of exceedances (Enterococci / 100 mL)		Days in Compliance (%days < 277 / year)
		140 to 277	>277	
2001	12	0	1	91 %
2000	13	2	0	100 %
1999	13	2	0	100 %
1998	13	1	0	100 %
1997	12	2	2	83 %
Total	63	7	3	95 %

Calculate MAC
Press "Calculate MAC" to determine a MAC assessment Calculate MAC

MAC Results
MAC category 95%ile (/100 mL)
Interim Result?

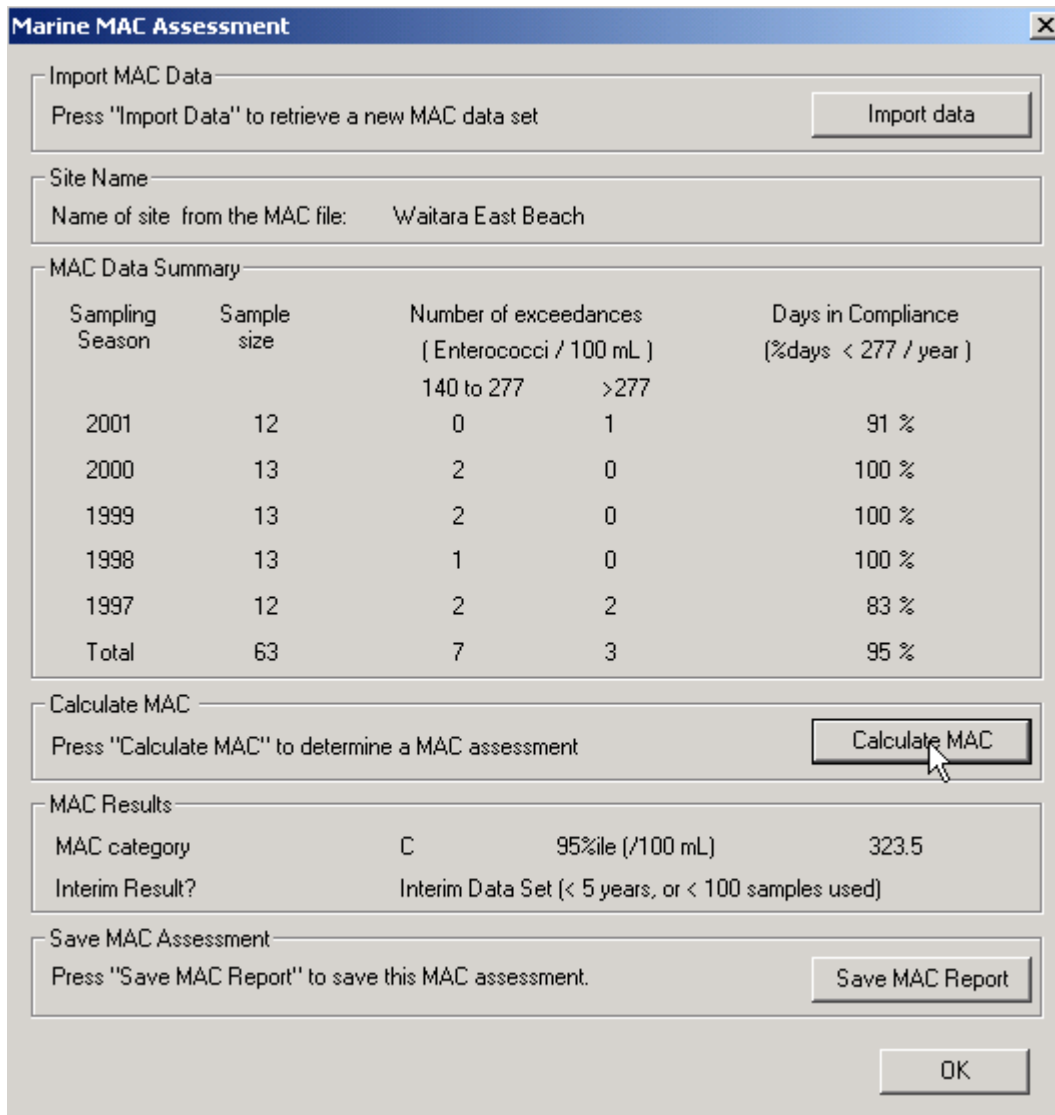
Save MAC Assessment
Press "Save MAC Report" to save this MAC assessment. Save MAC Report

OK

If there is an error in reading in the data, an error message will appear. In such a case, it is likely that the data file is not formatted correctly. (Note: A minimum set of 20 data points is required, a smaller data set will also produce an error.) Review the data file, using Appendix A as a guide, to ensure that the formatting is correct, then close the data file and try to import the data again.

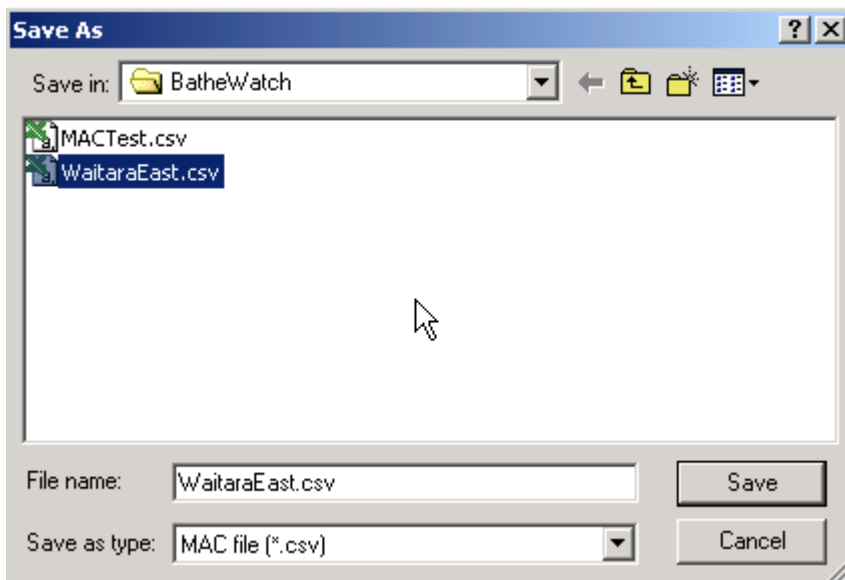
Calculate the MAC

Click on the “Calculate MAC” button. The results of the assessment will appear under the MAC Results heading:



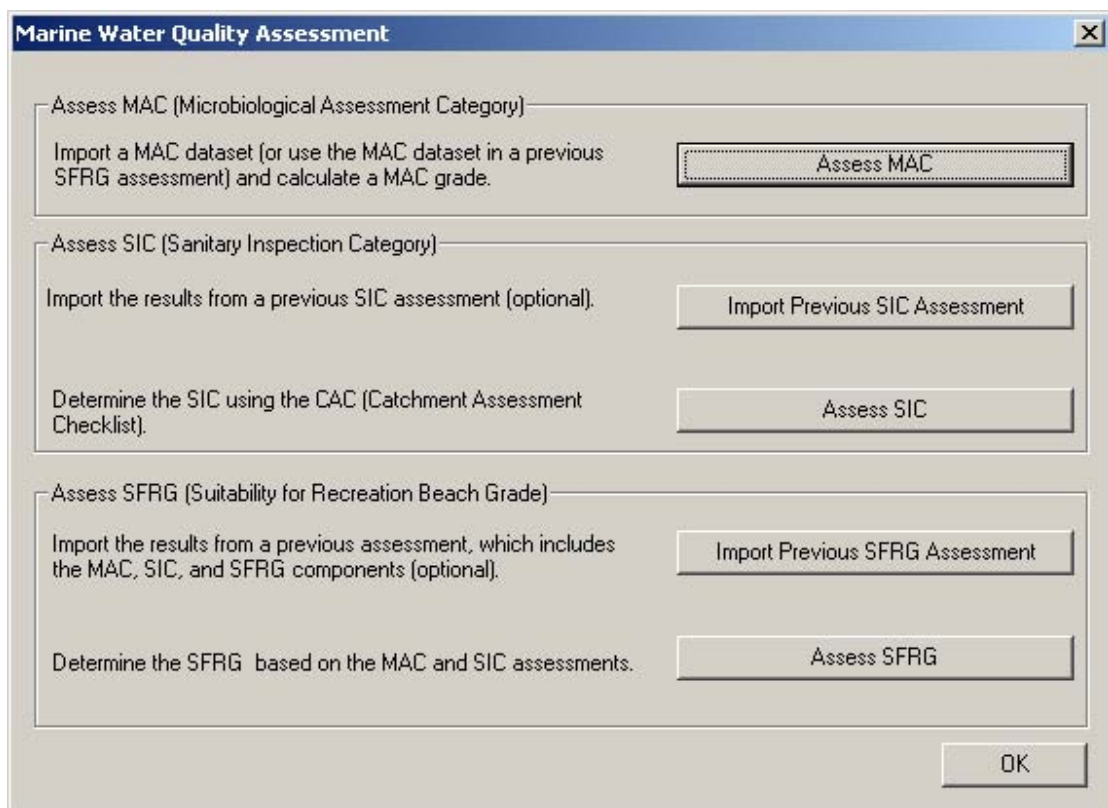
Save the MAC results (Optional)

To save your MAC results along with the original MAC data, click on “Save MAC Report” and the Save As dialogue box below will appear. Once you have chosen the folder and file name to save to, click on the “Save” button. This step is optional if you are going to save the SFRG you may not wish to create a separate MAC file since the MAC results and original MAC data will be saved the SFRG file.



