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Plastic pollution assessment methodologies suitability toolkit

V1.0

User Manual

PROBLUE
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Development of the user interface was provided by DNA with graphical support from the Digital Education Service (University of Leeds). The wider development team included: University of Leeds: Ed Cook; Deltares: Joana Veiga, Robyn Gwee, Bastien Van Veen; IUCN: Dr Janaka de Silva, Maeve Nightingale, Hien Bui Thi Thu, Lynn Sorrentino, Joao Sousa.

The work was managed by a World Bank team comprised of Kate Philp, Anjali Acharya, Tao Wang, and Ikbal Alexander under the leadership and guidance of Mona Sur. Grzegorz Peszko and Suiko Yoshijima provided peer review.

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Please direct technical support questions to Dr Costas Velis (University of Leeds).

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Developed by: UNIVERSITY OF LEEDS, DAVID NEWBY ASSOCIATES, Deltares, IUCN

Contents

1. Overview

Aim

In response to the plastic pollution crisis, many methodologies for quantification of plastic pollution have been developed. However, the breadth of these plastic pollution assessment methodologies makes it difficult for practitioners to assess which methods are best suited for their needs. The 'Plastic Pollution Assessment Methodologies Suitability Toolkit' (PLAST) has been designed to characterize and compare plastic pollution assessment methodologies and generalised methodological approaches to suggest the most suitable options based on a user's requirements. PLAST focuses on quantification assessments whereby the amounts of plastic pollution are determined and insight into sources, pathways and fates are provided.

PLAST does not aim to provide harmonisation between the methodologies, however, it allows the outputs, technical features and data requirements to be compared thereby providing the first necessary stage in this harmonisation.

Objectives

PLAST has four objectives:

1. To collate methodologies available for the assessment of plastic pollution.
2. To characterise assessment methodologies according to an explanatory framework.
3. To suggest what broad methodological approaches may be best suited based on a user's overall objectives and generalised resources.
4. To suggest suitable plastic pollution assessment methodologies based on a user's specific technical objectives and data availability.

Who should use PLAST?

PLAST is designed to aid all users interested in applying plastic pollution assessment methodologies, for example those shown in **Figure 1**. These users can be split into those wanting to apply a methodology to assess plastics pollution (governments, NGOs, local authorities and businesses) and those looking to gain further information on how newly developed assessment methodologies may compare with those that already exist (academia and developers).

Figure 1: Users that may want to use PLAST.

To apply PLAST, we recommend input from both **high-level users** focused on overall objectives, policies and resources; as well as **technical users** familiar with plastic pollution assessment methodologies terminology, data availability and required outputs. The manner in which these users' knowledge and requirements is incorporated into PLAST is explained in the following sections.

2. How to open and run PLAST

The PLAST spreadsheet application contains a full MS Office VBA application and a suite of Macros. To use the tool, Microsoft Excel must be configured to enable Macros and access the VBA application, the steps of which are outlined below. Please follow all these steps before trying to run PLAST to ensure it operates correctly. Refer to the Quick Start Guide for a further breakdown of each step.

Please follow all these steps before trying to run PLAST to ensure it operates correctly

Microsoft Windows

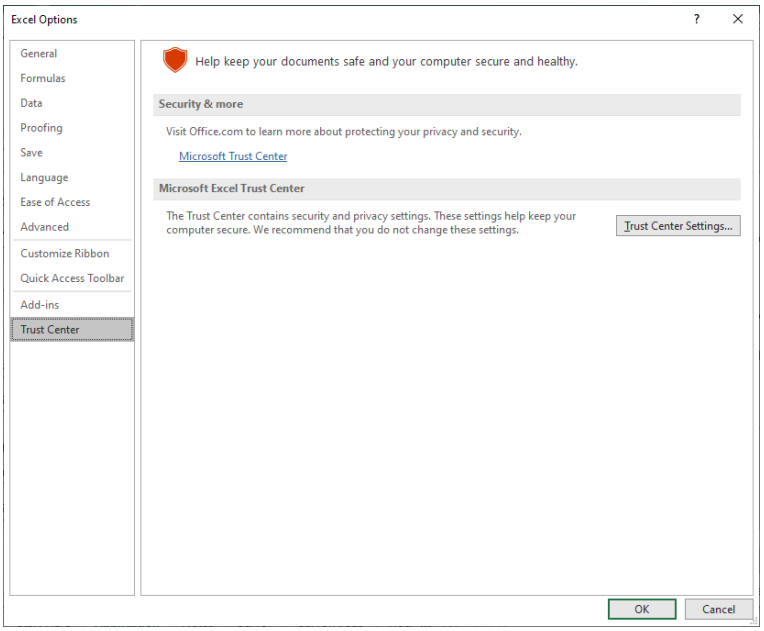
Step 1. Save the PLAST toolkit in 'My Documents'

Errors may be encountered if you try and run PLAST from a network drive such as OneDrive. To ensure PLAST works correctly, we recommend saving the downloaded file to 'My Documents' to run. PLAST can still be saved after its operation to OneDrive folders for sharing, however, it should always be moved to a stable location prior to opening (e.g., 'My Documents'). **Note:** You must have permission to save files in the folder in which the PLAST has been saved and opened from.

Step 2. Configure settings in the 'Trust Center'

The 'Trust Center' settings control what content you are able to open within Microsoft Excel, for example Macros. We recommend users change their macro settings to 'Disable VBA macros except digitally signed macros' and check 'Trust access to the VBA project object model'. These settings ensure users are opening a version of the toolkit that is unmodified from the official release. To change these settings, follow the steps below:

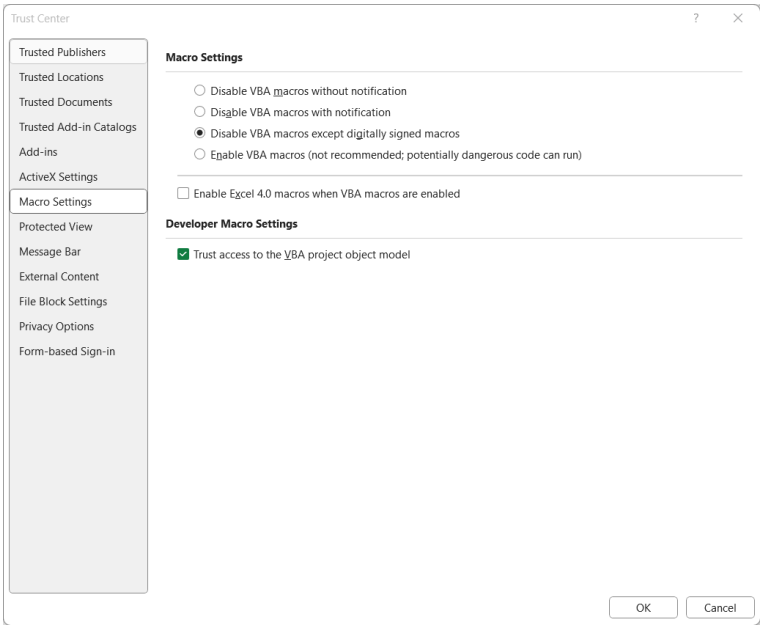
2.1: Open Excel and click on File in the menu, then Options and click Trust Centre. You will see a screen similar to the following:



2.2: Click on Trust Center Settings.. in the main window you will then see the following screen:

Choose the Macro Setting "Disable VBA macros except digitally signed macros" (on some versions of Microsoft Excel this may instead read, "Disable all macros except digitally signed macros"). Tick the box "Trust access to the VBA project object model".

Click OK button to save settings and exit back to the Excel program. Close Excel and re-open the workbook…..

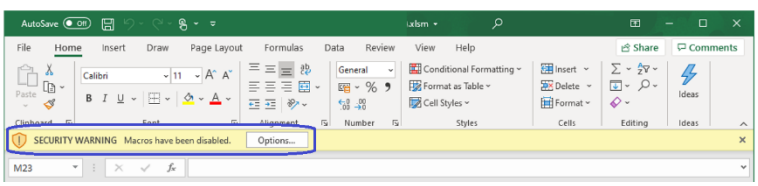


Step 3. Open PLAST and Install the 'Digital certificate'.

A digital certificate is a security feature added to VBA projects to verify that they are safe. It is recommended that users install the digital certificate prior to trying to run PLAST to show that they trust it. Although Step 2 can be completed by opening a new Excel workbook, the following steps should be done when opening the PLAST workbook. Please follow the steps below to install the certificate.

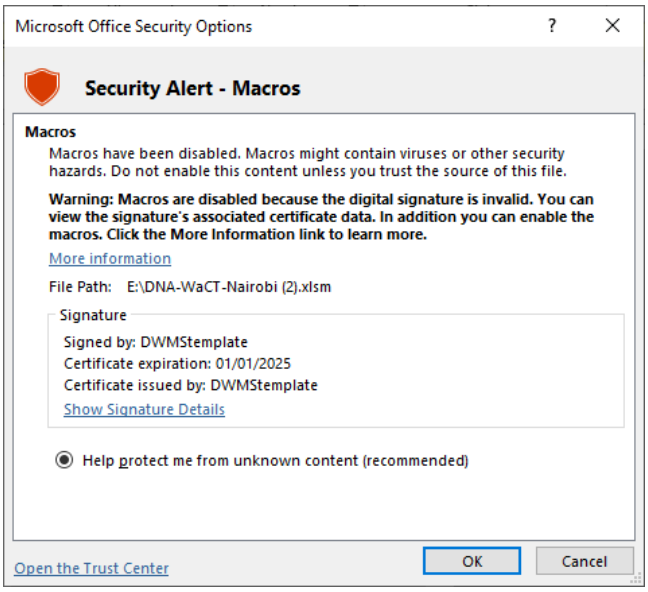
3.1: Open the digitally signed PLAST workbook and you should then see the SECURITY WARNING:

Click on the Options.. button.



