

Integrating Locus Applications with Microsoft Power BI Using Locus APIs



Integration with other systems, whether on-premises or in the cloud, has become a key wish list item for many EHS software buyers.

Integration lets you take advantage of other tools used by your organization (or available from third parties) to simplify processes, access information, and enhance communication, both internally and externally. Locus' main applications (EIM and LP) were designed with the native capability to integrate with other systems.

Some common types of integrations that Locus has successfully implemented are:

- ◇ Integrate on-premises systems with cloud EHS software to provide a seamless process
- ◇ Integrate with identity providers to enable single sign-on
- ◇ Integrate with public API (like EPA or regulatory information providers) for data submittal or private commercial APIs for proprietary content
- ◇ Integrate with multiple sources for consolidation and review of disparate data sources (portal integrations)

Further information can be found in the [“How to extend your EHS software with integrated systems” Locus white paper.](#)

One of the most requested integrations is to combine Locus applications with business intelligence (BI) software such as Microsoft's Power BI and Salesforce's Tableau software. These applications, and others like them, ingest offline and online data sources and present the data in various types of interactive visualizations, such as line charts, scatter plots, or dot maps. A user can perform further analysis on the data to look for trends and make predictions. The user can also arrange the visualizations into custom dashboards or reports, and then share these with other users.

Organizations with EHS data may already have invested time, money, and effort to create custom visualizations and reports in their business intelligence software. Because Locus EHS software can be integrated with business intelligence software, users can leverage their data stored in their EHS system to maximize their investments in business intelligence software.

This document provides an outline for how to integrate Locus EIM and Locus Platform (LP) with Microsoft's Power BI.

Locus APIs



A simple integration path between EIM or LP, and Power BI, is to simply export data from the Locus application to Microsoft Excel format. You can then import the Excel file into Power BI as a data source. This method is simple, but the data export is static and will not update if new data are available in the Locus application.

A better approach is to take advantage of the Locus APIs. An API is an Application Programming Interface. You can think of an API as a 'bridge' between two applications. One application makes a request for data to the API, which then passes the request to the other application. The second application returns the data to the API, which returns it in a format the first application can use.

Locus provides an API for both its EIM and LP applications. The APIs are REST APIs; a REST API is simply an API that follows standards needed to operate via the HTTP protocol. In other words, the APIs can be accessed by calling a URL. To use the APIs, you need to include some information in your request, such as the query to run and your Locus login credentials. The Locus APIs then return data in JSON or Odata format, which are standard text-based data formats understood by many business intelligence applications.

[The EIM API is documented here](#)

The Locus APIs return data from a user-defined query in EIM or LP. In EIM, you first create an Expert Query to return the data you want. Once EIM validates the query as standard SQL, the query can be run in EIM and can also be called from the EIM API. In LP, the API returns data from a user-defined data source. You first create a data source to return data you want. Once the data source is tested and saved in LP, it can be called from the LP query API.

Because the API is always 'live', your BI applications always refreshes the API calls to show the latest data in EIM. Your visualizations stay current and up to date.

Connecting Power BI to a Locus API



In this example, we use an EIM Expert Query called “Groundwater Elevation in Wells for Power BI.” This query returns groundwater elevations over ten years for six wells in the EIM Acme demo database.

Expert Custom Queries ?
Query Results
— Groundwater Elevation in Wells for Power BI

| groundwater_elevation | location_id ↑ | measurement_date |
|-----------------------|---------------|------------------|
| 35.52 | MW-11 | 01/10/1985 |
| 34.94 | MW-11 | 01/22/1987 |
| 33.21 | MW-11 | 01/23/1986 |
| 27.33 | MW-11 | 01/23/1992 |
| 27.78 | MW-11 | 01/24/1991 |
| 27.98 | MW-11 | 01/25/1990 |
| 31.12 | MW-11 | 01/26/1989 |
| 30.94 | MW-11 | 01/27/1994 |
| 33.67 | MW-11 | 01/28/1988 |
| 28.84 | MW-11 | 01/28/1993 |
| 28.44 | MW-11 | 02/22/1990 |
| 30.68 | MW-11 | 02/23/1989 |
| 31.90 | MW-11 | 02/24/1994 |
| 32.90 | MW-11 | 02/25/1988 |
| 29.32 | MW-11 | 02/25/1993 |
| 35.15 | MW-11 | 02/26/1987 |
| 34.57 | MW-11 | 02/27/1986 |
| 28.17 | MW-11 | 02/27/1992 |
| 27.57 | MW-11 | 02/28/1991 |

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To use a Locus API in Power BI, you first select Get Data > Web from the menu. On the form that appears, enter the full URL path to the EIM API and click OK.