Return to the Marine Water Quality Assessment Dialogue

By clicking the “Save” button on the Save As dialogue, the MAC Assessment dialogue appears again. Click the “OK” button at the bottom of the MAC Assessment dialogue to return to the Marine Water Quality Assessment dialogue:



Completing the SIC Assessment

To prepare the SIC component of the beach assessment, either a new SIC Assessment can be performed, or a previously completed SIC Assessment can be loaded from a file. Jump to the section entitled "Using a Previous SIC Assessment" if you wish to use a SIC Assessment saved previously.

Performing a new SIC assessment

To open the SIC Assessment, click on the "Assess SIC" button on the Marine Water Quality Assessment dialogue.

The SIC assessment dialogue consists of tabbed pages, each asking for specific information regarding the beach to be assessed. There are six tabbed pages in total. Each tabbed page needs to be completed with as many details as are known about the beach being assessed.

To move between the tabbed pages, click on each of the headings (Site ID, Land Use, Water Uses, Microbiological Hazards 1, Microbiological Hazards 2, and SIC Assessment).

You can fill in each page by using the mouse or move between fields by using the Tab key and turn options on or off using the space bar.

Work your way through the pages, answering the questions and checking boxes to generate a profile of your beach.

When you have provided all the information, go to the last page and click the "Calculate SIC" button. The SIC Assessment results will appear. A final SIC assessment is calculated using a button on the final page, but to properly prepare the SIC assessment you need to complete all six pages prior to performing the SIC assessment on the last page.

Site ID Page

If you are not on the first tabbed page, click on the Site ID tab and fill in the information requested on that page. The entries presented here are the default entries – you should change these to the correct entries relating to the beach you are assessing. Once completed, click on the Land Use tab.

The screenshot shows a software window titled "SIC Assessment" with a tabbed interface. The "Site ID" tab is selected. The window contains the following elements:

- Site ID** | Land Use | Water Uses | Microbiological Hazards 1 | Microbiological Hazards 2 | SIC Assessment
- Catchment Assessment Checklist (CAC) for Marine Recreational Waters**
The purpose of the checklist is to identify potential catchment risk factors for use in establishing the Sanitary Inspection Category (SIC).
- Site ID**
 - Type of Site**
 - Open coastal beach
 - Estuarine
 - Enclosed bay
 - Other
 - Site Location**
 - Location:
 - Map references: Latitude (degrees)
 - Longitude (degrees)
 - Author of This Report**
 - Name of local authority (specify authority responsible)
 - Name of person completing checklist (for compiling report)
- OK**

Land Use Page

This page asks you to identify the main land use features of the marine environment being assessed. Tick the appropriate boxes to characterise the marine environment being assessed. This may involve ticking more than one box for each section. Fill in the text fields as appropriate. Once completed, click on the Water Uses tab.

SIC Assessment

Site ID | **Land Use** | Water Uses | Microbiological Hazards 1 | Microbiological Hazards 2 | SIC Assessment

Part A: Land Use

Land Cover and Geography

Forest/bush Pasture Urban Swamp/Mangrove

River/stream irrigation Sand dunes Hilly Flat

Urban

Residential Commercial Industry (specify)

Hotel Harbour Airport Road / rail

Military/prison (restricted areas) Sanitary Landfills/old dumps

Disposal of human wastes (please specify degree and type of treatment applied)

Other potentially polluting activities (please specify)

Part B: Rural Land Use

Sheep Dairy/beef Horses Pigs Deer Poultry Feral

Is there disposal of animal wastes? Please specify.

OK

Water Uses Page

This page asks you to identify the kinds of water uses associated with the marine environment being assessed. Tick the appropriate boxes and fill in the other fields as appropriate. Once completed, click on the Microbiological Hazards 1 tab.

SIC Assessment

Site ID | Land Use | **Water Uses** | Microbiological Hazards 1 | Microbiological Hazards 2 | SIC Assessment

Part C: Water Uses

Marine Area

Marina Fish boat berths Permanent boat moorings

Harbour Temporary boat moorings Ferry berth

Size of Bathing Area

Area (sq. m) Mean width (m) Length (m)

Size of Beach Area

Is there a beach? Average area (m²) Length (m)

Yes No Width at low tide Width at high tide

Additional Influencing Factors

Are the lagoons used for bathing? Yes No Sandbars present? Yes No

Is the beach subject to above average seasonal/holiday loading? Yes No

Direction of prevailing onshore winds: Average surf wave heights

Direction of prevailing water currents: Total annual rainfall (mm)

Shoreline configuration/geomorphology/erosion gullies:

Seasonal rainfall pattern:

OK

Microbiological Hazards 1 Page

This page asks you to identify what types of attributes may exist and may be affecting water quality in the recreational area being assessed. Tick the box in the 'Is It Present?' column if the attribute is present in the beach area. Doing this will enable the tick box in the 'Causes an Effect?' column (as for questions 1, 2, and 3 in the dialogue shown below). Tick the 'Causes an Effect?' box if the attribute is considered influential on the beach (as for questions 2 and 3 below). Once completed, click on the Microbiological Hazards 2 tab.

Is the water quality in the recreational area affected or likely to be affected by?		Is it present?	Causes an effect?
Sewage and Animal Waste			
1. Discharge of untreated human effluent onto or adjacent to a recreational area	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Stormwater outlets with potential sewage contamination / combined stormwater outlet onto or adjacent to a recreation area	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Urban stormwater that is protected from sewage ingress	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4. On-site or other private sewage disposal systems (e.g., septic tank or package plant)	<input type="checkbox"/>	<input type="checkbox"/>	
5. Communal sewage disposal or primary or secondary treatment facilities	<input type="checkbox"/>	<input type="checkbox"/>	
6. Communal sewage disposal with tertiary treatment facilities	<input type="checkbox"/>	<input type="checkbox"/>	
7. Intensive agricultural use in immediate catchment and potential for run-off from untreated animal effluent (e.g., dairying, piggeries, milking sheds etc.)	<input type="checkbox"/>	<input type="checkbox"/>	
8. The incidence and density of bird life (particularly where lagoons or estuarine conditions exist)	<input type="checkbox"/>	<input type="checkbox"/>	
9. Water craft mooring or use (proximity, densities, and pump outs)	<input type="checkbox"/>	<input type="checkbox"/>	

OK

Microbiological Hazards 2 Page

This page is a continuation of Part D. If there is a river or stream discharging into the recreational area, select the "Yes" option; this will enable questions 10-15. Questions 16 and 17 are always required. Once you have completed all enabled questions (in the same manner as the previous page), click on the SIC Assessment tab.

SIC Assessment

Site ID | Land Use | Water Uses | Microbiological Hazards 1 | **Microbiological Hazards 2** | SIC Assessment

Part D: Microbiological Hazards (Part 2 of 3)

Is there a river or stream (including a piped stream) discharging into the recreational area? If there is, please answer questions 10 to 15 and if there isn't, please continue with Other Influences.