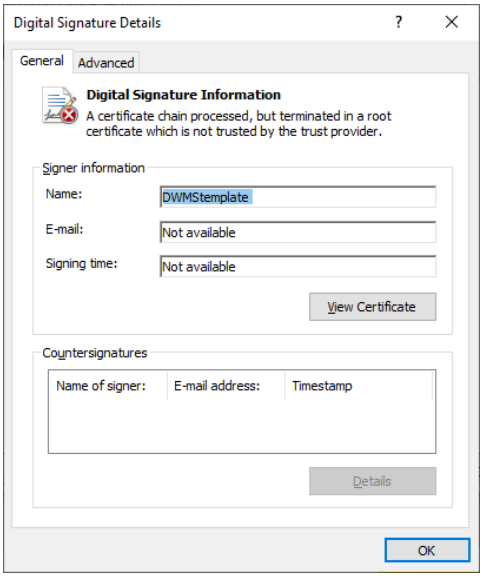
3.2: The dialog box that opens shows the certificate details that the spreadsheet model is digitally signed with.

Click on “Show Signature Details”

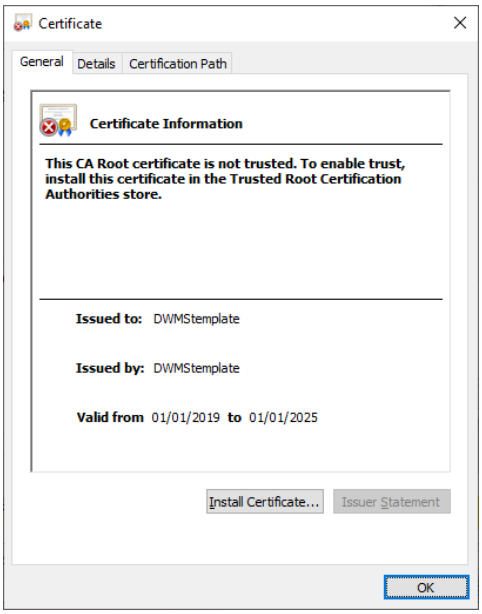


3.3: A further “Digital Signature Details” dialog opens:

Click on the View Certificate… button:

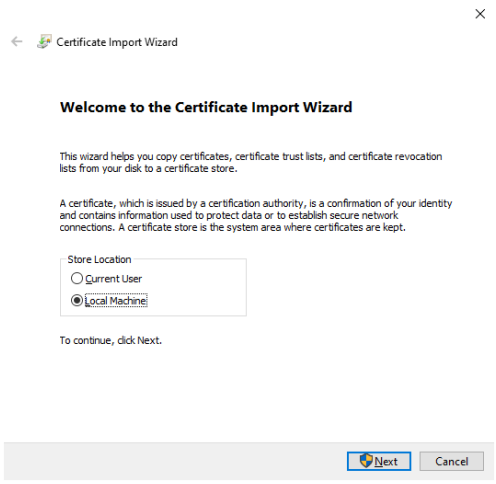


3.4: Now click on Install Certificate… and the next dialogue box opens:

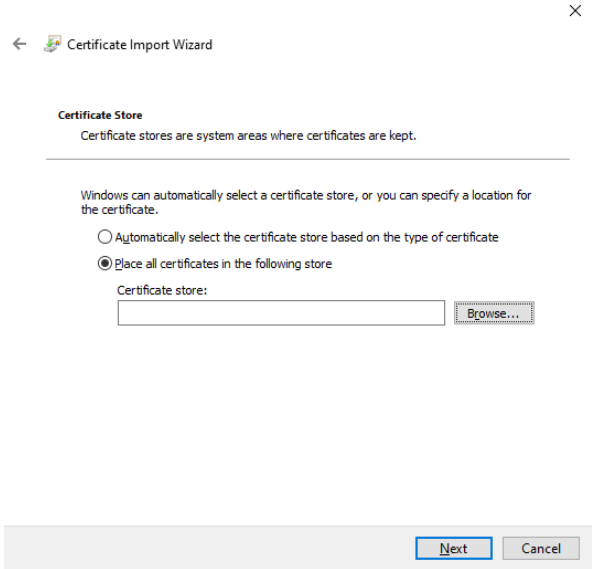


3.5: Choose store location "Local Machine" and click Next button:

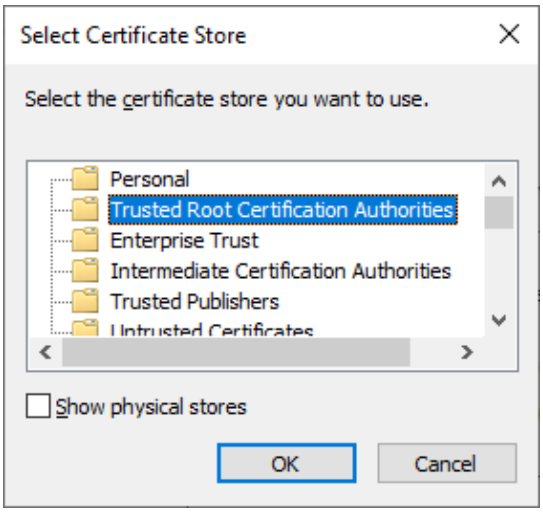
If storing to the "Local Machine" is disabled, the certificate can be stored on the "Current User" instead, however, others users of the PC will also have to install the certificate if they wish to run PLAST.



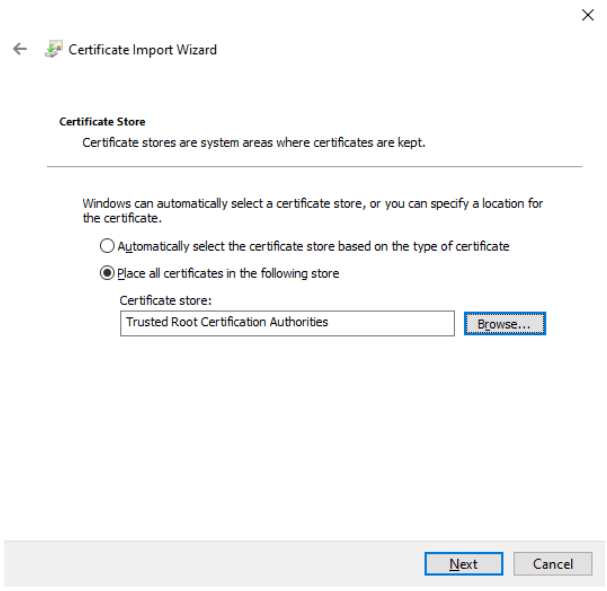
3.6: Now we choose where to save the certificate. To do this, you click on the Browse… button.



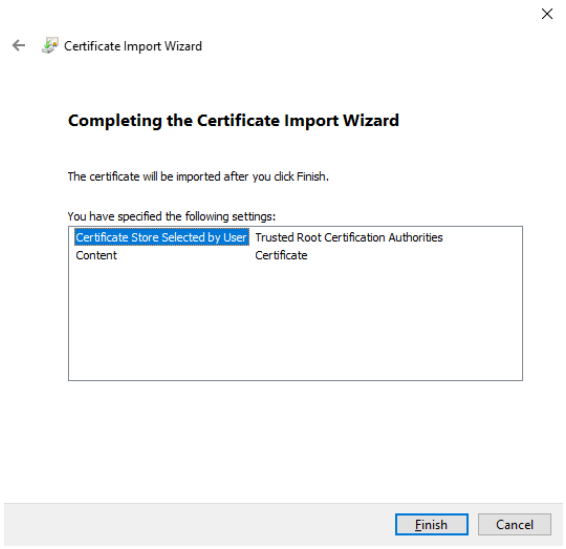
3.7: Choose “Trusted Root Certification Authorities” and click on the OK button.



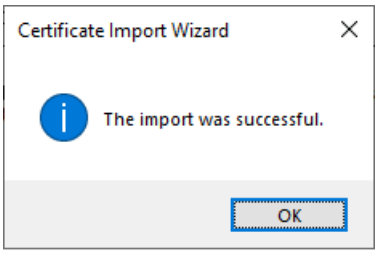
3.8: Having chosen the certificate store, click the Next button



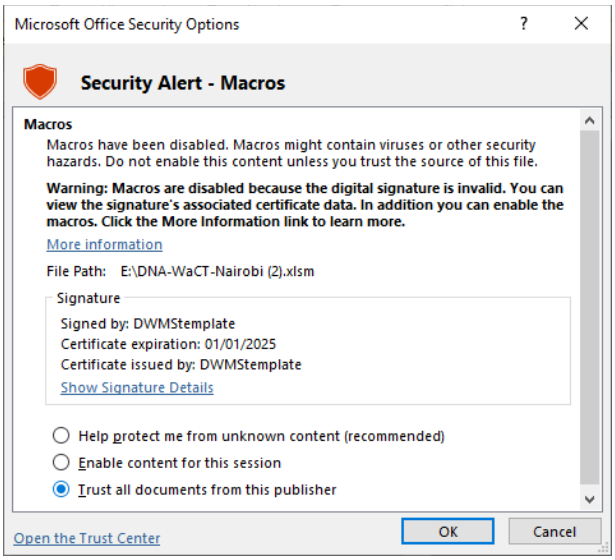
3.9: Then click Finish button to complete the certificate installation.



3.10: You will get a confirmation. Click OK.



3.11: Select the option "Trust all documents from this publisher" and click OK and Close Excel.



Step 4. Running PLAST

Once steps 1-3 have been completed, PLAST should be successfully configured to run on your PC and can be opened by double clicking the PLAST file. Ensure all open Microsoft Excel workbooks and PDF files are closed prior to opening PLAST to avoid interference with the application. New users to PLAST should follow the above installation instructions and complete the necessary training before using PLAST.

Other Microsoft Excel security features

Microsoft Excel security features to prevent malicious use of macros have been frequently updated, keeping up with these can be problematic for developers of bona-fide Excel applications that rely on Microsoft's Visual Basic for Applications (VBA). It is strongly recommended that the digital certificate is installed if possible.