For the URL, enter the path to the EIM API provided to you by Locus. An example is shown below. You need to replace **DB_NAME** with your database name and **RECNO** with the expert query record number.

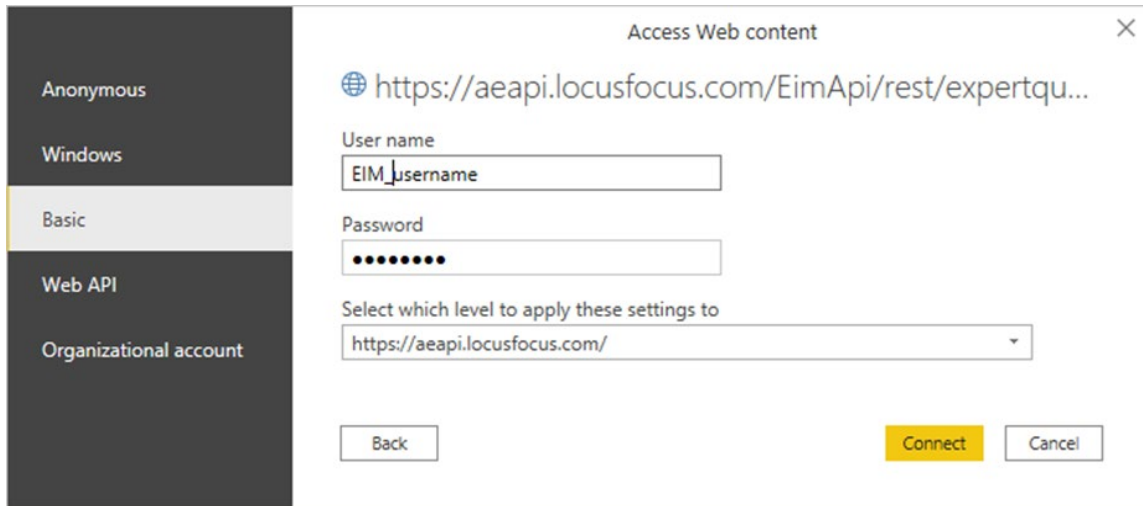
[https://aeapi.locusfocus.com/EimApi/rest/expertquery/RECNO?datasourceId=DB_NAME\)/](https://aeapi.locusfocus.com/EimApi/rest/expertquery/RECNO?datasourceId=DB_NAME)/)

From Web ✕

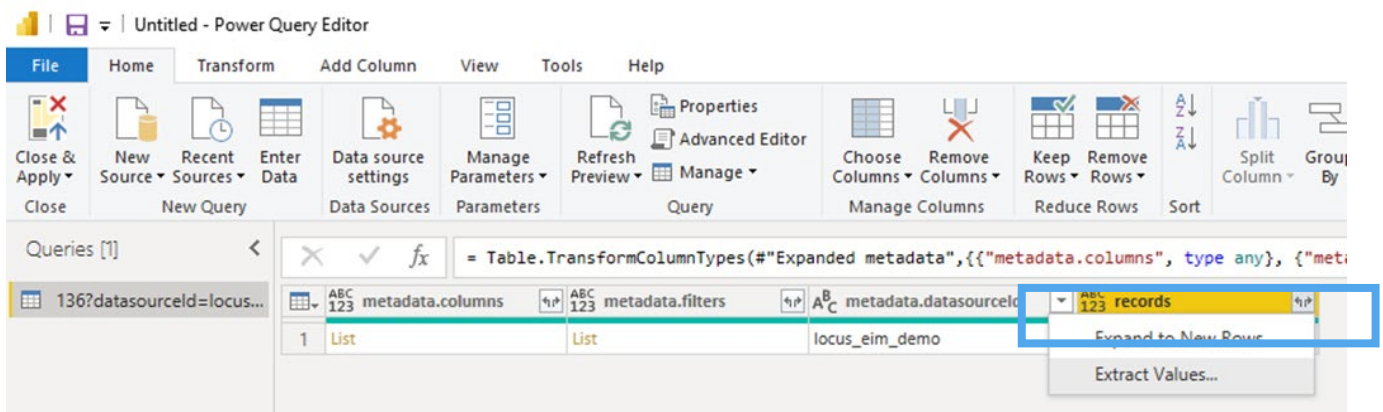
Basic Advanced

URL

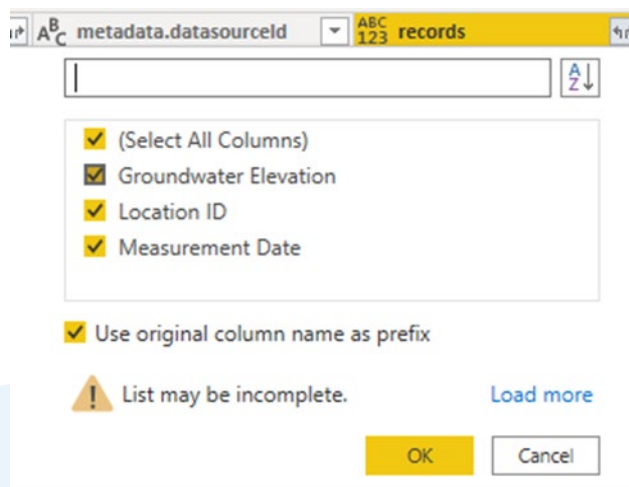
On the next form, select the Basic tab and enter your EIM username and password so the EIM API can authenticate you as a valid user for the Expert Query you are trying to run. Click Connect.



