MAKE YOUR STREAM MONITORING DATA COUNT!

Overview for organisations supporting CBM data collection or use

The national quality assurance (QA) framework for community-based monitoring (CBM) is a resource to support community and catchment-based monitoring groups to collect freshwater data of a known quality that are 'fit for purpose'. The framework is also intended to help increase the visibility and use of CBM data in freshwater management. Your organisation can help CBM groups to implement the framework.

Why is there a national framework?

There are hundreds of CBM groups across Aotearoa New Zealand involved or interested in monitoring the health of our streams. The national QA framework was developed to provide groups like yours the confidence that the stream data you collect will:

- meet your needs
- be recognised by regional councils and other organisations as being credible and fit for purpose, and
- support catchment-based freshwater management and potential re-use by third parties (e.g., in freshwater modelling and reporting).
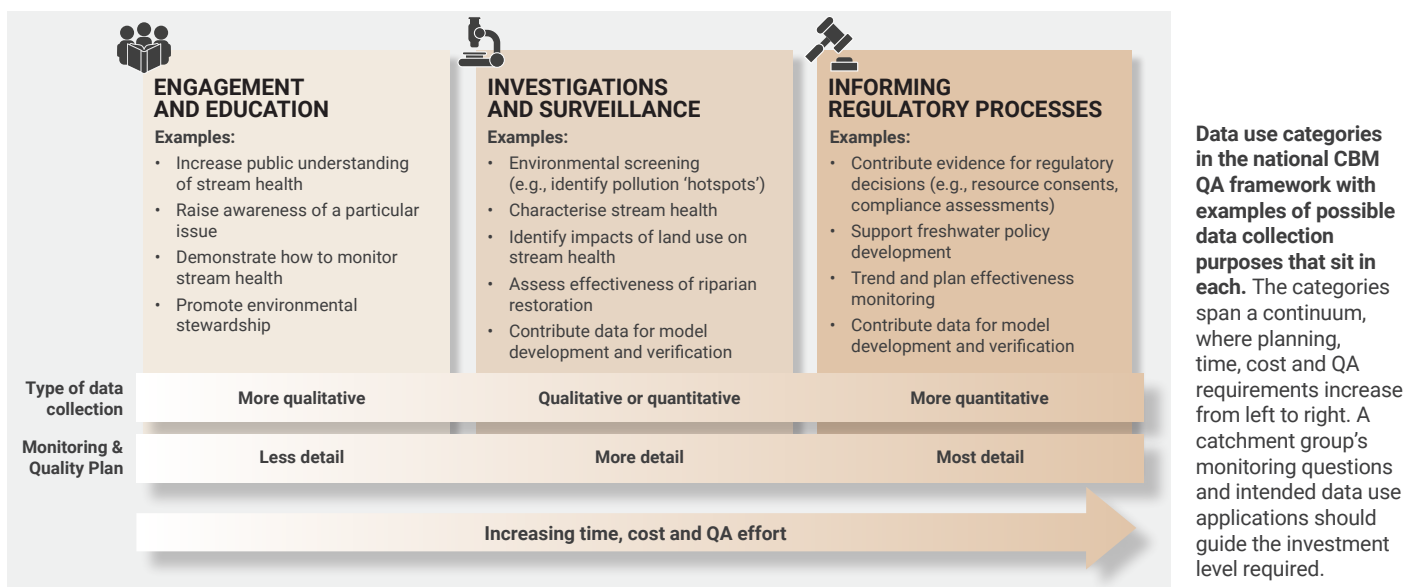
Photo: Terry Parminter

How will the framework benefit my organisation?

Many organisations already support, or want to support, CBM groups but may lack the capability or capacity to do this efficiently and effectively. The framework provides a suite of resources that promote consistency, efficiency and transparency in the collection of stream monitoring data. These include:

- an electronic **Monitoring and Quality Plan** template to establish a clear monitoring purpose (the "why") and what where, how and when the monitoring will be carried out.
- a **guidance document** to support completion of a Monitoring & Quality Plan. This includes, for each of 28 stream health indicators included in the framework, a common set of measurement methods, the necessary supporting information (metadata) to record, and recommended training and quality checks.
- **electronic field form templates** CBM groups can use on a mobile phone, tablet or computer to capture their measurements and metadata in an efficient and standardised way. These forms prompt users to enter all critical information and automatically complete specific calculation and quality checks.

The framework both promotes and facilitates the sharing of CBM data where groups have identified an interest in their data being considered for third party use.

Data use categories in the national CBM QA framework with examples of possible data collection purposes that sit in each. The categories span a continuum, where planning, time, cost and QA requirements increase from left to right. A catchment group's monitoring questions and intended data use applications should guide the investment level required.