Yes
 No

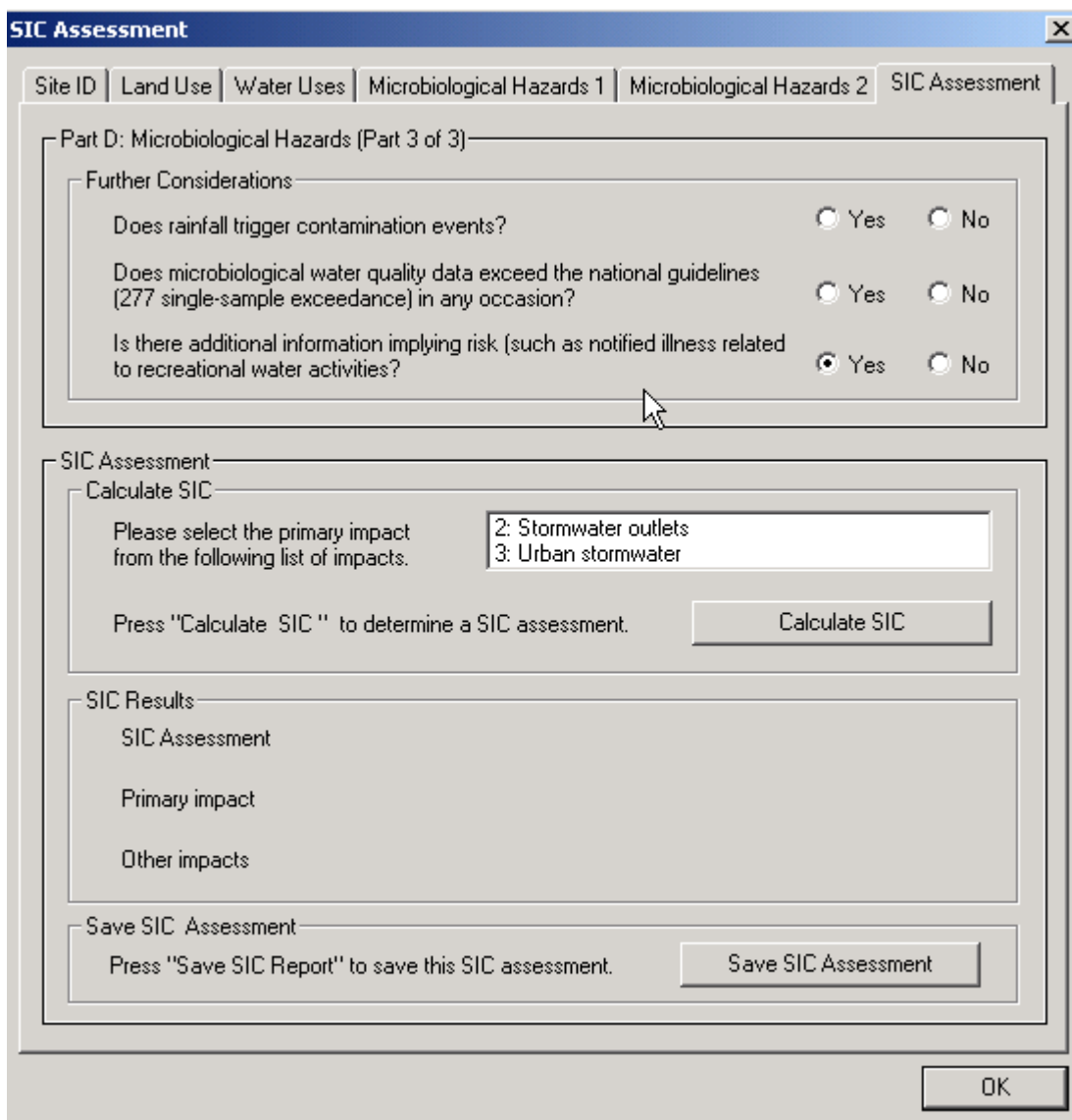
Is the water quality in the recreational area affected or likely to be affected by:

	Is it present?	Causes an effect?
River / Stream Discharge Influences		
10. Discharge of untreated human effluent, primary or secondary wastewater treatment plant discharge, on-site or other private sewage disposal systems (e.g., septic tank)	<input type="checkbox"/>	<input type="checkbox"/>
11. Stormwater outlets with potential sewage contamination/combined stormwater outlet	<input type="checkbox"/>	<input type="checkbox"/>
12. Communal sewage disposal with tertiary treatment facilities	<input type="checkbox"/>	<input type="checkbox"/>
13. High intensity agricultural/rural activities, incidence and density of feral animal/bird population	<input type="checkbox"/>	<input type="checkbox"/>
14. Focal points of drainage, as runoff from low intensity agriculture/urban/rural catchment	<input type="checkbox"/>	<input type="checkbox"/>
15. Potential for run-off from feral animals (e.g., forest or bush)	<input type="checkbox"/>	<input type="checkbox"/>
Other Influences		
16. Tidal movements or onshore winds that are likely to carry water, polluted by untreated/primary/secondary treated effluent or onsite waste treatment systems, into the recreational area	<input type="checkbox"/>	<input type="checkbox"/>
17. Tidal movements or onshore winds that are likely to carry water, polluted by tertiary treated wastewater, into the recreational area	<input type="checkbox"/>	<input type="checkbox"/>

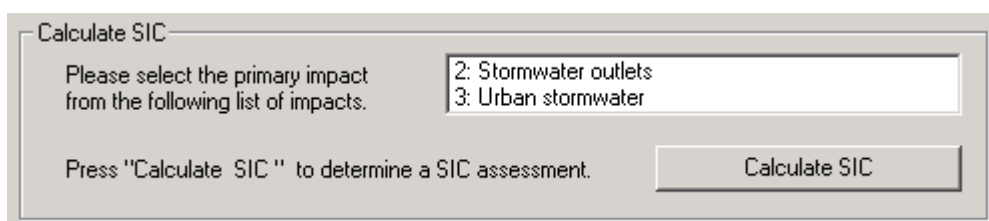
OK

SIC Assessment Page

The top portion of this page is the final part of the Microbiological Hazards section. Click the appropriate answers.



A box in the Calculate SIC section will list the impacts you selected on the Microbiological Hazards pages (in this example, impacts 2 and 3 were selected as present and causing an effect):



Select the impact that you believe to be the most significant for this particular recreational area then click the "Calculate SIC" button to complete the SIC assessment. The dialogue box will display the results of the SIC Assessment. For example, if you select 2:Stormwater outlets, the SIC results will look as follows:

SIC Results	
SIC Assessment	High
Primary impact	2: Stormwater outlets
Other impacts	CAC references: 3

For this example, the SIC Assessment is “High”, the primary impact is the CAC reference number 2, Stormwater outlets, and the other impacts include the CAC reference number 3. (Note that the CAC reference number is the question number in Part D of the CAC – these are the questions 1–17 on the tabbed pages Microbiological Hazards 1 and Microbiological Hazards 2.)

Save the results

Click the button “Save SIC Assessment” to save your results. Once you have chosen your directory and file name to save to, click OK. The default extension for Marine SIC files is **.sic**. The file may be viewed in Word, Excel or Notepad, and information can be copied and pasted into reports if required. Do not edit the original file or you will not be able to import it back into BatheWatch in the future.

Using a Previous SIC Assessment (Optional)

If you have already completed a SIC Assessment for an area and would like to re-use that same assessment for the purposes of the SFRG Assessment, you can do this by simply importing your previous SIC Assessment information.

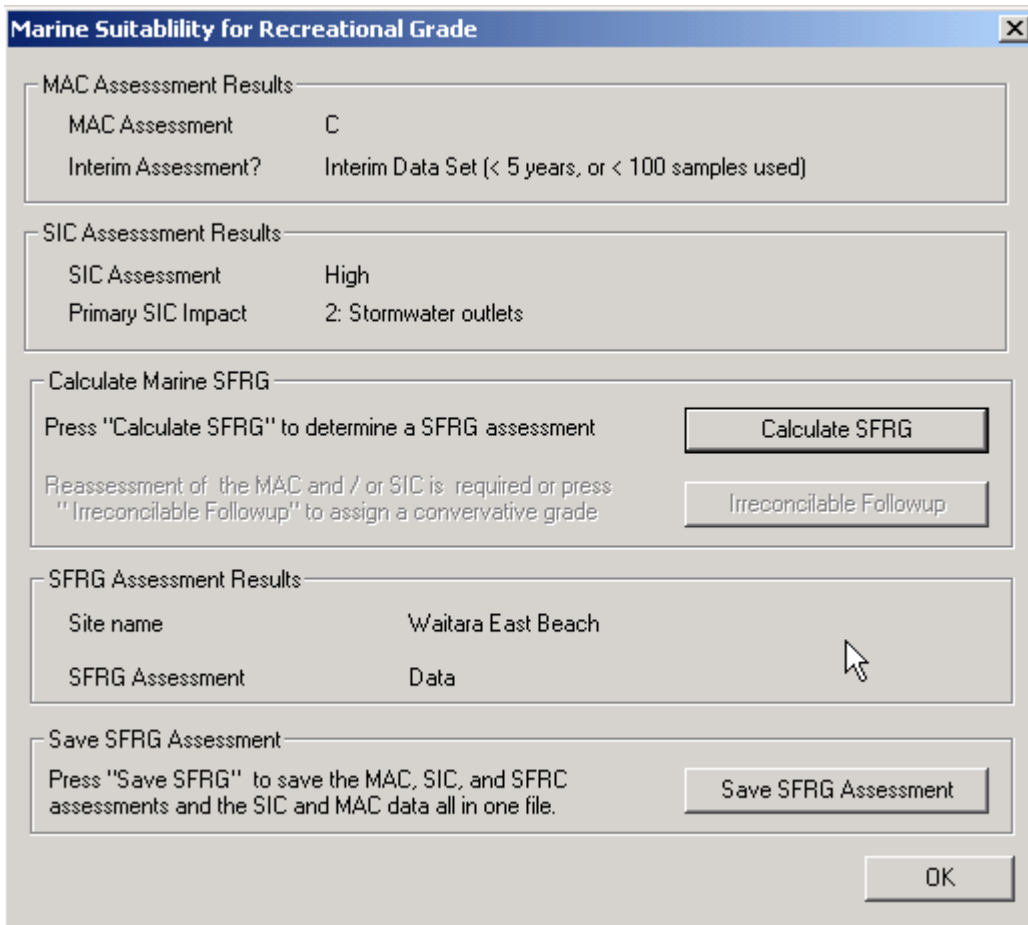
Click on the “Import Previous SIC Assessment” button from the Marine Water Quality Assessment dialogue. The familiar Open dialogue appears which allows you to select the data file you wish to import. Click on the file name and then click on the “Open” button. The SIC Assessment page will be display with the results of the imported SIC Assessment.