Power BI then connects to the EIM API and returns a new 'power query editor' where you preview the data.

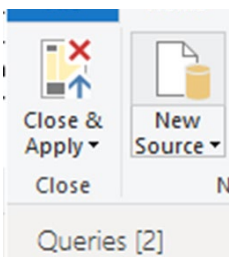


Here, you must click the 'double arrow' icon at the top right of the 'records' column and click Expand to New Rows. You then see a list of all columns in the query.



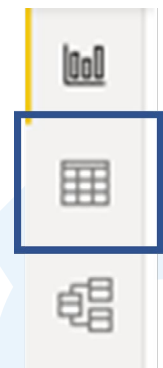
Click OK on this form. Power BI shows you all the data records returned from your EIM API call to the Expert Query.

| ABC 123 records.groundwater_elevation | ABC 123 records.location_id | ABC 123 records.measurement_date |
|---------------------------------------|-----------------------------|----------------------------------|
| 35.52 | MW-11 | 01/10/1985 |
| 34.98 | MW-11 | 04/17/1985 |
| 34.82 | MW-11 | 04/26/1985 |
| 34.83 | MW-11 | 06/06/1985 |
| 34.82 | MW-11 | 06/14/1985 |
| 34.72 | MW-11 | 07/27/1985 |
| 34.64 | MW-11 | 08/06/1985 |
| 34.52 | MW-11 | 08/27/1985 |
| 34.54 | MW-11 | 09/26/1985 |
| 34.06 | MW-11 | 10/24/1985 |
| 33.71 | MW-11 | 11/26/1985 |
| 33.21 | MW-11 | 01/23/1986 |
| 34.57 | MW-11 | 02/27/1986 |
| 35.08 | MW-11 | 03/27/1986 |
| 34.90 | MW-11 | 04/24/1986 |
| 34.66 | MW-11 | 05/22/1986 |
| 34.27 | MW-11 | 06/26/1986 |
| 33.98 | MW-11 | 07/24/1986 |
| 34.40 | MW-11 | 08/28/1986 |
| 34.39 | MW-11 | 09/25/1986 |
| 34.94 | MW-11 | 10/23/1986 |
| 34.82 | MW-11 | 11/26/1986 |
| 35.28 | MW-11 | 12/16/1986 |
| 34.94 | MW-11 | 01/22/1987 |
| 35.15 | MW-11 | 02/26/1987 |
| 35.07 | MW-11 | 04/23/1987 |
| 35.32 | MW-11 | 05/28/1987 |
| 35.27 | MW-11 | 06/25/1987 |

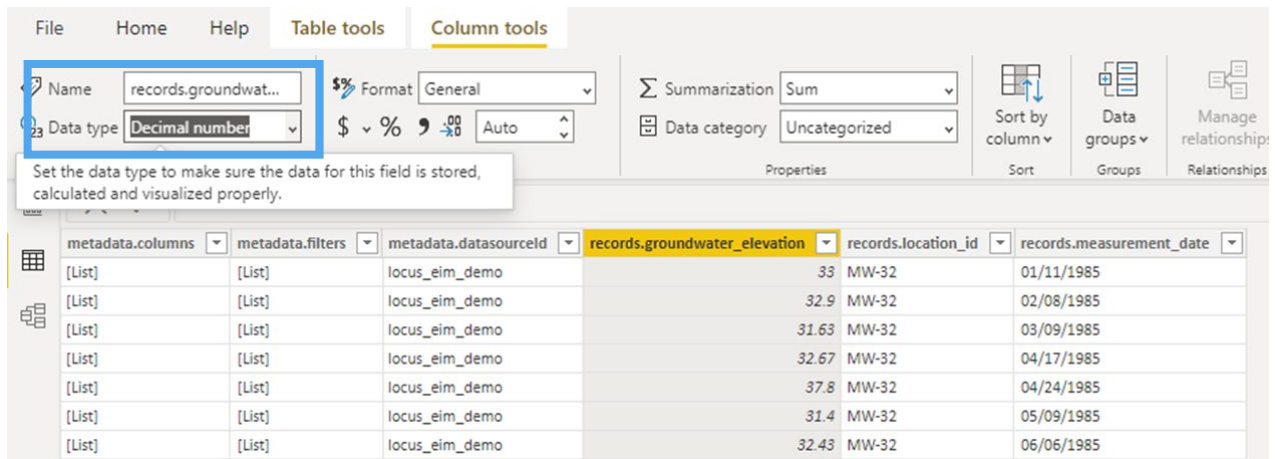


Select Close & Apply to return to the main Power BI window. You may want to save your work at this time.