Framework development

The framework was developed by NIWA, on behalf of regional councils, in partnership with a range of government, not-for-profit and other organisations. It builds on existing national monitoring and CBM guidance as well as a review of overseas approaches to CBM QA.

Monitoring purpose

The framework emphasises the need for CBM groups to establish a clear monitoring purpose. It also recognises that monitoring purpose often differs across groups and caters for this by establishing three broad categories of data use.

Monitoring indicators

The framework is built around an initial set of 28 indicators of stream health that are relevant to freshwater values enshrined in the National Policy Statement for Freshwater Management (e.g., aquatic ecosystem health and recreation). The indicators describe physical, chemical and microbiological water quality (e.g., visual clarity, nutrients, *E. coli*), aquatic life (e.g., peripyton (algae), macroinvert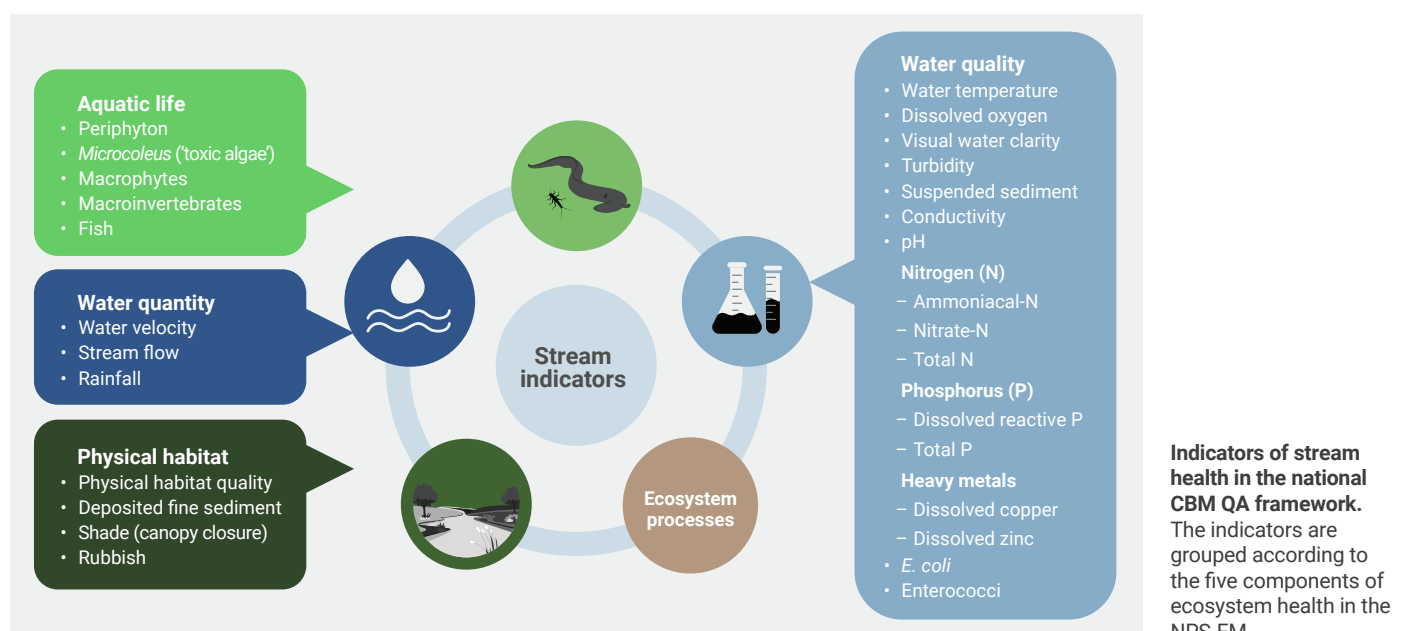ebrates, fish), physical stream habitat (e.g., shade) and water quantity (e.g., velocity, rainfall). Some of the indicators are also relevant to monitoring of lakes and coastal waters.

Measurement methods

The measurement methods included in the framework have been selected or adapted from existing nationally recognised standards and guidance. These methods include a mix of methods used by regional councils (e.g., NEMS) and those designed for use by CBM groups (e.g., NIWA's Stream Health Monitoring and Assessment Kit, SHMAK).

More than one method is available for most indicators because different monitoring purposes call for different methods and quality standards. Also, the amount of time or resources for monitoring may differ across CBM groups.

The CBM QA guidance document identifies which of the three broad categories of data use each method is suitable for, along with equipment and material requirements, and an indication of the time, cost and complexity associated with each method. Measurement and metadata record requirements, recommended training, and internal and external quality checks are also outlined.

Indicators of stream health in the national CBM QA framework. The indicators are grouped according to the five components of ecosystem health in the NPS-FM.

How can my organisation support implementation of the framework?