If it is not possible to install the digital certificate, then one of the following actions may enable the application to run, however this is at the user's own risk.

Trusted locations

Excel has implemented another security feature "trusted locations" recently which can prevent even digitally signed macros, with certificate installed, from running if the file is opened from the "Downloads" folder or a shared network location (e.g. OneDrive). If this is the case, users are likely to see a standard excel workbook with the PLAST 'About' sheet displayed. **The best way to correct this is to download the spreadsheet, open it, save it**

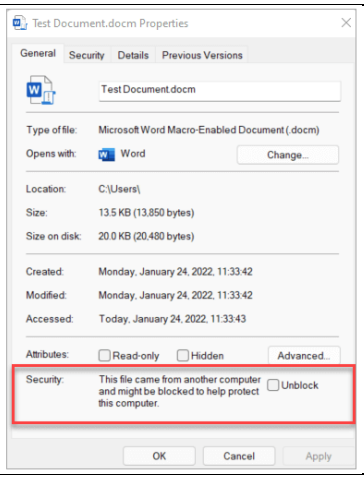
to "My Documents", close it and then re-open it. This usually satisfies the "trusted location" security check.

Alternatively, a folder can be set as a trusted location by going to the 'Trust Center' (see step 2 above), clicking 'Trusted Locations', then "Add new location…" and selecting the folder in which PLAST is saved. We do not recommend that shared locations (e.g., OneDrive) are set as trusted locations.

Warning – Making a folder a "trusted location" can enable any office application with macros to run, including files with malicious content. Do not copy office documents to a "trusted location" unless you are sure they are safe.

Microsoft policy settings

Some users that have computers provided and configured by their companies/organisations may have Security Policies pre-set and find that access to the Microsoft Excel Trust Centre is disabled.

Users may attempt to run the macros by right-clicking the file, choosing **Properties**, and then select the **Unblock** checkbox on the **General** tab. **Warning – Selecting 'Unblock' bypasses the digital certification and should only be done if users are confident of the source of the file.**	

MacOS

Unfortunately PLAST will not work correctly on MacOS. Please run PLAST on a Microsoft Windows PC.

3. Terminology

What is meant by a methodological approach?

Whilst many plastic pollution assessment methodologies exist, each with their own unique method and results, each methodology can be grouped into one of four main approaches (**Table 1**), known hereafter as 'methodological approaches'.

Table 1: Four methodological approaches used in the quantification of plastic pollution. It should be noted that there is considerable overlap in these approaches, and as such many assessment methodologies incorporate more than one approach.

Icon	Description
	**Transfer coefficient** The transfer coefficient approach is a top down method where flows are distributed according to coefficients. For example, the amount of mismanaged waste which may enter oceans. When applied as the primary method, the transfer coefficient approach is typically adept at requiring low resources and giving gross estimations to guide policy. Transfer coefficient approaches tend to provide a simplistic overview of the plastic flows in the solid waste management system.
	**Material flow analysis** Material flow analysis aims to model the flows and stocks of plastic waste within a solid waste management system to a much greater detail than that used in transfer coefficient based approaches. Although in its simplest form transfer coefficients are used to calculate the distribution of waste flows, more complex forms can be used such as probabilistic material flow analysis which incorporates uncertainty of flows, or data validation and reconciliation which aims to harmonise different measurements within the system. Material flow analysis approaches tend to be used when a detailed assessment of the solid waste management system is required.
	**Statistical / trend analysis** Statistical or trend analysis approaches are a bottom up approach typically used to understand the amount of plastic pollution in different environmental compartments via measurements. Results give a snapshot of the plastic pollution in an area at a moment in time, but can be conducted over longer periods to assess how the amounts of plastic pollution changes with time. They are often utilised to develop baselines or monitor the impact of interventions.
	**Hydrological modelling** Hydrological and transport modelling approach aims to harness the considerable experience that has been amassed in hydrological models and transfer this to the problem of plastic pollution. Typically using geographic information system (GIS) analysis, this approach is primarily focused on understanding how plastic in the environment may move and transfer to the ocean by combining estimates of terrestrial/riverine plastic with information on rainfall and river characteristics

The relative suitability of each methodological approach is scored in PLAST based on a user's high level objectives (Part A questions). These results are useful in providing an indication of the type of methodological approach which may be best suited for a user, without suggesting specific methodologies.

What is meant by a plastic pollution assessment methodology?

The growing awareness of plastic pollution has seen it rise up the international agenda to become a leading priority for nations and the global community alike. With this, a wealth of data, methodologies, and metrics have been developed to aid in the understanding of plastic pollution. One particular area receiving important attention is the quantification of plastic pollution sources, along with its subsequent transport and accumulation in the environment.

The plastic pollution assessment methodologies included in PLAST are focused solely on these quantification assessments. As such, assessment methodologies which focus on the ecological impacts of plastic pollution, for example, are omitted. Similarly, assessment methodologies that are related solely to policy without a quantification of the amount of plastic pollution are deemed out of scope. Given the quantification of plastic pollution is meant to provide knowledge and understanding on how to effectively act, any methodologies that are designed simply for the collection of data and which lack any interpretive analysis are also out of scope. A full list of the system boundaries used to define if plastic pollution assessment methodologies are in-scope is shown in Table 2.

Table 2: System boundaries used for defining inclusion of plastic pollution assessment methodologies in PLAST.

System boundary	In scope	Out of scope
Types of assessment methodologies	Assessments quantifying plastic pollution sources, transportation pathways or accumulation in the environment	Assessments without quantification of plastic pollution sources, transportation pathways or accumulation in the environment (e.g. ecological impacts)
	Assessments / models with explanatory outputs	Data / monitoring protocols with no explanatory outputs
	Indicators if fundamental to assessment and standardised, e.g. plastic pollution related SDG indicators	Non-fundamental or non-standardised indicators
Geographical boundary	Global	NA
Scale	Local to regional (multi-country) level assessments	Solely global assessments

Life Cycle	Life cycle assessments if covering plastic waste emissions into the environment	Life cycle assessments focused solely on plastic production and use
Macro / Microplastics	Macroplastic assessments	Solely microplastic assessments
Implementable	Assessments are transferrable to other locations	Assessments are not transferrable to other locations

Accounting for the inclusion criteria shown in Table 2, plastic pollution assessment methodologies are defined here as:

"An implementable methodology that quantifies macroplastic pollution, providing knowledge and understanding in order to effectively act."

Other terminology

Additional terminology used to describe the structural components of PLAST can be seen in **Figure 2**.

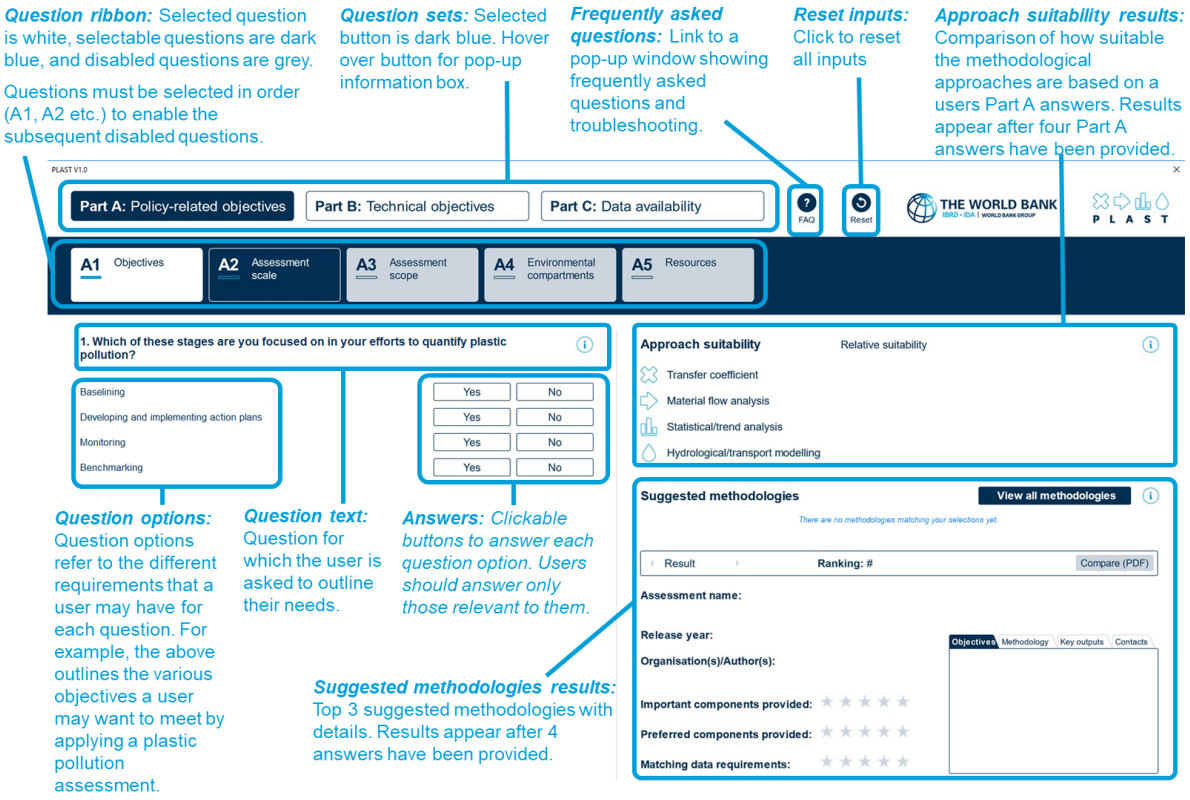


Figure 2: Terminology used in PLAST to describe the structural components on the main page.