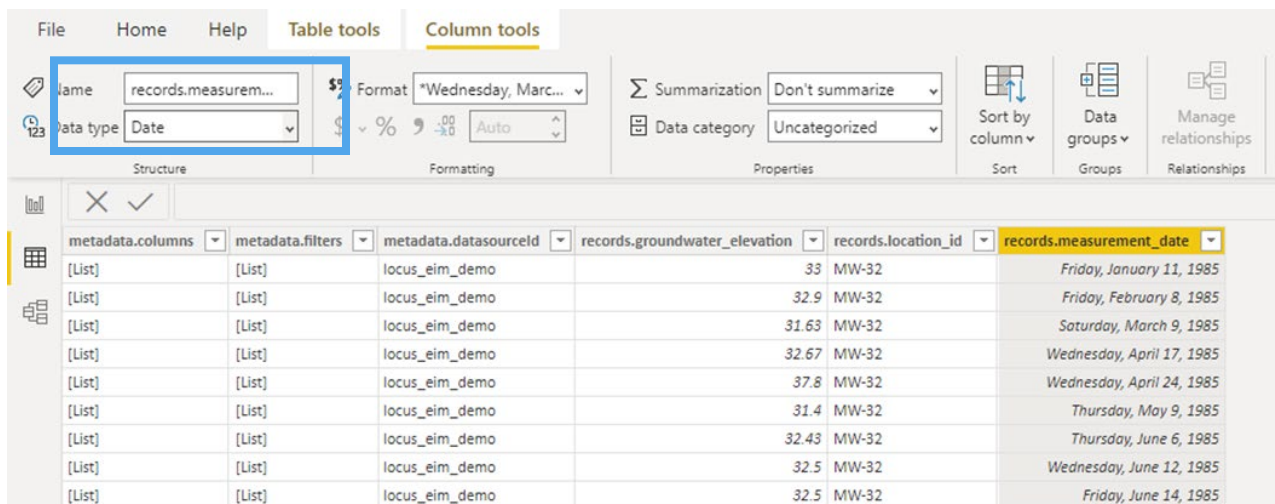
Before you continue, you need to review the data columns and edit their data types, if needed. Dates and numbers may come into Power BI as text values, so you need to fix that. On the main window, there are three buttons. Click the 2nd button to go to a table view of all records.



In this grid, highlight the 'ground_elevation' column and change the Data Type to 'Decimal number.'



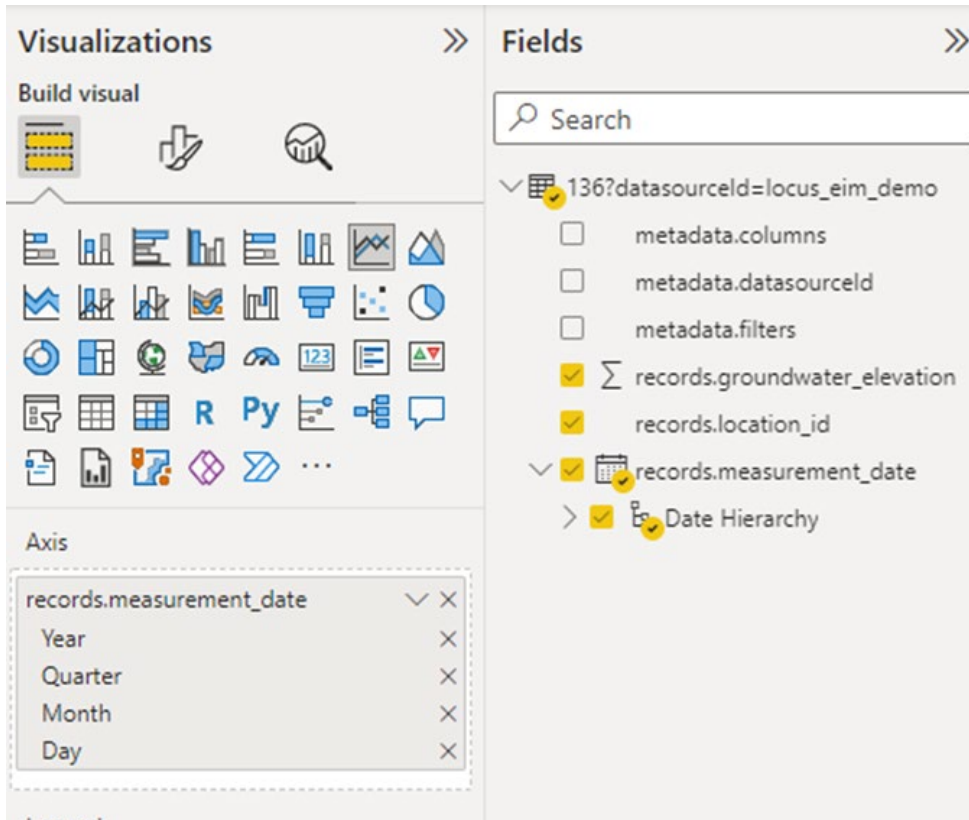
Repeat this process to change 'measurement_date' to the 'Date' data type.