Return to the Main Screen

Click on the “OK” button at the bottom of the SIC pages to return to the Marine Water Quality Assessment dialogue. If you have a completed SIC assessment, and you have previously completed a MAC assessment, you are now ready to complete the SFRG Assessment.

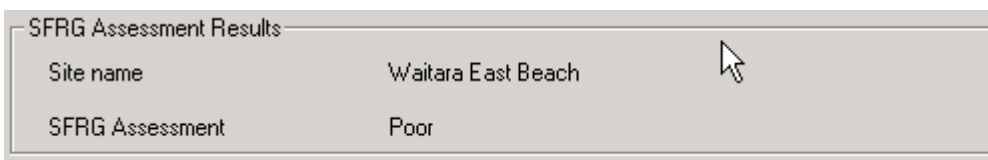
Completing the SFRG Assessment

Once both a SIC and a MAC have been loaded and assessed, an SFRG Assessment can be completed. From the Marine Water Quality Assessment dialogue click on the Assess SFRG button. The Marine Suitability for Recreational Grade dialogue box appears.



Calculate the SFRG

The results from your SIC and MAC assessments appear at the top of the page and will be used to generate an SFRG. Click on the "Calculate SFRG" button. The SFRG results will be displayed under the heading SFRG Assessment Results.



Irreconcilable Followup

This message will appear if the data provided for the MAC and SIC assessment is considered to be contradictory in some way. There are certain combinations of MAC and SIC results that are considered unlikely to occur. Should this message appear, it is recommended that the MAC and SIC assessments be reviewed and if necessary repeated. Alternatively, you may continue with the SFRG Assessment by clicking the "Irreconcilable Followup" button. Please note that the

programme will automatically assign a more conservative grade in recognition of the uncertainty in the data provided.

Save the results

Click on Save SFRG Assessment to save your results. Once you have chosen your directory and file name to save to, click OK. The default extension for marine SFRG files is **.all**. The file may be viewed in Word, Excel, or Notepad, and information can be copied and pasted into reports if required. Do not edit the original file or you will not be able to import it back into BatheWatch in the future.

Using a Previous SFRG Assessment (Optional)

If you have already completed a SFRG Assessment for an area and would like to re-use that same assessment, you can do this by simply importing your previous SFRG Assessment information. This file will contain the original MAC and SIC data and the SIC, MAC and SFRG assessments. Click on the "Import Previous SFRG Assessment" button and select the appropriate data file to import.

Beach Assessment complete

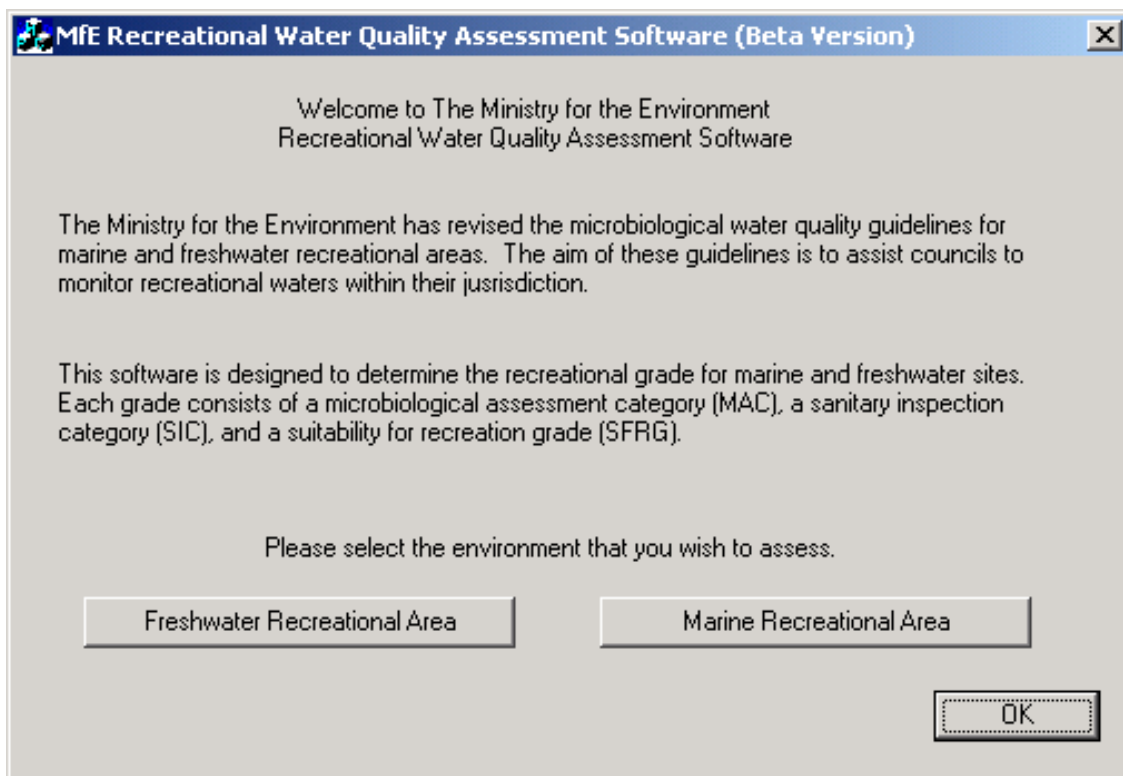
Congratulations, you have completed your MAC and SIC assessments, and evaluated a Marine Suitability for Recreation Grade. To leave the programme, click OK and then Exit.

A Step-by-step Guide to a Freshwater Beach Assessment

Conducting a Freshwater Beach Assessment involves completing three procedures. These are:

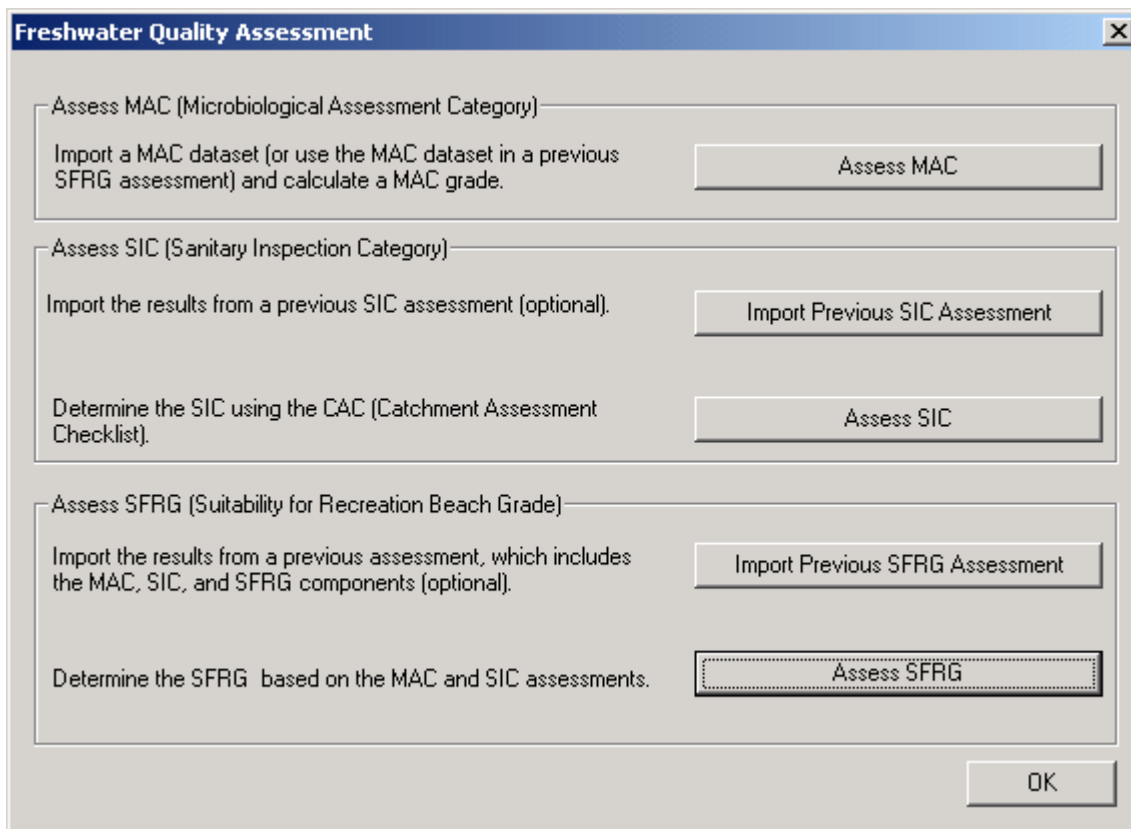
- a MAC (Microbiological Assessment Category) assessment
- a SIC (Sanitary Inspection Category) assessment
- an SFRG (Suitability For Recreation Grade) assessment.

To run the software, double-click the executable file (BatheWatch.exe) or the shortcut you created. The following dialogue box appears:



The instructions in this section of the manual are specific to conducting a freshwater assessment. You can also choose the “Marine Recreational Area” button to perform a marine assessment. If you want to perform a marine assessment, please read the section entitled *A Step-by-step Guide to a Marine Beach Assessment*.

Click on “Freshwater Recreational Area” button to open the Freshwater Quality Assessment dialogue.