4. Structure of PLAST

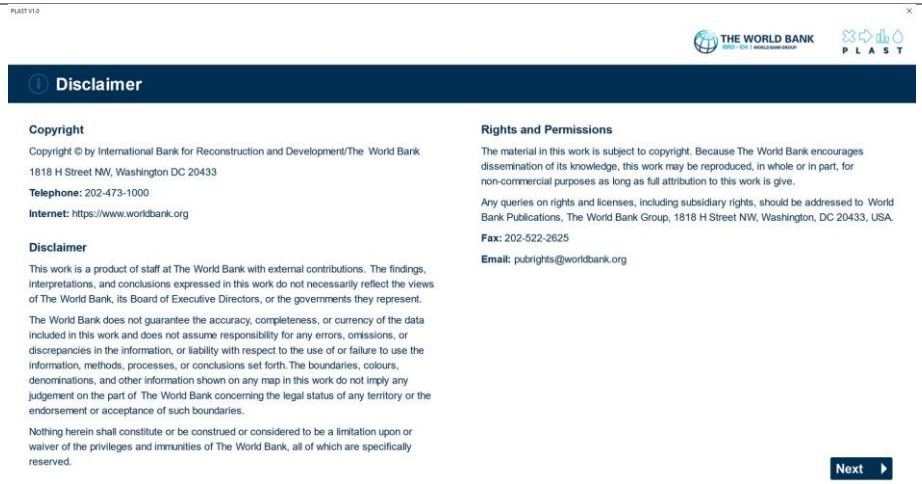
PLAST has been developed using Microsoft Excel and harnesses Visual Basic for Application (VBA) to provide an intuitive and interactive graphical user interface for users. **To use PLAST, Microsoft Excel must be configured to enable Macros and access the VBA application, the steps of which are outlined in section 2: How to open and run PLAST**.

PLAST is comprised of several distinct sections, a description of which is provided in **Table 3**.

Table 3: Description and functions of the sections of PLAST.

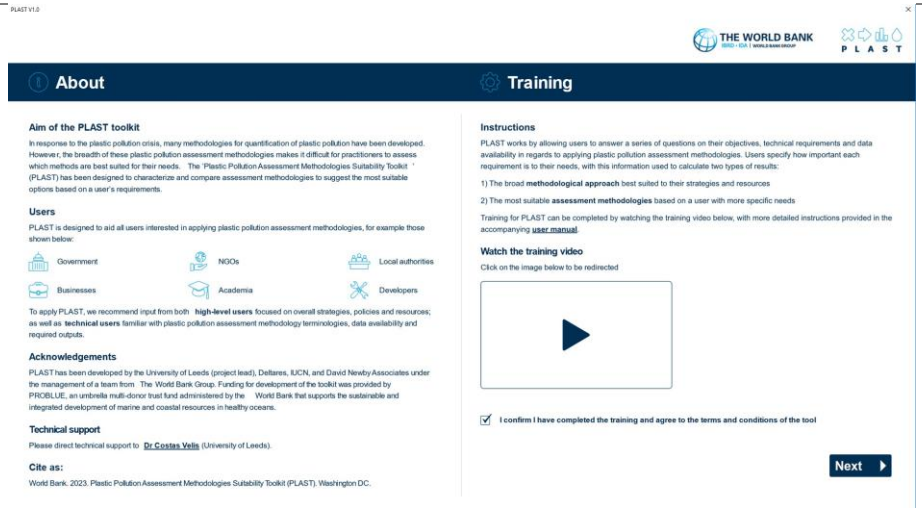
Section	Visualisation	Description
Splash screen		On loading of PLAST, a splash screen ('landing screen') is displayed signifying the version, funders and developers. To progress, users click the start button.

Disclaimer page



After clicking ‘Start’ on the splash screen, users will be shown a disclaimer page. Users can progress to the next page by clicking the ‘next’ button.

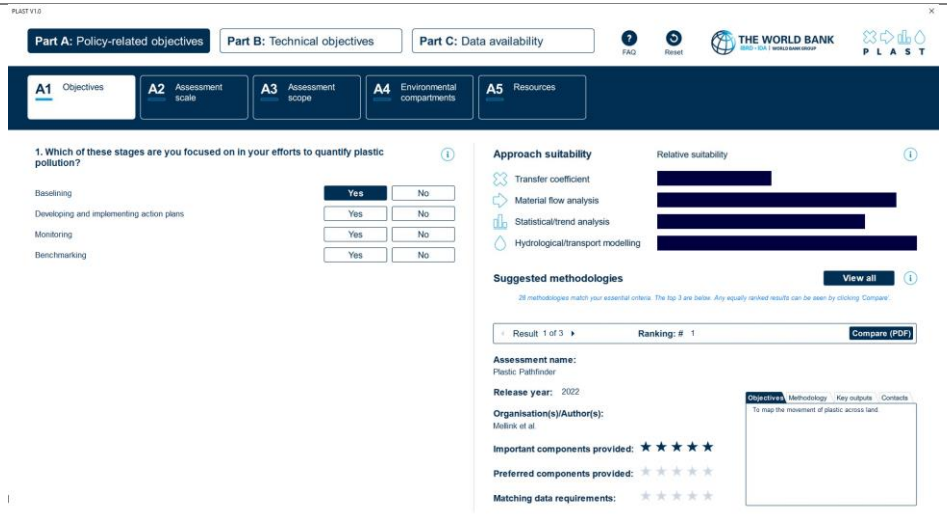
About & training page



After clicking ‘Next’ on the disclaimer page, users will be shown the about & training page. On the left is information about PLAST including a summary of its aim, users, development, citation, as well as an email contact for technical support (Dr Costas Velis – University of Leeds).

On the right, users are presented with some training text as well as a link to a training video. It is strongly encouraged that users watch the brief training video prior to progressing to ensure all aspects of PLAST are understood and results are suggested as intended. Users can only progress to the questions by confirming with the checkbox that they have completed the training, at which point the ‘Next’ button can be clicked.

Main page

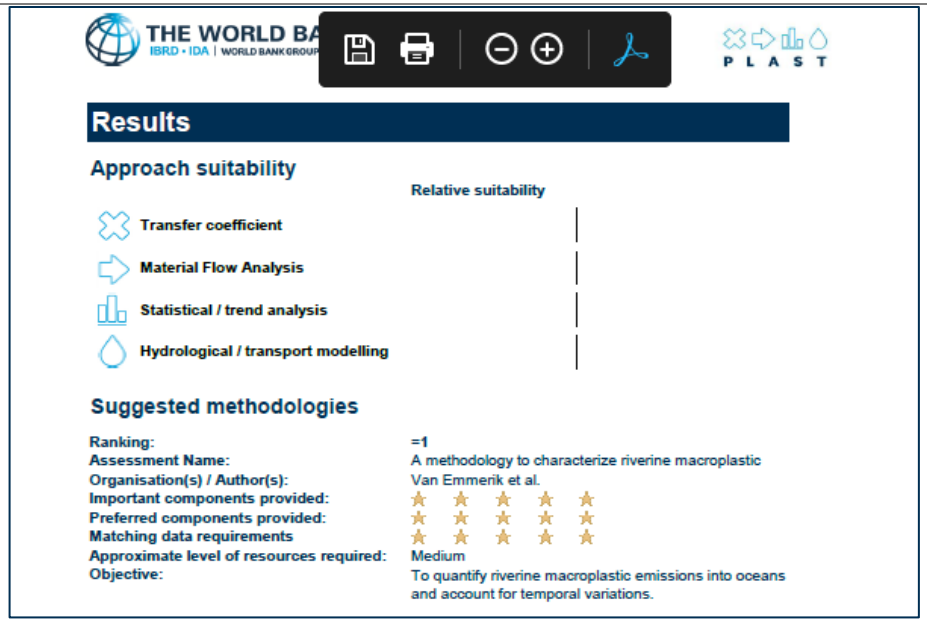


The main section of PLAST is where the questions can be answered by a user and a summary of the results shown. This is structured as having three selectable *question sets* (Part A, B, C) at the top left of the page, each of which has a series of questions displayed below.

Users are required to go through the questions under each of the three parts and answer them based on their requirements (see How to use PLAST Section for details on how to complete).

On the right, users are provided with results on the relative suitability of methodological approaches, and a comparison of the top three suggested assessment methodologies with details of each.

Results comparison page

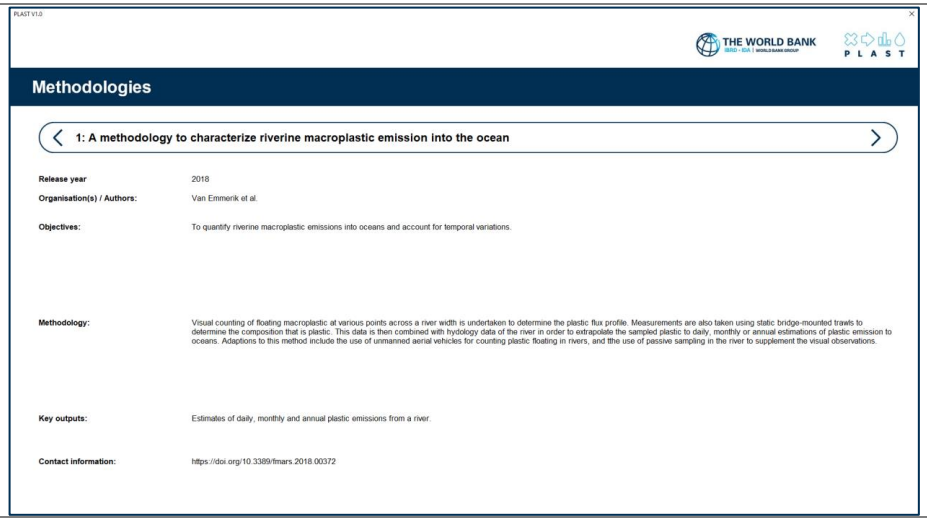


If users click the 'compare' button on the question and results summary page, they are directed to a PDF document that displays both the results of the relative suitability of methodological approaches, and a comparison of the top three suggested assessment methodologies. Depending on the user's PC, this PDF will either open in a separate Excel pop-up window or in a PDF viewer such as Abode. In addition, a radar diagram is displayed providing a visual comparison between the top 3 suggested methodologies.