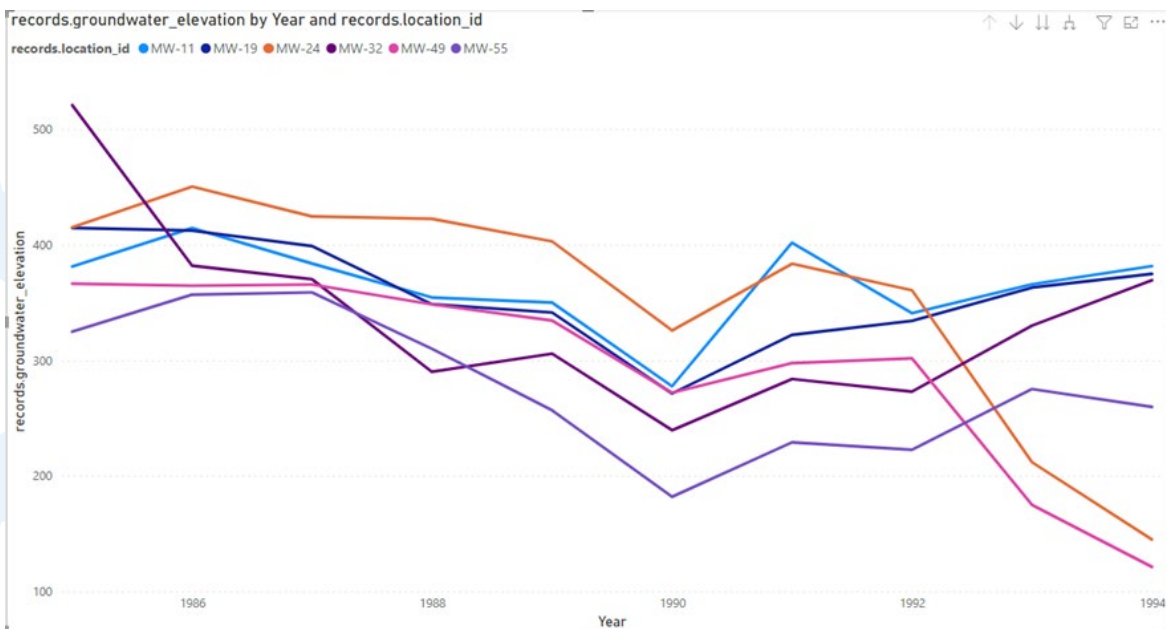
You can now make a visualization! Click the first icon on the left side to change from the data table to the visualization panel.



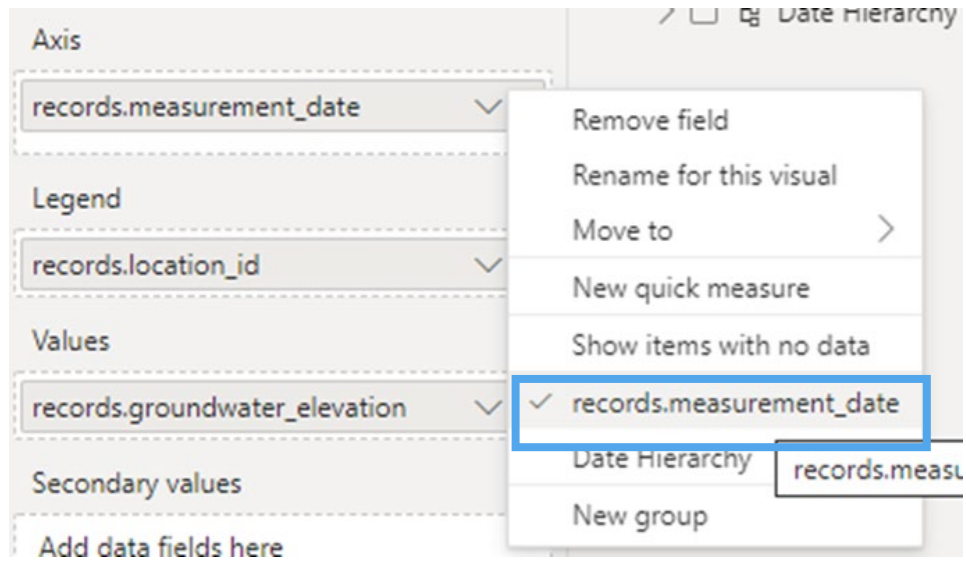
At this point, you can make many visualizations with Power BI. The simplest to make with this example data is a line chart. In the Fields section, select the groundwater_elevation, location_id, and measurement_date columns. Power BI places them into the input boxes as shown below (measurement_date for Axis, location_id for Legend, and groundwater_elevation for Values).