Completing the MAC Assessment

Freshwater MAC grades are based on the 95th percentile of the number of *Escherichia coli* (*E. coli*) per 100 mL. The grades are defined as: A (≤ 130), B (131–260), C (261–550), and D (>550). The MAC assessment requires a comma-delimited file that includes the site name, date, *E. coli* count, depth, and method. See Appendix A for more details on how to construct this file.

Open the MAC Assessment Dialogue box

Click on the “Assess MAC” button to open the MAC Assessment dialogue box (note that the MAC data are initially shown as zeroes).

Freshwater MAC Assessment [X]

Import MAC Data
 Press "Import Data" to retrieve a new MAC data set Import data

Site Name
 Name of site from the MAC file: No site location provided

MAC Data Summary

Sampling Season	Sample size	Number of exceedances (E. coli / 100 mL)		Days in Compliance (%days < 550/ year)
		260 to 550	>550	
Year 1	0	0	0	0 %
Year 2	0	0	0	0 %
Year 3	0	0	0	0 %
Year 4	0	0	0	0 %
Year 5	0	0	0	0 %
Total	0	0	0	0 %

Calculate MAC
 Press "Calculate MAC" to determine a MAC assessment Calculate MAC

MAC Results
 MAC category: 95%ile (/100 mL)
 Interim Result?

Save MAC Assessment
 Press "Save MAC Report" to save this MAC assessment. Save MAC Report

OK

Import your data

Click on "Import data" and a standard "Open" dialogue box appears:

Open [?] [X]

Look in: Bathewatch

Sumner.csv

File name: *.csv Open

Files of type: Freshwater MAC data (*.csv) Cancel

Open as read-only

MAC files are of type *.csv, which is the comma delimited format (also known as comma-separated values). Select the appropriate data file to import, leave the "Open as ready-only check box unchecked, and press the "Open" button. If the data has been accepted, the following dialogue box appears:

MAC Data Summary

Sampling Season	Sample size	Number of exceedances (E. coli / 100 mL)		Days in Compliance (%days < 550/ year)
		260 to 550	>550	
2002	13	0	0	100 %
2001	16	0	0	100 %
2000	15	1	0	100 %
1999	14	0	0	100 %
1998	11	2	0	100 %
Total	69	3	0	100 %

If there is an error in importing the data, an error message will appear. It is likely that the data file has not been formatted correctly. (Note: A minimum set of 20 data points is required, a smaller data set will also produce an error.) Review the data file, using Appendix A as a guide, to ensure that the formatting is correct, then close the file and try to import the data again.

Calculate the MAC

Click on the “Calculate MAC” button. The results of the assessment will appear under the MAC Results heading:

Freshwater MAC Assessment

Import MAC Data
Press "Import Data" to retrieve a new MAC data set

Site Name
Name of site from the MAC file: Sumner Beach,....

MAC Data Summary

Sampling Season	Sample size	Number of exceedances (E. coli / 100 mL)		Days in Compliance (%days < 550/ year)
		260 to 550	>550	
2002	13	0	0	100 %
2001	16	0	0	100 %
2000	15	1	0	100 %
1999	14	0	0	100 %
1998	11	2	0	100 %
Total	69	3	0	100 %

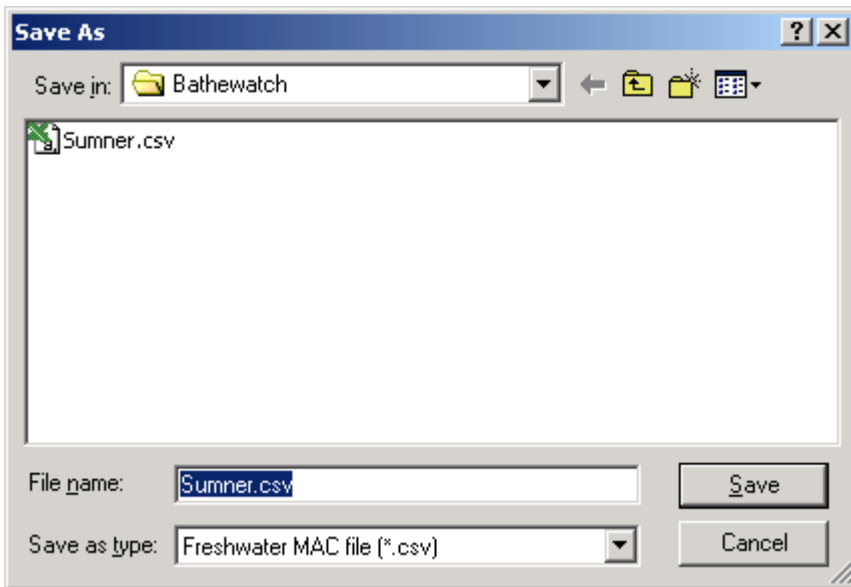
Calculate MAC
Press "Calculate MAC" to determine a MAC assessment

MAC Results
MAC category: B 95%ile (/100 mL): 233.5
Interim Result?: Interim Data Set (< 5 years, or < 100 samples used)

Save MAC Assessment
Press "Save MAC Report" to save this MAC assessment.

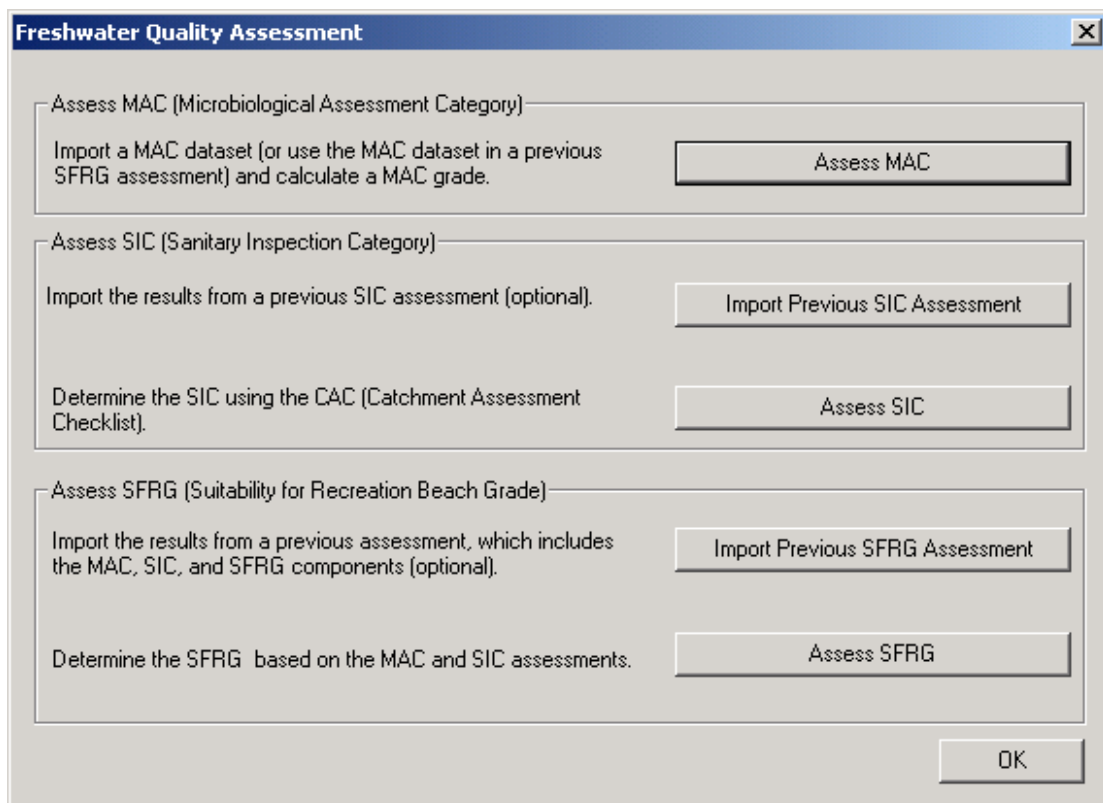
Save the MAC results (Optional)

To save your MAC results along with the original MAC data, click on “Save MAC Report” and the Save As dialogue box below will appear. Once you have chosen the folder and file name to save to, click on the “Save” button. This step is optional if you are going to save the SFRG you may not wish to create a separate MAC file since the MAC results and original MAC data will be saved the SFRG file.



Return to the Freshwater Quality Assessment Dialogue

By clicking the “Save” button on the Save As dialogue, the MAC Assessment dialogue appears again. Click the “OK” button at the bottom of the MAC Assessment dialogue to return to the Freshwater Quality Assessment dialogue:



Completing the SIC Assessment

To prepare the SIC component of the beach assessment, either a new SIC Assessment can be performed, or a previously completed SIC Assessment can be loaded from a file. Jump to the section entitled "Using a Previous SIC Assessment" if you wish to use a SIC Assessment saved previously.

Performing a new SIC assessment

To open the SIC Assessment, click on the "Assess SIC" button on the Marine Water Quality Assessment dialogue.

The SIC assessment dialogue consists of tabbed pages, each asking for specific information regarding the beach to be assessed. There are 6 tabbed pages in total. Each tabbed page needs to be completed with as many details as are known about the beach being assessed.