Users can save this results comparison page to a PDF or print the results using the bar at the top of the page.

The page can be closed by clicking the cross in the top right corner of the window to return the user to the main page.

Assessment methodologies comparison page



If users click the ‘View All’ button on the question and results summary page, they are directed to a pop-up window that displays information on each of the plastic pollution assessment methodologies included within PLAST. This includes all methodologies, not just those deemed suitable.

The page can be closed by clicking the cross in the top right corner of the window to return the user to the main page.

5. How to use PLAST

To use PLAST, Microsoft Excel must be configured to enable Macros and access the VBA application, the steps of which are outlined in section 2: How to open and run PLAST.

Inputting user needs and available resources

The basic premise of PLAST is that users answer a series of questions on their needs and resources available in applying a plastic pollution assessment. PLAST then ranks the suitability of generic methodological approaches and specific plastic pollution assessment methodologies according to multicriteria decision analysis and displays the result.

The questions are broken into three parts, as summarised in **Table 4**, with full descriptions of each question provided in **Appendix 1.**

Table 4: Summary of the three questions sets (Part A, B, and C) in PLAST including who they should be completed by, the focus of the questions and the number of questions in each Part.

Question set	Completed by	Focus of questions	No. of questions
Part A	**High-level users** focused on overall objectives, policies and resources	To understand the motivation of the user in applying a plastic pollution assessment and ascertain the general scale, scope and available resources of the planned assessment.	5
Part B	**Technical users** familiar with plastic pollution assessment methodologies terminology, data availability and required outputs	To understand the user's technical requirements of any outputs, for example, the level of detail (resolution) required or any specific functionalities.	8
Part C		To understand the availability of existing data or the capability to collect new data.	2

Each *question set* can be accessed using the buttons at the top of main page (see **Figure 2**). Users are encouraged to start with the questions of Part A, before proceeding onto the more technical questions of Part B and C. Help text for each *question set* can be viewed by hovering over the buttons.

The individual questions associated with each *question set* are shown in the dark blue *question ribbon* (see **Figure 2**). PLAST has been designed to guide the user through the questions one at a time to avoid users potentially skipping relevant questions. To aid in this, only the next question is clickable, with this depicted as dark blue (for example question A2 in **Figure 2**). The remaining questions are disabled as depicted by a grey colour (for example question A3 to A6 in **Figure 2**), and only become clickable once the subsequent question has been viewed by the user. It is not mandatory to answer all the questions and

available options, instead users are only required to complete those that are relevant for their needs.

The *question text* for the selected question is shown directly beneath the *question ribbon*. This is accompanied by a series of *question options* each of which can have an *answer* selected for it (see **Figure 2**).

Help text for each *question text* can be viewed by hovering over the ⓘ icon, whereas additional help text for each of the *question options* can be viewed by hovering over the text. Therefore if users are unsure about the meaning of any terminology, these help-texts should be consulted for definitions. For question A5, the definitions of each *answer* are shown in a larger textbox below to accommodate the more detailed descriptions given. Hover over the *question options* text to show these definitions.

If the user feels that a question is repeated, we ask them to carefully read the definitions as subtle differences do exist. In general, questions in Part A enquire about the overall ambitions of the project (e.g. scope and scale), whereas those in Part B are referring specifically to the resolution of the outputs. For example, a user could answer in Part A that they are wanting to apply a methodology at the country level, but in Part B signify they want the outputs to inform at the municipality resolution.

"It is not mandatory to answers all the questions and available options, instead users are only required to complete those that are relevant for their needs"

The answers available for each question differ, but fall into one of three options:

Yes / No
The 'Yes/No' option is available for question A1 as this is asking at what stage the users are in preventing plastic pollution. Users may be acting on multiple stages simultaneously, therefore multiple options can be set to yes. The 'Yes/No' option is also provided for question C1 relating to available data as it is assumed users either have the data / are willing to collect it or the data is not available.

Essential, Important, Preferred, Not essential (default)
The majority of *question options* have these terms as the possible *answers* to select from, particularly for those in Part B – Technical objectives. These terms are provided in order for the user to specify how important it is that assessment methodologies can satisfy each option. For example, a user may wish to select that:

- It is **essential** that the methodology can operate at the national scale.
- It is **important** that it can assess the state of the environment and inform on coastal regions.
- It is **preferred** that the amount of plastic discharge to oceans is assessed.

These terms are defined in the following order of importance (starting from most important), as reflected in the multicriteria decision making:

Essential > Important > Preferred > Not essential

Question options which have had the *answer* set to 'essential' are therefore treated as more important than those set as important, preferred or not essential. Likewise, *answers* set as important, are treated as more important than those set as preferred or not essential, whilst setting to preferred means it is treated as more important than only those set as not essential. By default, answers are set initially as non-essential.

It is crucial to note that if an *answer* is set to 'essential', this is taken literally by the toolkit. As such, if a plastic pollution assessment methodology is characterized in the assessment framework as not meeting this option, it will be removed as a potentially suitable method and will not show in the results. Users should therefore only select essential when they wish that all methodologies that do not satisfy the option be excluded. In this sense, using essential as an answer acts as a hard filter to remove unsuitable results. If answering as 'essential' is overused by a user, there may be no methodologies that fully match the criteria and therefore the results display 'No methodologies match criteria'. In such cases, it is suggested users set some of their essential options to important or preferred. A warning message is provided to remind them of this consideration.

"Users should only select essential when they wish that all methodologies that do not satisfy the option be excluded."

High, Medium, Low

The high, medium, low *answers* are provided for question A5 - What level of resources can you commit towards applying the assessment methodology? This question has three possible options to input:

1. Resource availability for employing specialist expertise
2. Resource availability purchasing specialist equipment
3. The time available for the project

Each of these can be scored either High, Medium or Low according to the definitions shown in Table 5, or viewable in the text box at the bottom of the page when hovering over each option. As the resource required can vary greatly depending on the scope and scale of the project in question, we highly recommend users assess the suggested toolkits for all resource levels to avoid excluding methodologies that may be deemed suitable for their particular project scope.

"We highly recommend users assess the suggested toolkits for all resource levels to avoid excluding methodologies that may be deemed suitable for their particular project scope"

In addition to the above three *question options*, another input named the 'overall resource availability' is used to assess the suitability of methodologies. This input is automatically calculated from the above three *question options*, with the answer of high, medium and low reflecting the average score[1]. This therefore assumes that the overall resources available (which can be thought of as a proxy for the available budget) is dictated by the ability to purchase specialist expertise, specialist equipment and the time available for the project.

The automatic calculation of overall resource availability, rather than having this as a dedicated user input, is believed to be a fairer method to assess how well matched a user's resources are in meeting the resource requirements of different methodologies. This is due to the fact that the budgets required to run a methodology are likely to vary considerably even for the same methodology when applied at different scales, locations and with different scopes. As such, the automatic calculation of 'overall resource availability' does not require a definition with explicit monetary values. Instead it uses more easily quantifiable options of expertise, equipment and time to define the likely overall level of resources required. The definitions by which methodologies were scored high, medium and low for these three resource options is discussed in **Appendix 2**.

Table 5: Definition of 'high', 'medium' and 'low' answers for question A5 - Resources.

Resource type	High	Medium	Low
Specialist expertise	User provides project management only. Third parties (e.g. methodology developers) perform data collection and implementation of methodology	User performs data collection with support from third parties (e.g. methodology developers). Third parties support data collection and implements the methodology	User performs data collection and implementation of methodology with support from third parties (e.g. methodology developers).
Equipment	User has ability to purchase / hire specialized equipment (e.g. drones, specialist software etc.)	User has ability to purchase / hire semi-specialist equipment required (e.g. nets / trawls / boats etc.)	User does not have ability to hire specialist equipment
Time[1]	User has over 6 months duration OR over 6 person-months effort	User has from 2 – 6 months duration OR 2 to 6 person-months effort	User has less than 2 months duration OR less than 2 person-months effort
Overall resource availability (proxy for budget)	The 'overall resource availability' can be considered as a proxy for the budget required to implement the methodology. It is automatically calculated by averaging the total score for each of the above categories where high = 3, medium = 2, low = 1, before rounding to the nearest integer.		

1. The shortest option should be chosen here. For example, if a user can commit four people full-time for a month (4 person months effort), but require the results in less than two months, the low option should be selected.

[1] User inputs of high are allocated a score of 3, medium a score of 2 and low a score of 1. The average score from the three resource categories is calculated and rounded to the nearest integer. This is then displayed as high, medium or low for the 'overall resource availability' input according to the same scoring criteria.

Interpreting results

After a sufficient number of the inputs have been completed by the user the results will automatically update. If the user has not assessed all questions, a popup warning message will display to advise the user that the results are preliminary and that they should continue answering all relevant questions. Results are shown on the right-hand side of the main page and can be viewed in more detail by clicking the 'Compare (PDF)' button. A similar popup message is also displayed if the user clicks the 'Compare (PDF)' button prior to all questions being assessed.

1. Suggestion of what broad methodological approaches may be best suited based on a user's overall objectives, policies and generalised resources.

2. Suggestion of suitable plastic pollution assessment methodologies based on a user's specific needs.

Suitability of methodological approaches result

The top result relates to how suitable different methodological approaches are as informed by the high-level user inputs from Part A – policy-related objectives. In total four types of methodological approaches were identified as shown in **Table 1**. However, there is a large degree of overlap in these approaches, and as such, many of the models incorporate more than one of these approaches. In this sense, the results of this section only aim to give a broad overview of the type of approach that may be best suited.