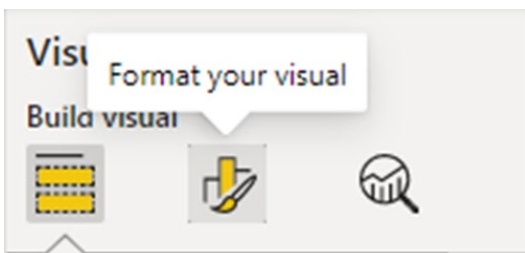
Power BI makes a simple line graph for each location ID. The X axis, however, is being grouped by year, and as a result the graph is losing many data points.



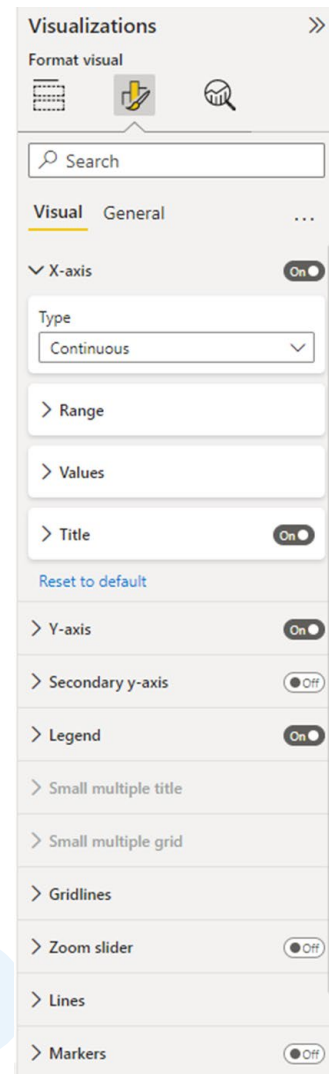
To resolve this, click the drop down for the Axis field and select 'records.measurement_date'.



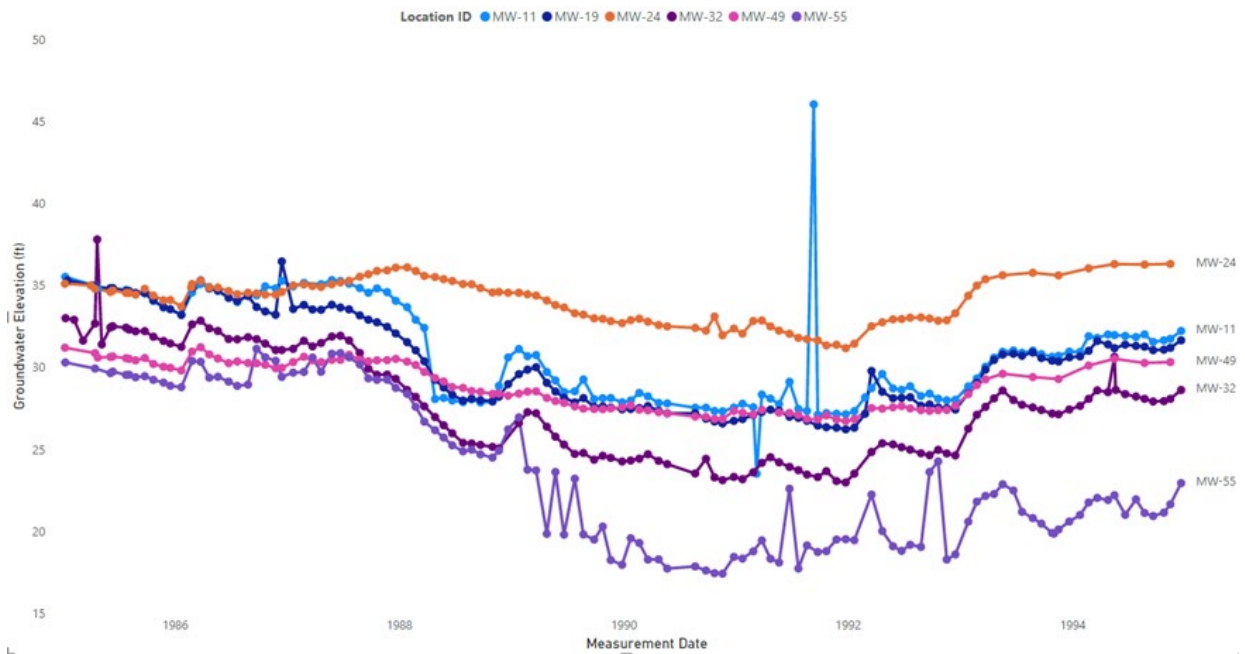
While you're making changes, you can click the middle icon in the Visualization panel to 'Format your visual.'