To move between the tabbed pages, click on each of the headings (Site ID, Land Use, Water Uses, Microbiological Hazards 1, Microbiological Hazards 2, and SIC Assessment).

You can fill in each page by using the mouse or move between fields by using the Tab key and turn options on or off using the space bar.

Work your way through the pages, answering the questions and checking boxes to generate a profile of your recreational site.

When you have provided all the information, go to the last page and click the "Calculate SIC" button. The SIC Assessment results will appear. A final SIC assessment is calculated using a button on the final page, but to properly prepare the SIC assessment you need to complete all six pages prior to performing the SIC assessment on the last page.

Site ID Page

If you are not on the first tabbed page, click on the Site ID tab and fill in the information requested on that page. The entries presented here are the default entries – you should change them to the correct entries relating to the beach currently being assessed. Once completed, click on the Land Use tab.

Freshwater SIC Assessment

Site ID | Land Use | Water Uses | Microbiological Hazards 1 | Microbiological Hazards 2 | SIC Assessment

Catchment Assessment Checklist (CAC) for Freshwater Recreational Waters

The purpose of the checklist is to identify potential catchment risk factors for use in establishing the Sanitary Inspection Category (SIC).

Site ID

Type of Site

Lake River/Stream

Site Location

Location:

New Zealand Map Grid (NZMG) references

Northing (metres):

Easting (metres):

Author of This Report

Name of local authority (specify authority responsible)

Name of person completing checklist (for compiling report)

OK

Land Use Page

This page asks you to identify the main land use features of the freshwater environment being assessed. Tick the appropriate boxes to characterise the freshwater environment. This may involve ticking more than one box for each section. Fill in the other fields as appropriate. Once completed, click on the Water Uses tab.

Freshwater SIC Assessment

Site ID | Land Use | Water Uses | Microbiological Hazards 1 | Microbiological Hazards 2 | SIC Assessment

Part A: Land Use

Land Cover and Geography

Forest/bush Pasture Urban Wetlands
 River/stream/irrigation Hilly Flat

Urban

Residential Commercial Industry (specify)
 Military/prison (restricted areas) Sanitary Landfills/old dumps

Disposal of human or animal wastes (please specify degree and type of treatment applied)

Other potentially polluting activities (please specify)

Part B: Rural Land Use

Sheep Dairy Pigs Beef
 Horses Deer Poultry Feral

Is there disposal of animal wastes? Please specify.

OK

Water Uses Page

This page asks you to identify the kinds of water uses associated with the freshwater environment being assessed. Tick the appropriate boxes and fill in the other fields as appropriate. Once completed, click on the Microbiological Hazards 1 tab.

Freshwater SIC Assessment

Site ID | Land Use | **Water Uses** | Microbiological Hazards 1 | Microbiological Hazards 2 | SIC Assessment

Part C: Water Uses

Boating Facilities

Marina Boat ramp

Permanent boat moorings Jetty/wharf

Size of Bathing Area

Area (sq. m) Mean width (m) Length (m)

Additional Influencing Factors

Is the beach subject to above average seasonal/holiday loading? Yes No

Direction of prevailing onshore winds

Shoreline configuration/geomorphology/erosion gullies:

Total annual rainfall (mm)

Location of rainfall monitoring station

Seasonal rainfall pattern:

OK

Microbiological Hazards 1 Page

This page asks you to identify what types of attributes may exist and may be affecting water quality in the recreational area being assessed. Tick the box in the 'Is It Present?' column if the attribute is present in the beach area. Doing this will enable the tick box in the 'Causes an Effect?' column (as for questions 2, 4, and 5 in the dialogue shown below). Tick the 'Causes an Effect?' box if the attribute is considered influential on the beach (as for questions 2 and 4 below). Once completed, click on the Microbiological Hazards 2 tab.

Freshwater SIC Assessment

Site ID | Land Use | Water Uses | **Microbiological Hazards 1** | Microbiological Hazards 2 | SIC Assessment

Part D: Microbiological Hazards (Part 1 of 3)

Is the water quality in the recreational area affected or likely to be affected by?

	Is it present?	Causes an effect?
Direct Influences for Rivers and Lakes		
1. Discharge of untreated human effluent onto or upstream to a recreational area	<input type="checkbox"/>	<input type="checkbox"/>
2. Stormwater outlets with potential sewage contamination / combined stormwater outlet onto or upstream to a recreation area	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3. Urban stormwater that is protected from sewage ingress	<input type="checkbox"/>	<input type="checkbox"/>
4. On-site or other private sewage disposal systems (e.g., septic tank or package plant)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5. Communal sewage disposal or primary or secondary treatment facilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Communal sewage disposal with tertiary treatment facilities	<input type="checkbox"/>	<input type="checkbox"/>
7. Intensive agricultural use in immediate catchment and potential for run-off from untreated animal effluent (e.g., dairying, piggeries, milking sheds etc.)	<input type="checkbox"/>	<input type="checkbox"/>
8. Focal points of drainage, as run-off from low intensity agriculture/urban/rural catchment	<input type="checkbox"/>	<input type="checkbox"/>
9. Unrestricted stock access to waterways	<input type="checkbox"/>	<input type="checkbox"/>
10. The incidence and density of birdlife	<input type="checkbox"/>	<input type="checkbox"/>

OK

Microbiological Hazards 2 Page

This page is a continuation of the last page. Tick the appropriate boxes.

Questions 13–18 are relevant only if the intermediate question -“Is there a river or stream (including a piped stream or tributary) or drain or wetland discharging into or upstream to the recreational area?” - is answered “Yes”. Otherwise, those questions are disabled.

When the page is completed, click on the SIC Assessment tab.

Freshwater SIC Assessment

Site ID | Land Use | Water Uses | Microbiological Hazards 1 | **Microbiological Hazards 2** | SIC Assessment

Part D: Microbiological Hazards (Part 2 of 3)

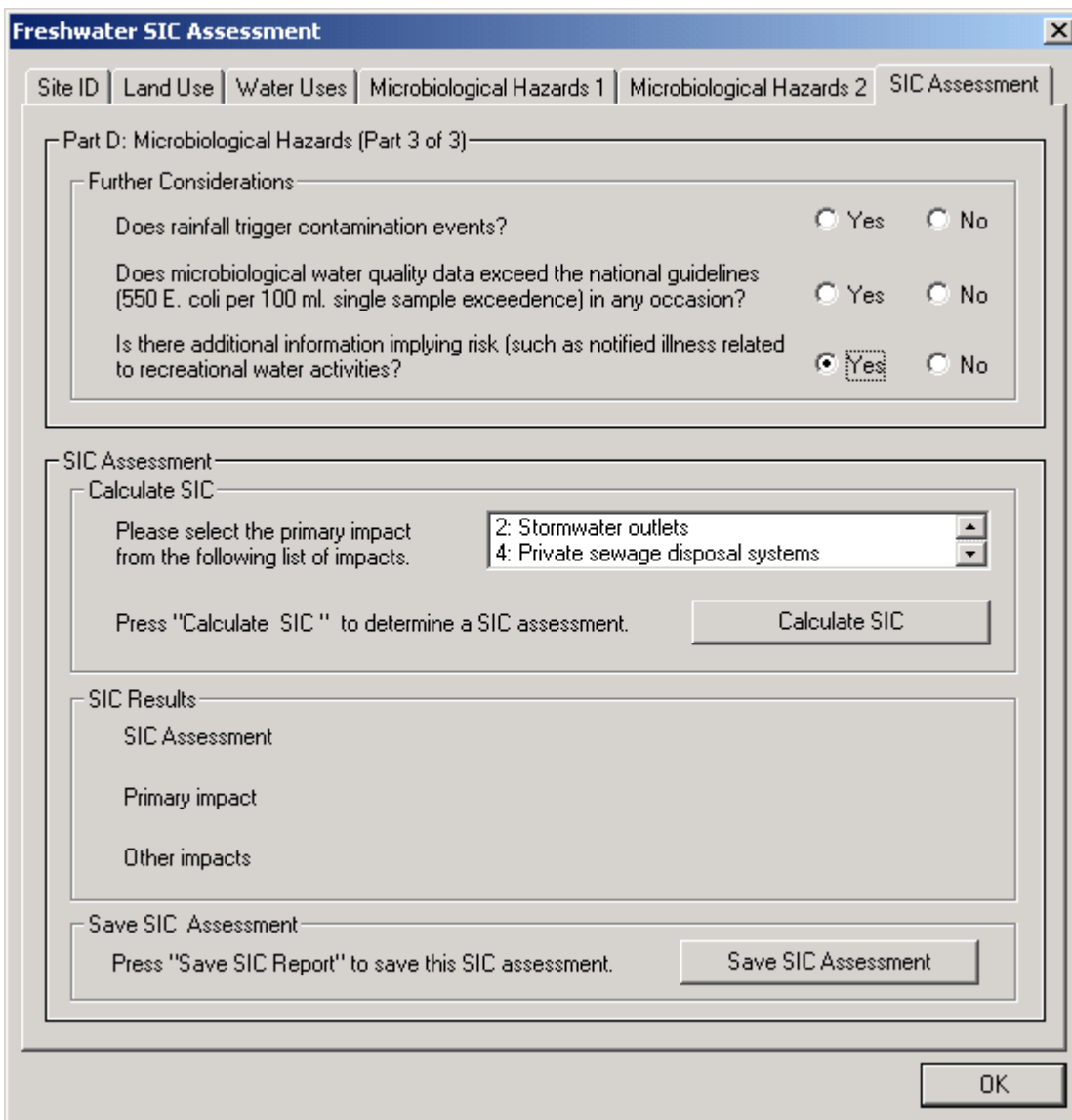
Is the water quality in the recreational area affected or likely to be affected by:

	Is it present?	Causes an effect?
Direct Influences for Rivers and Lakes		
11. Water craft mooring or use	<input type="checkbox"/>	<input type="checkbox"/>
12. Potential for run-off from feral animals (e.g., forest or bush)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Upstream Discharges		
Is there a river or stream (including a piped stream or tributary) or drain or wetland discharging into or upstream to the recreational area? If there is, please answer questions 13 to 18 and if there isn't, please continue with Other Considerations.	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Indirect Influences for Lakes and Rivers (from sewage or animal waste)		
13. Discharge of untreated human effluent, primary or secondary wastewater treatment plant discharge, on-site or other private sewage disposal systems (e.g., septic tank)	<input type="checkbox"/>	<input type="checkbox"/>
14. Stormwater outlets with potential sewage contamination/combined stormwater outlet	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
15. Communal sewage disposal with tertiary treatment facilities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
16. High intensity agricultural/rural activities, incidence and density of feral animal/bird population	<input type="checkbox"/>	<input type="checkbox"/>
17. Focal points of drainage, as runoff from low intensity agriculture/urban/rural catchment	<input type="checkbox"/>	<input type="checkbox"/>
18. Potential for run-off from feral animals (e.g., forest or bush)	<input type="checkbox"/>	<input type="checkbox"/>

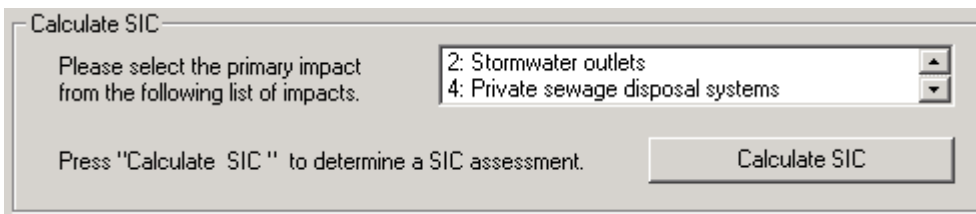
OK

SIC Assessment Page

The top portion of this page is the final section of the Microbiological Hazards section. Select the appropriate answers.



A box in the Calculate SIC section will list the impacts you selected on the Microbiological Hazards pages (in this example, impacts 2 and 4 were selected as causing an effect, and the scroll arrows indicate that there are more impacts in the selection list):



Select the impact that you believe to be the most significant for this particular recreational area. Now click the “Calculate SIC” button to complete the SIC assessment. The dialogue box will display the results of the SIC Assessment. For example, if you select “12: Runoff from feral animals”, the SIC results will look as follows:

SIC Results	
SIC Assessment	Low
Primary impact	12: Runoff from feral animals (e.g., forest/bush)
Other impacts	CAC references: 2, 4

For this example, the SIC Assessment is “High”, the primary impact is the CAC reference number 12, Runoff from feral animals (e.g., forest/bush), and the other impacts include the CAC reference numbers 2 and 4. (Note that the CAC reference number is the question number in Part D of the CAC – these are the questions 1–18 on the tabbed pages Microbiological Hazards 1 and Microbiological Hazards 2.)

Save the results

Click “Save SIC Assessment” to save your results. Once you have chosen your directory and file name to save to, click “OK”. The default extension for Freshwater SIC files is **.fsf**. The file may be viewed in Word, Excel or Notepad, and information can be copied and pasted into reports if required. Do not edit the original file or you will not be able to import it back into BatheWatch in the future.

Using a Previous SIC Assessment (Optional)

If you have already completed a SIC Assessment for an area and would like to re-use that same assessment for the purposes of the SFRG Assessment, you can do this by simply importing your previous SIC Assessment information.

Click “Import Previous SIC Assessment” on the Freshwater Quality Assessment dialogue. The familiar Open dialogue appears which allows you to select the data file you wish to import. Click on the file name and then click “Open”. The SIC Assessment page will display with the results of the imported SIC Assessment.

Return to the Main Screen

Click the “OK” button at the bottom of the SIC pages to return to the Freshwater Quality Assessment dialogue. If you have a completed SIC assessment, and you have previously completed a MAC assessment, you are now ready to complete the SFRG Assessment.

Completing the SFRG Assessment

Once both a SIC and a MAC have been loaded and assessed, an SFRG Assessment can be completed. From the Freshwater Quality Assessment dialogue click on the "Assess SFRG" button. The Freshwater Suitability for Recreational Grade dialogue box appears.

Freshwater Suitability for Recreational Grade

MAC Assessment Results

MAC Assessment	B
Interim Assessment?	Interim Data Set (< 5 years, or < 100 samples used)

SIC Assessment Results

SIC Assessment	Low
Primary SIC Impact	12: Runoff from feral animals (e.g., forest/bush)

Calculate Marine SFRG

Press "Calculate SFRG" to determine a SFRG assessment

Reassessment of the MAC and / or SIC is required or press "Irreconcilable Followup" to assign a conservative grade

Buttons: Calculate SFRG, Irreconcilable Followup

SFRG Assessment Results

Site name	Sumner Beach,....
SFRG Assessment	Data

Save SFRG Assessment

Press "Save SFRG" to save the MAC, SIC, and SFRG assessments and the SIC and MAC data all in one file.

Buttons: Save SFRG Assessment, OK

Calculate the SFRG

The results from your SIC and MAC assessments appear at the top of the page and will be used to generate an SFRG. Click the "Calculate SFRG" button. The SFRG results will be displayed under the heading "SFRG Assessment Results".

SFRG Assessment Results

Site name	Sumner Beach,....
SFRG Assessment	Good

Irreconcilable Followup

This message will appear if the data provided for the MAC and SIC assessment is considered to be contradictory in some way. There are certain combinations of MAC and SIC results that are considered unlikely to occur. Should this message appear, it is recommended that the MAC and SIC assessments be reviewed and if necessary repeated. Alternatively, you may continue with the SFRG Assessment by clicking the "Irreconcilable Followup" button. Please note that the

programme will automatically assign a more conservative grade in recognition of the uncertainty in the data provided.

Save the results

Click "Save SFRG Assessment" to save your results. Once you have chosen your directory and file name to save to, click OK. The default extension for freshwater SFRG files is **.fws**. The file may be viewed in Word, MS Excel or Notepad, and information can be copied and pasted into reports if required. Do not edit the original file or you will not be able to import it back into BatheWatch in the future.

Using a Previous SFRG Assessment (Optional)

If you have already completed a SFRG Assessment for an area and would like to re-use that same assessment, you can do this by simply importing your previous SFRG Assessment information. This file will contain the original MAC and SIC data and the SIC, MAC, and SFRG assessments. Click on the "Import Previous SFRG Assessment" button and select the appropriate data file to import.

Beach Assessment complete

Congratulations, you have completed your MAC and SIC assessments, and evaluated a Freshwater Suitability for Recreation Grade. To leave the programme, click OK and then Exit.

Appendix A: Input Data Format Requirements for a MAC Assessment

A Note on Files and File Extensions

SFRG, MAC and SIC assessments can all be saved to file independently when completed, and each assessment type will be saved with its own unique extension.

The MAC assessment is based on a comma-delimited file that you make, which is read into the programme. For both Marine and Freshwater assessments, MAC files have a file extension of **.csv** (for comma-separated values). The results of the MAC assessment, along with the original data can be saved to a MAC file (**.csv**) and later imported back into the programme.

The SIC assessment involves filling out the Catchment Assessment Checklist within the programme – you don't have to build a SIC file because the programme does it for you. You can save your SIC assessment (for a marine assessment, the programme uses a **.sic** file extension; for a freshwater assessment, it uses a **.fsf** file extension) and later import it back into the programme.

Once the MAC and SIC assessments have been completed, an SFRG assessment can be conducted and saved to file (for a marine assessment, the programme uses a ***.all** file extension; for a freshwater assessment, it uses a ***.fws** file extension). The results of the SFRG assessment, along with the results and data from both the MAC and SIC assessments, can be saved in one file and imported back into the programme. All files generated by the programme – the SIC, MAC, and SFRG files – can be opened with numerous programmes (e.g., Word, NotePad, or Excel) for using the content in reports.

MAC Data Fields

For the MAC component of the SFRG assessment, the data collected from field observations must be stored in a comma-delimited (***.csv**) file format. The data must be stored in this specific file format or it will fail to load properly.

The data file should include two and only two header lines of metadata information. The first line will contain the name of the beach currently being analysed. The second line is the table header row, specifying the contents of each row to follow.