Each of the methodological approaches are scored according to the user inputs provided and as described further in section 6 - 'How does PLAST work?". The scoring is displayed in the form of a bar chart (**Figure 3**) where the most suitable methodology has the largest bar. The relative suitability of the other assessments is then shown in comparison to this bar. If all the bars are similar in size, all methodological approaches are deemed equally suitable. **A bar spanning the full width does not signify that this approach is perfectly suitable, instead it signifies it has the best suitability.**

Figure 3: Example visualisation of the results for the most suitable methodological approach

Suitability of plastic pollution assessment methodologies result

The second result shown relates to how well the user's needs and resources match each individual plastic pollution assessment methodology. The top three ranked methodologies according to the multicriteria decision making algorithm are visualised as shown in Figure 4. The user can navigate between these top three results using the side arrows.

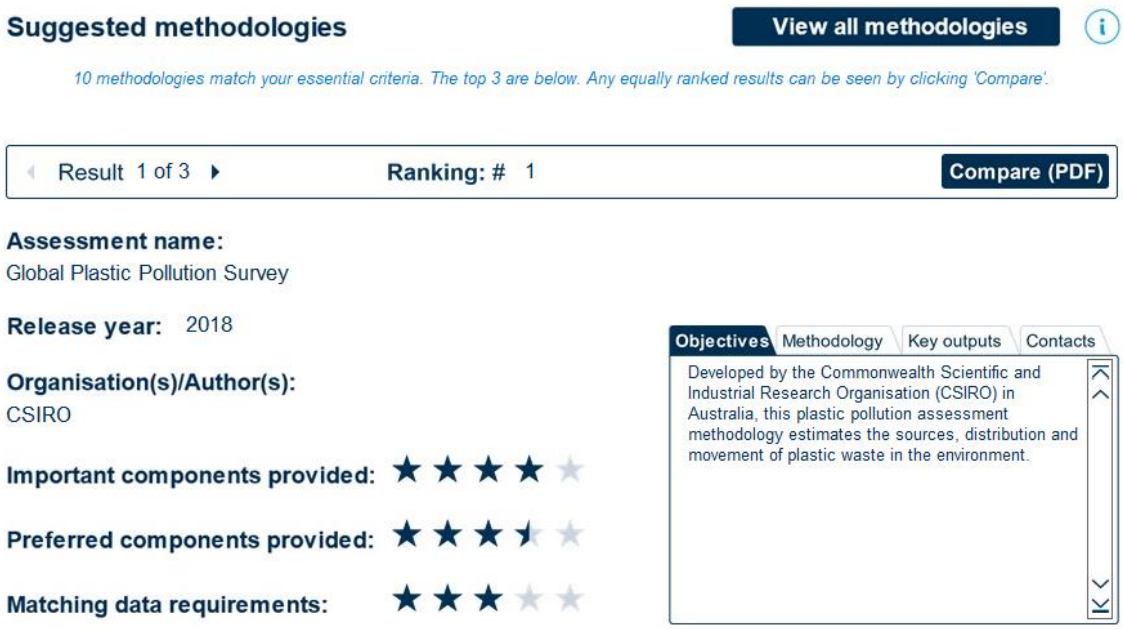


Figure 4: Example visualisation of the results for the most suitable plastic pollution assessment methodologies

The top three results are shown along with important information for each, navigable by clicking the tabs of the results box. Information shown includes:

- Assessment name
- Organization / authors (if publication)
- 5 star ratings on how well the methodology matches the inputs the user selected as 'important' or 'preferred' and the associated match with data requirements. Note, the assessments shown are ordered based off the 'important' star rating first, and then by the 'preferred' rating and eventually the 'data requirements' rating as explained in How does PLAST work?' section. As such, methodologies showing higher star ratings for the important or data requirements categories may show up lower overall due to them ranking lower in the important rating.
- A short description of the assessment methodologies objectives, methodology and key outputs.
- Contacts with hyperlink to developer's webpage or publication (if the hyperlink does not work, the URL can be found in the 'Assessment methodologies comparison page').

In addition, the results section also notes how many methodologies meet the essential criteria specified by the user. The ranking of the top 3 methodologies from 1 to 3 is shown. However, as it is possible for multiple methods to rank equally, particularly when only a few inputs have been specified by the user, the names of any methodologies that are equally ranked within the top three but not shown in the 'Suggested methodologies result' section, are instead listed on the 'Results comparison' page.

Importantly, it should be stressed that the suitability of each assessment methodology is determined only using the multicriteria decision making algorithm, as explained in the How does PLAST work?' section. No indication is given to the methodologies scientific rigour or accuracy of results. As such, the results presented here should be used as a guide only. Additionally, whilst the level of resources and data requirements are included as scoring criteria, it should be acknowledged that primary data collection is always encouraged and that the quality of the results will likely reflect the resources allocated.

"No indication is given to the methodologies scientific rigour or accuracy of results. As such, the results presented here should be used as a guide only"

A printable PDF of the top three ranked results can be viewed by clicking the 'Compare' button. **Note: please ensure all open PDF documents are closed prior to clicking this button**. In addition to showing a summary of each of the suggested plastic pollution assessment methodologies it also provides a visual comparison in the form of a radar diagram (**Figure 5**).

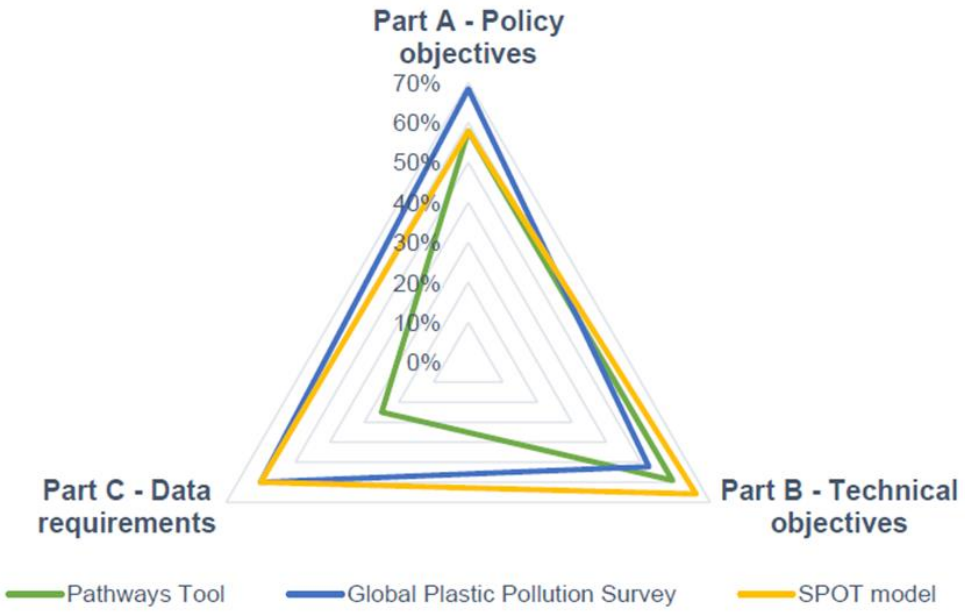


Figure 5: Radar diagram providing visual comparison of performance of the top 3 suitable assessment methodologies by each question set.

Comparing methodologies

A useful feature of PLAST is the ability for users to compare the different plastic pollution assessment methodologies at a high-level. Different potential examples of when this may be useful are as follows:

1. Users received the top 3 most suitable options from the toolkit but wish to understand what other assessment methodologies exist.
2. Developers may wish to compare methodologies and ascertain how their methods match up to others or provide scope for harmonisation.
3. Users received the top 3 most suitable options but PLAST could have specified equally suitable / alternate options that exist as explained above. The user may therefore want to understand the details of these methodologies.

For each of these cases, the user simply has to click the 'View all' button. This provides a database of all the available plastic pollution assessment methodologies and their key information. Methodologies can be navigated between by clicking the left and right arrow buttons (**Figure 6**). Assessment methodologies are ordered alphabetically.

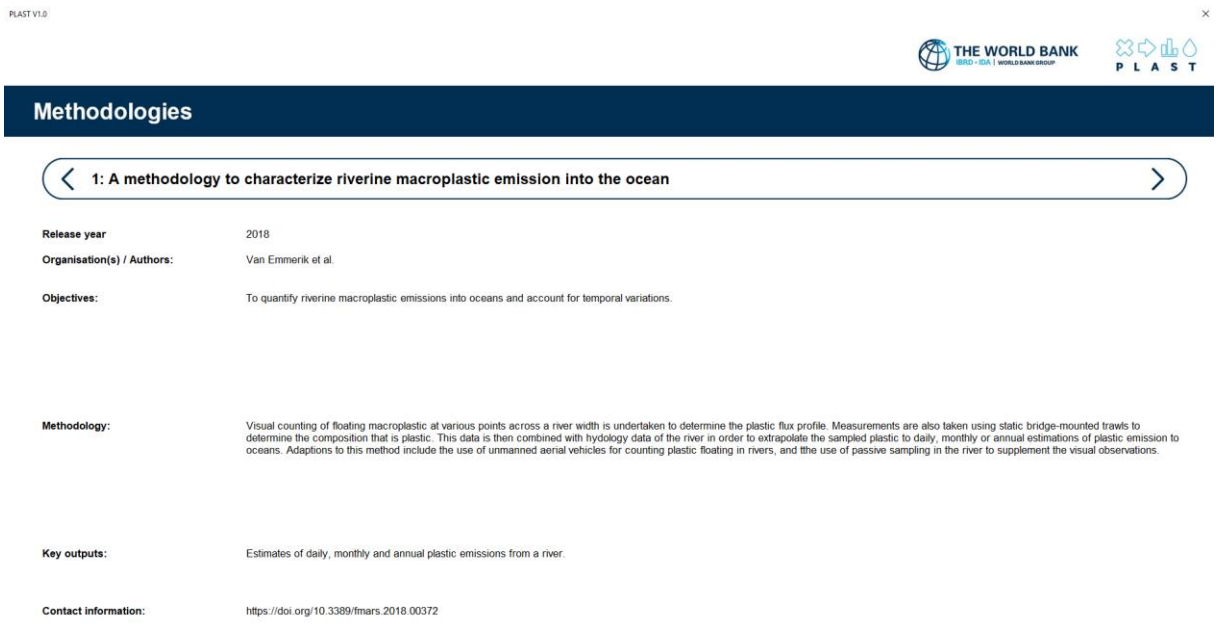


Figure 6: Assessment methodologies comparison page.