You can support CBM groups to implement the framework in several ways.

MONITORING & QUALITY PLAN ASSISTANCE OR REVIEW

For all data uses other than engagement and education, the CBM framework requires CBM groups to prepare a Monitoring and Quality Plan.

A CBM group is likely to require input from someone experienced in stream monitoring to help them complete this plan. Depending on their monitoring purpose and methods, they may also wish or need to have an external organisation independently check that the plan is fit for purpose.

Section 3 of the guidance document and a short instructional video outline how to complete the Monitoring and Quality Plan template provided in the framework.

HOST A CBM GROUP'S ELECTRONIC FIELD FORMS

The electronic field forms have been created using Esri's ArcGIS Survey123 software. If your organisation has a suitable ArcGIS licence, you can act as a 'host' for one or more CBM groups. This will provide them with free access, via an invitation link, to the forms and allow the group's data to be captured and submitted electronically. The only adjustments needed to the standard templates are the addition of the group's name and site details. This information is provided as part of the "minimum essential information" in the CBM group's Monitoring and Quality Plan. You will need to discuss with the CBM group how they will access their monitoring data as well as data privacy and storage requirements.

PROVIDE TRAINING OR OTHER SUPPORT

Your organisation may be able to offer other forms of support such as:

- access to monitoring equipment or training
- independent quality checks (e.g., annual observation of CBM group monitoring techniques or taking measurements alongside a CBM group)
- providing a suitable online space for groups to view and interpret their data (e.g., via ArcGIS dashboards).

"WHY?"
A: Monitoring Purpose

"WHERE?"
B: Monitoring sites

"WHAT?"
C: Monitoring indicators

"HOW?"
D: Measurement methods
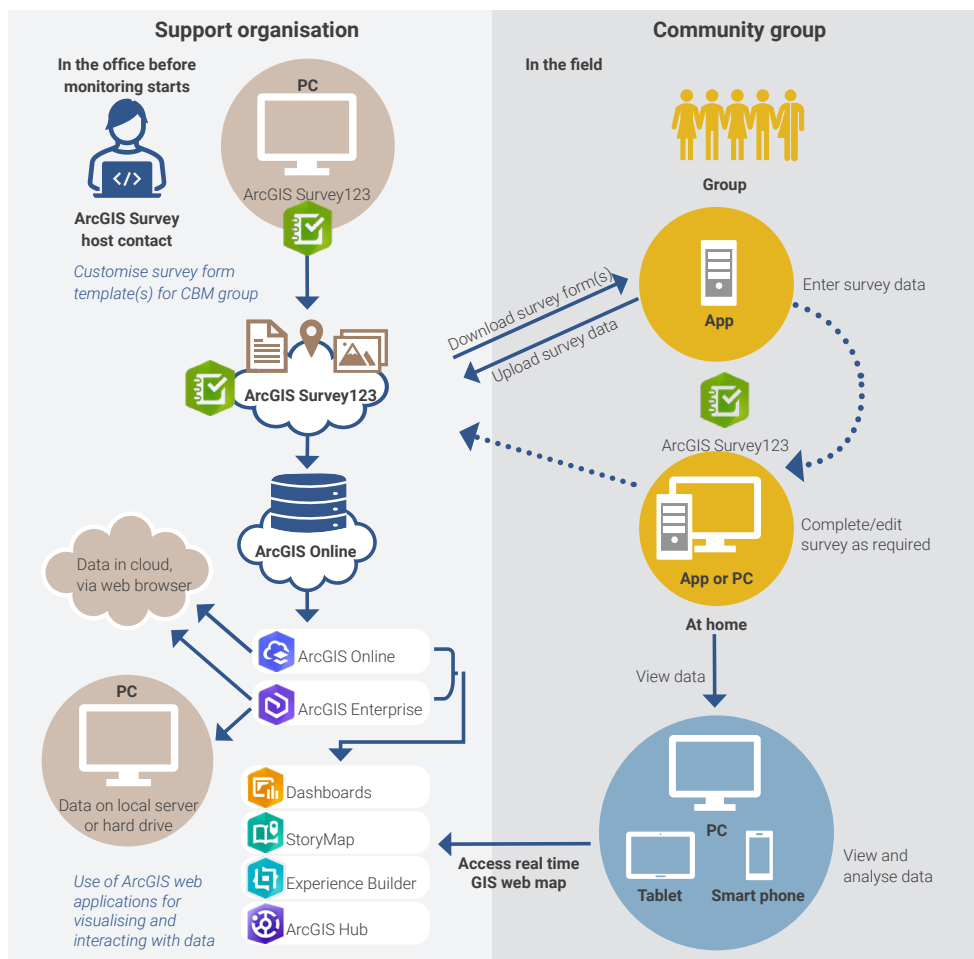
"HOW?"
E: Training & quality checks

"WHEN?"
F: Monitoring frequency and timing

"WHO?"
G: Roles, responsibilities and review

The different forms that make up the Monitoring and Quality Plan template.