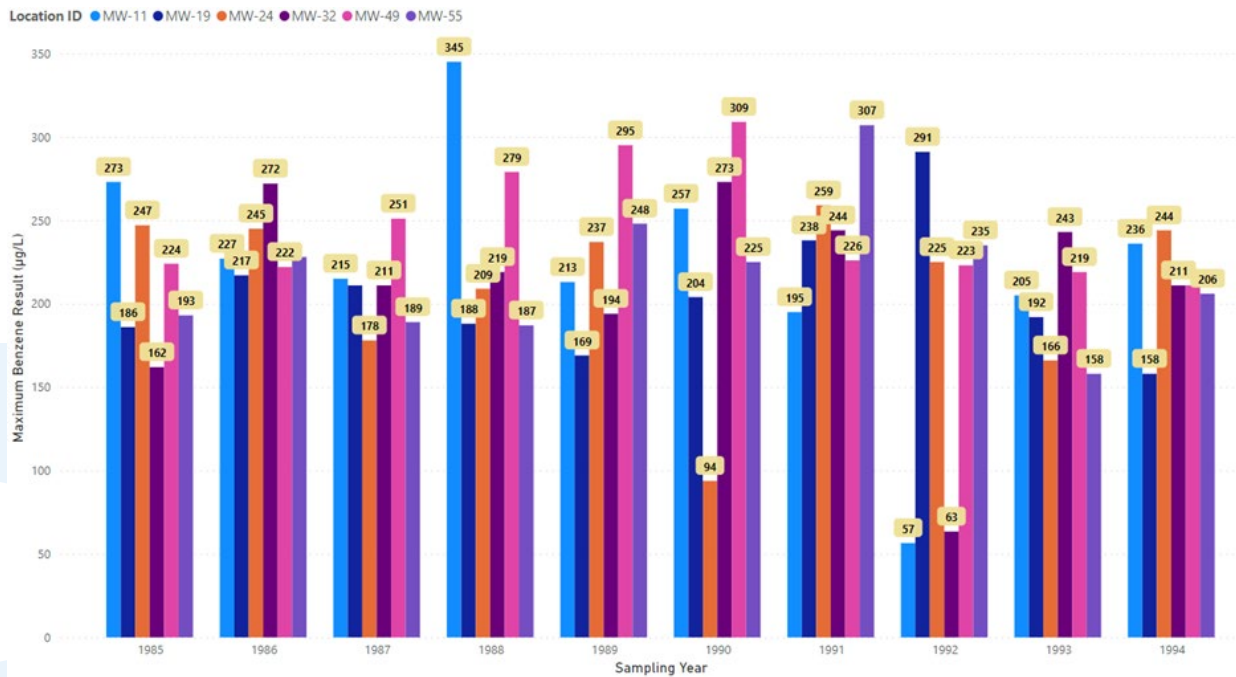
Some simple things to do would be to change the X and Y axis text and to set the Legend label. You can also change colors, fonts, and markers.