6. How does PLAST work?

PLAST works by initially categorising each plastic pollution assessment methodology by a framework, as seen in **Appendix 3**. This framework is designed to categorise each methodology by its important features such as scope, outputs and requirements. Users are then required to input their needs and available resources within the *question sets* of Part A - C, with these directly linked to the assessment framework categorisations. As users fill out their needs and objectives, the toolkit automatically scores and ranks the assessment methodologies and generalised methodological approaches against this criteria. The manner in which this scoring and ranking takes places is outlined below for both the 'suitability of methodological approaches' result and the 'suitability of plastic pollution assessment methodologies' result.

Scoring and ranking of methodological approaches

The scoring of the four methodological approaches is against only the high-level policy questions of Part A. The scores assigned for each question can be viewed in the scoring matrix of **Figure 7** below:

DEFAULT SCORES					
		METHODOLOGICAL APPROACHES			
POLICY OBJECTIVES		Transfer Coefficient	MFA	Statistical / Trend Analysis	Hydrological modelling
Stage	Developing strategies, policies and commitments Baselining Developing and implementing action plans Monitoring Benchmarking	Methodology dependent			
Scale	Global Regional (multiple countries) National Provincial Municipal Local	Methodology dependent			
Scope	Pre-leakage / upstream	1	3	1	1
	Point of plastic emission (sources)	3	3	2	1
	Plastic discharge to oceans (marine litter)	3	2	3	3
	State of the environment (accumulations)	1	2	3	2
Compartment	Land	3	3	2	2
	Riverine	2	2	2	3
	Coastal	1	1	3	3
	Marine	1	1	3	3
Resources available	High	1	3	2	3
	Medium	2	3	3	3
	Low	3	2	2	2

Figure 7: Default scoring matrix linking each methodological approach against each *question option*. Green cells (score of 3) relate to those where the approach is well suited. Yellow cells (score of 2) relate to those where the approach is somewhat suited, and red cells (score of 1) relate to those where the approach is poorly suited. Blue cells represent ones which can be equally covered by all methodologies and therefore are not scored.

The scoring works by taking the value shown in **Figure 7** for the option the user inputted and multiplying this by a weighting factor that depends on the level of importance the user specified. For example, if the user input that they want to assess the marine compartment as 'essential', this would take the default scores for each methodological approach and multiply them by a weighting of 5. Alternatively, if the user sets this option as 'important' the

weighting would be by a factor of 2, whilst setting it to 'preferred' would keep the default score the same. By default, question five on the resources available is treated as 'essential' therefore weighted by a factor of 5. For this, only the automatically calculated 'overall resource availability' option is used in determine the methodological approach, with the other resource options feeding into this calculation as explained previously.

The ranking process simply involves summing up the scores for each methodology, with the highest value assigned as the most suitable in the bar chart of the results section.

Scoring and ranking of plastic pollution assessment methodologies

The scoring and ranking of each plastic pollution assessment methodology against the users' needs and resources is conducted via 'Multicriteria Decision Analysis'. This involves matching the user input against the assessment framework categorisation so that if the methodology satisfies the user's input, a score of 1 is allocated. The exception to this is for the inputs of Part A, which due to them being targeted at high level decisions and objectives, are deemed more influential and therefore allocated a weighting factor of 2. For resource availability questions with inputs of 'high', 'medium' and 'low', a match is defined as one whereby the methodology requires equal to or less than the available resources as input by the user.

The ranking process acts in a stepwise manner where methodologies are first filtered out if they do not satisfy all of the 'essential' components specified by the user inputs. All remaining methodologies are then ranked according to the number of important components that they match. If two or more methodologies are ranked equally for the number of matching important components, the ranking process then goes to the next level and distinguishes methodologies based on the number of preferred components they match. Likewise, if two or more methodologies rank equally in terms of both important and preferred components, the ranking process then looks at the data requirements (Question C1). Lastly, if any methodologies still cannot be separated, ranking is performed in terms of alphabetical order. However, in this case, the results page signifies that other equally matching methodologies exist by showing an equal sign prior to the rank.

By default, the four resource inputs of question A5 are treated as 'important' with a score of 1 given if the users resources match that of the assessment methodology exactly, whereas a score of 0.5 is given is the user has more resources available than required by the assessment methodology. However, as the resource requirements are generalised and can vary greatly depending on the scope and scale of the project in question, we highly recommend users assess the suggested toolkits for all resource levels to avoid excluding methodologies that may be deemed suitable for their particular project scope.

7. Frequently asked questions

What is the aim of PLAST?
See the 'Aim' section

Who should use PLAST?
See the 'Who should use PLAST?' section.

What is meant by a methodological approach?
See the 'What is meant by a methodological approach?' section.

What is meant by a plastic pollution assessment methodology?
See the 'What is meant by a plastic pollution assessment methodology?' section

How does the toolkit work?
See the 'How does PLAST work?' section.

What if a question isn't relevant to me?
Users may skip any questions or *question options* that are not relevant to them, with all skipped questions not impact the scoring of methodologies. However, it is encouraged that users view each question in turn and decide if it is relevant to them rather than skipping to only the questions they consider relevant. This is to avoid users missing questions that may be relevant to them only once they have considered the possible *question options*. To assist in this, PLAST is designed to encourage users to check each question sequentially. Once a question has been viewed, users may return to that question at any point to change their answers.

What is meant by 'essential',' important', 'preferred' and 'not essential'?
The majority of *question options* have these terms as the possible answers for the user to select, particularly for those in Part B – Technical objectives. These terms are provided in order for the user to specify how important it is that the assessment methodology can satisfy each option, with the terms ranked in the following order of importance (starting from most important) in the multicriteria decision making:

Essential > Important > Preferred > Not essential

If a user selects 'Essential' as an answer, only assessment methodologies that include this feature will be suggested as possible suitable methodologies. 'Essential' thereby acts as a filter and should only be used when having that feature is vital. Answers of 'important' and 'preferred' do not act as a filter, but instead are used to rank how suitable the available assessment methodologies are. 'Important' has a higher weighting than 'preferred' and therefore allows the user to distinguish the relative importance of non-essential features. Lastly, if a user selects 'Not essential' (default option), then assessment methodologies will not be scored based on this question.

How do I save my answers and results?
Any changes to PLAST, such as viewing or answering questions, or the generation of results can be saved by clicking the cross in the top-right corner of the main page. A message will

appear asking users whether they wish to save their progress. Click yes to save. Alternatively, the results can be saved by saving the PDF of the 'Results comparison page'.

8. Troubleshooting

PLAST does not open / work

Please follow the instructions in Section 2: How to open and run PLAST. Ensure all open workbooks of Microsoft Excel are closed before opening PLAST.

The results say 'No methodologies match criteria'

This typically occurs when either too few questions have been answered to populate results, or too many 'essential' answers have been specified so that no methodologies match them all. Try reducing the number of 'essential' answers by converting any that are not completely essential to 'important'.

I do not understand the question / option?

Definitions of each question can be read by hovering over the question in the question ribbon, or by hovering over the ⓘ icon next to the question text. Definitions of each *question option* can be viewed by hovering over the relevant option text. It is recommended that if users do not understand a question, it is better to leave it as 'Non-essential' than to incorrectly answer the question. High-level users are recommended to complete Part A questions whereas more technical users should complete Part B and C.

Why do the same methodologies always appear?

This is typically because of two reasons:

1) When the user has provided only a few inputs the results will start to populate. However, as there are not many inputs to rank them by, many methodologies are likely to rank equally. In such cases, the toolkit is forced to assign the top 3 ranked methodologies by alphabetical order, meaning that the same methodologies often show up. It is suggested that users complete more of the questions to allow the decision making algorithms to better distinguish between the methodologies.

2) If the user has selected an answer as 'essential' that only a small number of methodologies satisfy, this will by default only include these methodologies in the results. Try reducing the number of 'essential' answers to allow more methodologies to be suitable.

The toolkit does not include a methodology

A comprehensive literature review was performed to ascertain all the available plastic pollution assessment methodologies that fit within the scope of those allowed. However, as this is a rapidly evolving field new methodologies may have been subsequently released or previous methodologies excluded. In such cases, please contact the development team with a request to add a new methodology.

I am unable to open the Compare (PDF) results.

The Compare (PDF) button only becomes active once sufficient answers have been input to show results. Please ensure all PDF documents are saved and closed before clicking the Compare (PDF) button.

9. Appendices

Appendix 1

Table 6: Questions asked in PLAST to understand a user's needs and resources in applying a plastic pollution assessment. These are distributed between three question sets (Part A, B, C).

Question set	Question topic	Description
Part A	Objectives	The stage of the objective relates to how progressed the user is in regards to planning mitigation of plastic pollution. Generally, users may aim to baseline their plastic pollution first, followed by identifying interventions (action plans) to address it, with subsequent monitoring allowing the impact of these interventions to be quantified and progress towards targets tracked. Lastly, users may also require benchmarking their performance against others to reassess overall objectives. These stages may be conducted simultaneously therefore users can specify more than one objective stage.
	Assessment scale	The assessment scale relates to the geographic area across which the plastic assessment methodology can be practically applied within a single project. Multiple assessment scales can be selected by a user.
	Assessment scope	The assessment scope relates to the aspect of plastic pollution that the user is most interested in understanding. For example, users may be interested in the understanding the generation of plastic waste and how it is managed prior to its release into the environment, or users may want to quantify the sources (ways by which the plastic is leaked to the environment). Alternatively, users may be interested in understanding where and when plastic waste enters the marine environment, or how polluted the environment is. Multiple scopes can be selected by a user.
	Environmental compartments	The environmental compartment relates to the part of the environment where the user is most interested in understanding the sources, flows or concentrations of plastic pollution. This is typically the environmental compartment in which the method is applied. Users can select multiple environmental compartments of interest.
	Resources	The level of resources relates to the resources available to both collect data and implement the methodology, categorized by the required expertise, equipment and time. The average combination of these dictates the overall budget requirements.