Support organisation

In the office before monitoring starts

ArcGIS Survey host contact

Customise survey form template(s) for CBM group

PC
ArcGIS Survey123

ArcGIS Survey123

ArcGIS Online

Data in cloud, via web browser

ArcGIS Online

ArcGIS Enterprise

PC
Data on local server or hard drive

Use of ArcGIS web applications for visualising and interacting with data

Dashboards

StoryMap

Experience Builder

ArcGIS Hub

Access real time GIS web map

Community group

In the field

Group

Download survey form(s)

Upload survey data

App

Enter survey data

ArcGIS Survey123

App or PC

Complete/edit survey as required

At home

View data

PC

Tablet   **Smart phone**

View and analyse data

An overview of data collection under the national CBM QA framework. Your organisation (left) adds a CBM group's name and monitoring site details to the CBM framework ArcGIS Survey123 field form templates and provides the group with a link to use the forms and submit their data. The data will be transferred via the cloud to your organisation's ArcGIS system. Data access, storage and sharing should be agreed with each group before monitoring starts. The lower half of the diagram is only intended to show what data access and sharing could look like. What you can actually provide will depend on your organisation's ArcGIS licence, internal IT systems and resources. As a starting point, unless otherwise agreed with the CBM group, you should promptly download data submitted via ArcGIS Survey123 and return this to the CBM group.

Access to the national CBM QA framework resources

The majority of the CBM framework resources are available for download on the Resources section at www.waiconnection.nz

These include:

- the Monitoring and Quality Plan template as well as a completed example, summary sheet, and a short instructional video
- the guidance document for community and catchment group coordinators
- a background report that explains how the framework was developed and the selection of indicators and measurement methods
- summary leaflets and hard copy field forms.

ArcGIS Survey123 electronic field forms

The CBM framework field form templates are not available for download. Instead, these will be provided directly to organisations with the appropriate ArcGIS licence and capacity to support CBM groups with electronic data collection. Updates to the forms will be managed by a governance group and rolled out to host organisations to maintain consistency in content and use.

For more information, contact: info@waiconnection.nz

Note that the electronic field form templates do not capture rubbish, rainfall or high frequency water temperature and dissolved oxygen (DO) data. For CBM groups monitoring the rainfall or rubbish indicators, the CBM framework promotes the use of existing apps provided by Litte Intelligence and NIWA. For high frequency temperature and DO data, the sensors incorporate their own loggers and software for data storage, download and viewing.

How can I access CBM data collected under the national framework?

All CBM groups are required to record in their Monitoring and Quality Plan whether they are willing to share their data and, if so, for what purposes. How the data are accessed may depend on the data management arrangements a CBM group has put in place with the organisation hosting its electronic field forms.

Although the national CBM QA framework does not include a database or portal to store or display CBM group data, the use of ArcGIS Survey123 templates facilitates sharing of data in a standard format between different organisations and the potential future development on-line portal(s) that pool and display data across groups. The development of on-line portals dedicated to CBM and other freshwater monitoring data has already started to increase regionally and nationally. Check the Wai Connection website to keep up-to-date on a proposed national portal for CBM data.
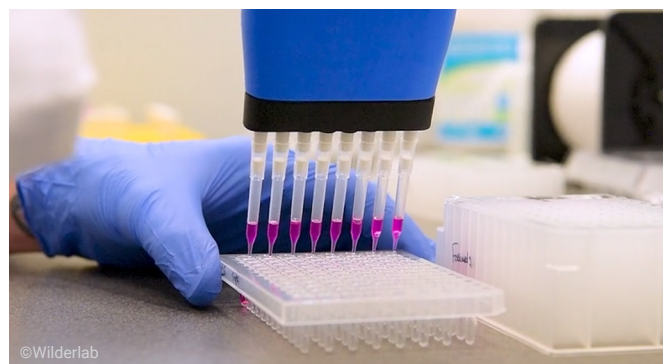
How is the national CBM QA framework managed and kept up to date?

The regional councils of New Zealand initiated the development of this framework. Future updates are likely to involve a similar multi-organisational effort to that which helped to develop it. Check with your regional council or the Wai Connection website as a starting point.

Additional indicators and/or measurement methods may be added to the framework in future if, and when, resources allow. The companion CBM QA background report outlines the key criteria for selecting indicators and methods. These relate to the indicator's relevance to stream health, community interest in the indicator, and the availability of a recognised, practical and affordable CBM method to measure it.

Photo: Friends of Maitai

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