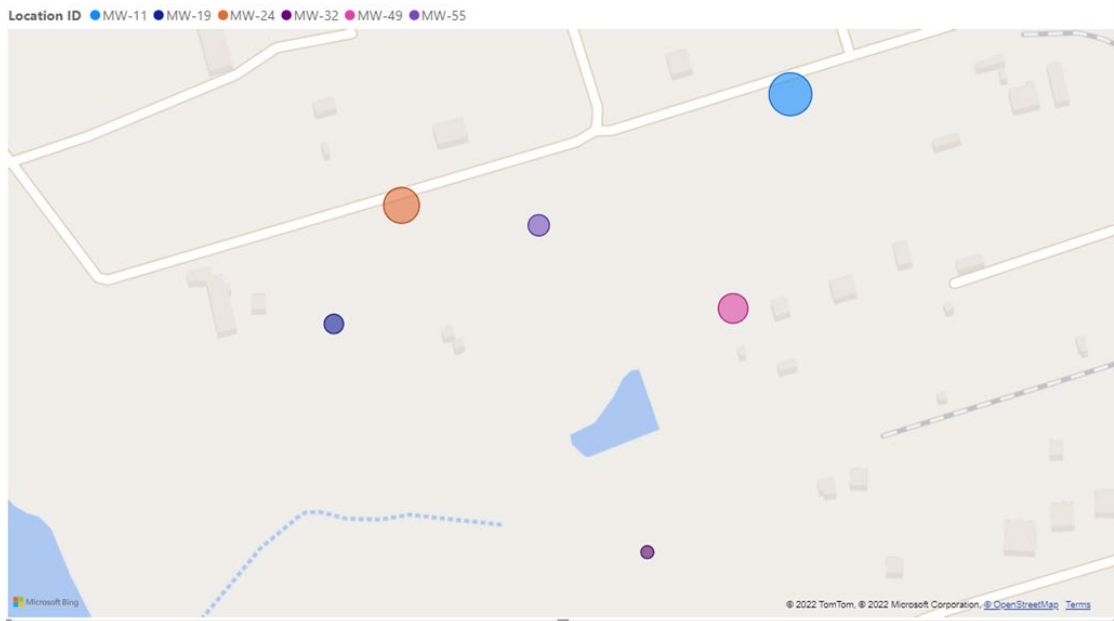
Your graph now shows every groundwater level for all locations. There is a very noticeable spike for MW-11!



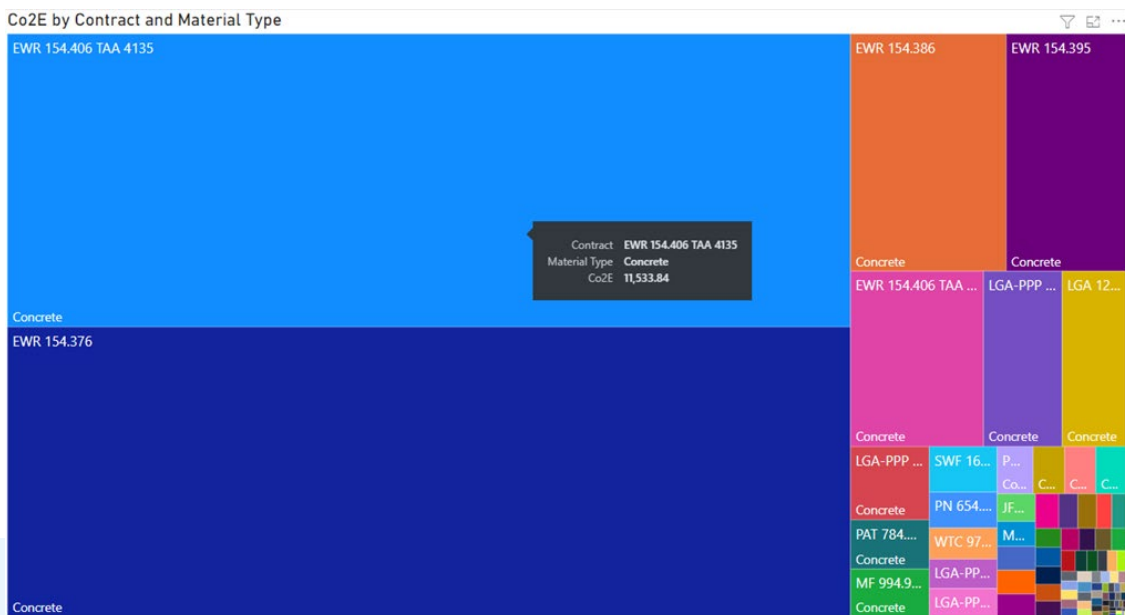
As a second example, here is a bar graph created in Power BI with an EIM API call to the 'Maximum Benzene Result by Year for Power BI' Expert Query. This query returns the maximum benzene result for six wells for a ten-year period.



As a further illustration, here is a map showing the data values from the chart above for just the first year (1985).




Finally, here is an example of a heatmap using a query from the LP API. The heatmap shows CO2 emissions categorized by contract and material type.



There are many clear benefits to integrating modern software tools such as EIM, LP, and Power BI wherever you can in your EHS processes. Even if some integrations are only optional for your needs, consider the added value to your organization in simplifying your EHS software implementation, maximizing other available resources, and improving the reliability and accuracy of data sources driving your EHS decisions. Integrations are sometimes initially perceived as an optional feature, but you should consider making it a requirement for your EHS software based on these benefits. And as new integration tools increasingly become available, you'll find more value in having a system that can use them to their full advantage.

Ready to get started?

We hope we have demonstrated the importance of integrating with other systems to maximize the returns on your software investments and improve your environmental data management. Our team welcomes the opportunity to discuss APIs and third-party integrations with you.

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