The table header row should include the following:

year, month, day, count, method, depth

Comma-delimited fields required for the software include:

1. Dates as year, month, and day, e.g., **2001, 1, 17** for 17 January 2001.
2. Enterococci count (per 100 mL) field consisting of whole numbers. The only non-integer symbols permitted in this field are the less-than symbol (<) and greater-than symbol (>). These are used to indicate where values fell below or above detection limits. Symbols such as '*' or blank spaces are not permitted.

3. Analysis method (A = Membrane filtration, B = Enterolert). Two analysis methods have been used historically and some debate exists on how to reconcile the two methods. In the initial version of BatheWatch, the two methods are assumed to produce equivalent results.
4. Sample Depth field (S=Shallow, standard taken at 0.5 m; D=Deep, old method, taken at chest height). Two sample depths are included in this software to enable historical data, collected using previous guidelines and at chest depth, to be used in the analysis of beach grades.

Note on Followup data

Followup or repeat samples, as required under the guidelines following an exceedance of the Alert or Action Mode thresholds (Marine Guidelines Section D.9, Freshwater Guidelines Section E.2), should not be included in the analysis. Be sure to exclude these followup data when preparing your MAC data file.

Building the MAC Data File using Microsoft Excel

This section provides a step-by-step to constructing a comma-delimited MAC input file using Microsoft Excel. The principles will be the same in other spreadsheet programs, though the details may differ slightly.

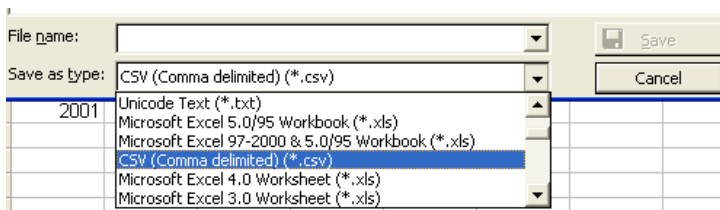
1. Open up Excel with a new blank spreadsheet. In cell A1, enter the name of the beach site.
2. In row 2, cells A2 to F2, enter the header row, i.e. year, month, day, count, method, depth.
3. Fill in the table with values for the site. If you have stored these data in MS Excel, open that file and copy and paste the values into the MAC data file you are constructing. Each row is a record. Blanks and symbols such as '*' are not permitted in the count column – the only symbols permitted in the count column are the less-than and greater-than symbols. Your new Excel file should now have the same format as the following example:

	A	B	C	D	E	F	G
1	First Beach						
2	year	month	day	count	method	depth	
3	2002	2	27	3	A	S	
4	2002	2	20	5	A	S	
5	2002	2	13	1	A	S	
6	2002	1	30	1	A	S	
7	2002	1	23	2	A	S	
8	2002	1	16	8	B	S	
9	2002	1	9	8	B	S	
10	2001	12	27	310	B	S	
11	2001	12	19	>960	B	D	
12	2001	12	12	3	B	S	
13	2001	12	5	370	B	S	
14	2001	11	28	2	B	S	
15	2001	11	21	7	B	S	
16	2001	2	28	7	B	S	
17	2001	2	21	<1	A	S	
18	2001	2	17	299	A	D	
19	2001	2	7	208	A	S	
20	2001	1	31	295	A	S	
21	2001	1	24	305	A	D	
22	2001	1	17	301	A	S	
23							
24							
25							

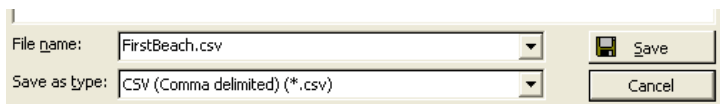
4. Follow the steps below if the dates in your data use a format other than that shown above:
 - a. In the column to the right of the depth column (Cell G2), add another heading 'date'.
 - b. Enter the dates for your data in the existing format into the new 'date' column.
 - c. In cell A3 insert the equation: =YEAR(G3).
 - d. In cell B3 insert the equation: =MONTH(G3).
 - e. In cell C3 insert the equation: =DAY(G3).
 - f. Copy these equations to cells A4 to C22.

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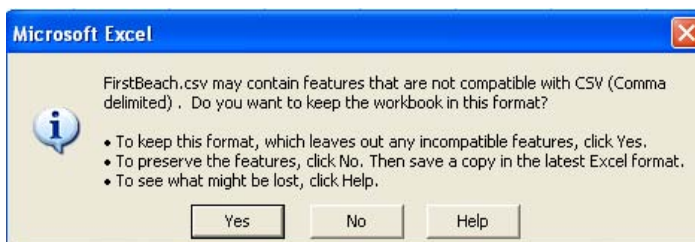
5. Save your new Excel as a comma-delimited file.
 - a. In Excel, select **File**, then **Save As**, and the “Save As” dialogue should appear.
 - b. Select “CSV (Comma delimited) (*.csv)” from the choices in “Save as type”:



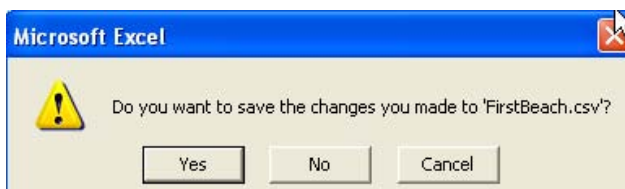
- c. Name your file (in this example, the name is **FirstBeach.csv**) and click the “Save” button.



- d. The following message will pop up warning you of the limitations of a .csv file. Click the “Yes” button to continue.

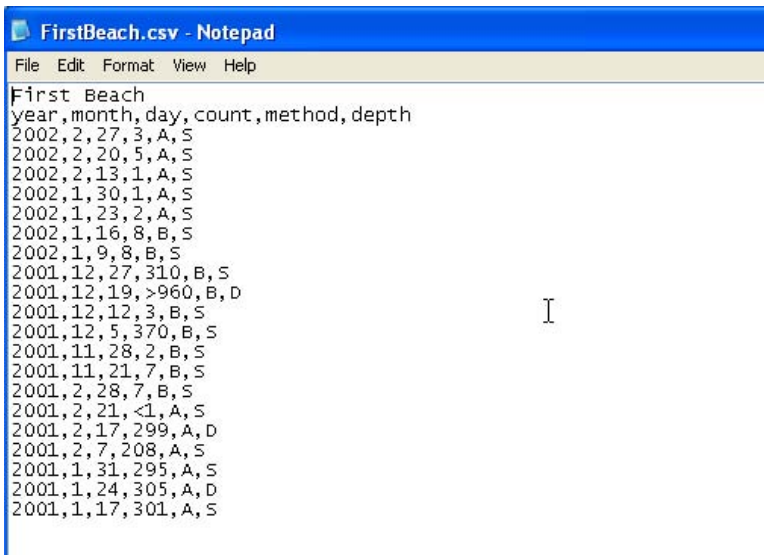


- e. When you exit Excel after saving a file as a .csv file, the following message will pop up asking you if you want to save (again). Since you have just saved it, you can click the “No” button:



- f. It is recommended that you check your new .csv file to make sure that the format is correct. To do this you can open it in Excel, Word, WordPad, or Notepad. This is what the file FirstBeach.csv looks like in Notepad:

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```
First Beach
year,month,day,count,method,depth
2002,2,27,3,A,S
2002,2,20,5,A,S
2002,2,13,1,A,S
2002,1,30,1,A,S
2002,1,23,2,A,S
2002,1,16,8,B,S
2002,1,9,8,B,S
2001,12,27,310,B,S
2001,12,19,>960,B,D
2001,12,12,3,B,S
2001,12,5,370,B,S
2001,11,28,2,B,S
2001,11,21,7,B,S
2001,2,28,7,B,S
2001,2,21,<1,A,S
2001,2,17,299,A,D
2001,2,7,208,A,S
2001,1,31,295,A,S
2001,1,24,305,A,D
2001,1,17,301,A,S
```

I

Loading Beach Assessment Results into Reports

Any MAC, SIC or SFRG results produced by BatheWatch and saved are stored in a comma-delimited format, but this format is not the best format for viewing the data as all data entries are separated by commas and results are not organised into neat columns as in a table.

A suggested method for preparing data for reports is to first load the saved file into a spreadsheet program such as Excel. When opening comma-delimited files in Excel, go to the folder where your data files are stored and in Excel's "Open" dialog under "Files of Type" choose "All Files (*.*)" to see all files stored in that folder. Click on your file and click "OK". If the file is a MAC file it will have a **.csv** extension, which is the comma-delimited format recognized by Excel, and the file will load into a spreadsheet automatically.

If it is a SIC file or a SFRG file, when you click "OK" Excel will open a Text Import Wizard which will ask you how you want the file to be imported. On the Step 1 dialog of the Text Import Wizard select the "delimited" option and then press the "Next" button. On the Step 2 dialog of the Text Import Wizard check the box beside "Comma" in the Delimiters section of the dialog. Click the "Finish" button. The file will load into Excel in a table format.

The data in the Excel spreadsheet can be moved or reformatted to produce any presentation format you desire. When the data is formatted as you want, you can then save the file as an Excel spreadsheet. When using data in a report or document, the spreadsheet can then be inserted directly into your document. You can also copy and paste any portion of these data into a word processing program such as Word.