		Although it can be tempting to limit results to methodologies requiring the lowest resources, it should be noted that the quality of outputs are often related to the resources applied. Similarly, the actual level of resource required often depends on the overall scope of the project, and scorings applied in the framework are suggestions only. If in doubt, we recommend leaving this question blank.
Part B	Spatial resolution	The spatial resolution is the geographical scale at which the outputs are reported; this differs from the 'assessment scale' which is the geographical scale at which the method is applied. For example, if applying a methodology at the national scale, but where results are wanted to inform cities, the 'assessment scale' should be set as 'national' and the spatial resolution set to 'municipal'.
	Temporal resolution	The temporal resolution relates to the time-scales over which the plastic pollution assessment methodology informs. If a methodology informs on a daily basis for a year, then both of these timescales and all in between are informed by the methodology.
	Sector resolution	The economic / industrial sector resolution relates to whether outputs are reported by economic sectors (e.g. fishing, retail etc.) and companies.
	Waste management resolution	The waste management activity output resolution relates to the waste management activities for which outputs are reported on.
	Material resolution	The material / item resolution relates to the granularity at which plastic is assessed. This may be at overall plastic material-level, by polymers, items, or brands
	Quantification unit	The quantification unit relates to whether the assessment methodology has outputs by count or by mass.
	Desired functions	The format and functionality of outputs relates to the manner in which the outputs are presented or what functions they can perform
	Interventions	Prioritization of interventions relates to whether useful information is gained by the methodology that would allow users to rank the importance of interventions in mitigating plastic pollution based on their cost or expected impact.
Part C	Collecting data	The data availability relates to the general data that may be required to feed into plastic pollution assessment methodologies, broken down by common categories.
	Proxy / default data	Proxy / default data relates to the ability of the methodology to substitute missing data with a generic value. Although accuracy may be comprised, this can assist in simplifying data collection if large data gaps exist.

Appendix 2

Table 7: Criteria for scoring methodologies resource requirements

Resource type	High	Medium	Low
Specialist expertise	Methodology typically requires data collection and implementation of the methodology to be done by the methodology developers.	Data collection can be undertaken by the user with guidance from methodology developers, however, the implementation of the methodology is typically undertaken by the methodology developers.	The user is able to perform data collection and implementation of methodology with only limited support from the methodology developers.
Equipment	Specialised equipment essential (e.g. specialist software, drones, modelling code etc.)	Semi-specialist equipment required (e.g. nets / trawls / boats etc.)	No specialist equipment required
Time	Typical assessment[1] requires over 6 months duration OR over 6 person-months effort	Typical assessment[1] requires from 2 – 6 months duration OR 2 to 6 person-months effort	Typical assessment[1] requires less than 2 months duration OR less than 2 person-months effort
Overall resource availability (proxy for budget)	The 'overall resource intensity' can be considered as a proxy for the budget required to implement the methodology. It is automatically calculated by averaging the total score for each of the above categories where high = 3, medium = 2, low = 1, before rounding to the nearest integer.		

1. Typical assessment refers to the most common scale and scope for each assessment methodology (e.g. city level, country level etc.). As this differs depending on the specific ambitions of the project this aims to provide only a generalised overview.

Appendix 3

The framework shown in **Table 8** is an outline of that used to categorize methodologies by objectives, functionality, outputs and requirements.

Table 8: Framework to categorise assessment methodologies. The primary and secondary category columns represent the framework categorisation, whilst type column shows the available options that may be specified.

Framework	Primary category	Primary category definition	Secondary category	Secondary category definition	Unit
Assessment details and contact information framework	**Assessment details**	Key information relating to assessment name and organisation	**Assessment name**	Name of the plastic pollution assessment methodology or title of paper/report if no official name given.	*Text*
			Organization(s) / Author(s)	Name of organization(s) or authors for academic papers	*Text*
			URL (if available)	Website address of plastic pollution assessment methodology	*URL*
			Objectives	Objectives	*Text*
			Methodology	Methodology	*Text*
			Key outputs	Key outputs	*Text*
			Year released	Year of initial release	*Year*
Policy objectives	**Stage of objective**	The stage of the objective relates to how progressed the user is in regards to planning on how to mitigate plastic pollution. The framework informs on whether the assessment methodology can help the user meet this stage of their objective.	**Can be used for baselining**	Initial quantification of plastic pollution to identify areas to focus and establish a reference	*Y,N*
			Provides details of interventions necessary to implement action plans	Identification of interventions to apply within action plans to mitigate plastic pollution	*Y,N*
			Can be used for monitoring	Regular quantification of plastic pollution to assess effectiveness of interventions and track progress towards goals and commitments	*Y,N*
			Can be used for benchmarking	Periodic quantification of plastic pollution to compare against other	*Y,N*

			locations and reassess overall strategies	
Assessment scale	The assessment scale relates to the geographic area across which the plastic assessment methodology can be practically applied within a single project. Multiple assessment scales can be selected by a user.	**Global**	Can be applied worldwide	*Y,N*
		Regional (multiple countries)	Can be applied across multiple countries or continents	*Y,N*
		National	Can be applied at a national (country) scale	*Y,N*
		Provincial	Can be applied to a province, county or state	*Y,N*
		Municipal	Can be applied to a municipality or local authority	*Y,N*
		Sub-municipal (local)	Can be applied to a local area smaller than a municipality e.g. a neighbourhood.	*Y,N*
Assessment scope	The assessment scope relates to the aspect of plastic pollution that the user is most interested in understanding.	**Pre-leakage / upstream**	Plastic prior to its emission into the environment, e.g. production, imports / exports, waste generation, recycling, waste management.	*Y,N*
		Point of uncontrolled release into environment (sources)	Plastic at the point of its uncontrolled release (leakage) into the environment. This may be to all environmental compartments, not just marine e.g. littering on land.	*Y,N*
		Plastic discharge to oceans (marine litter)	Flux (e.g. rates) of plastic entering the oceans and becoming marine litter, typically via rivers.	*Y,N*
		State of the environment (accumulations)	Stock (e.g. concentration) of plastic which has accumulated in the environment over time	*Y,N*
Environmental compartment	The environmental compartment relates to the part of the environment where the user is most interested in understanding the sources, flows or concentrations of	**Land**	Terrestrial environment including non-perennial drains (e.g. those not permanently filled with water).	*Y,N*
		Riverine	Rivers, lakes and perennial drains (e.g. permanently filled with water).	*Y,N*
		Coastal	Interface between land and sea (e.g. beaches).	*Y,N*
		Marine	Oceans and seas.	*Y,N*

		plastic pollution. This is typically the environmental compartment in which the method is applied. Users can select multiple environmental compartments of interest.			
	Resource availability	Resources to both collect data and implement methodology, categorised by the required expertise, equipment and time. The average combination of these dictates the overall budget requirements	**Specialist expertise**	Level of expertise required (e.g. level of support required from third parties) **High** = Methodology typically requires data collection and implementation of the methodology to be done by the methodology developers. **Medium** = Data collection can be undertaken by the user with guidance from methodology developers, however, the implementation of the methodology is typically undertaken by the methodology developers. **Low** = The user is able to perform data collection and implementation of methodology with only limited support from the methodology developers.	*High, Medium, Low*
			Logistics / equipment required	Level of logistics and equipment required (e.g. specialist software or equipment) **High** = Specialised equipment essential (e.g. specialist software, drones, modelling code etc.) **Medium** = Semi-specialist equipment required (e.g. nets / trawls / boats etc.) **Low** = No specialist equipment required	*High, Medium, Low*

			Time required	Estimated time required for both data collection and implementation of the methodology **High** = Typical assessment requires over 6 months duration OR over 6 person-months effort **Medium** = Typical assessment requires from 2 – 6 months duration OR 2 to 6 person-months effort **Low** = Typical assessment requires less than 2 months duration OR less than 2 person-months effort	*High, Medium, Low*
			Calculated overall resource availability (proxy for budget)	The 'overall resource intensity' can be considered as a proxy for the budget required to implement the methodology. It is automatically calculated by averaging the total score for each of the above categories where high = 3, medium = 2, low = 1, before rounding to the nearest integer.	*High, Medium, Low*
Technical objectives	**Spatial resolution of outputs**	The spatial resolution is the geographical scale at which the outputs are reported; this differs from the 'assessment scale' which is the geographical scale at which the method is applied. For example, if applying a methodology at the national scale, but where results are	**Global**	Outputs reported at a global level	*Y,N*
			Regional (multiple countries)	Outputs reported across multiple countries or continents	*Y,N*
			National (federal)	Outputs reported at a national (country) level	*Y,N*
			Provincial (state)	Outputs reported at a provincial, county or state level	*Y,N*
			Municipal	Outputs reported at the municipal or local authority level	*Y,N*
			Sub-municipal (local)	Outputs reported at a local level smaller than that of the municipality	*Y,N*
			Urban	Outputs reported on areas with high population densities such as towns and cities.	*Y,N*

		wanted to inform cities, the 'assessment scale' should be set as 'national' and the spatial resolution set to 'municipal'.	**Rural**	Outputs reported on areas with low population densities outside of towns and cities	*Y,N*
			Catchment / Basin	Outputs reported at a river basin level (e.g. the area whereby precipitation drains to a common outlet)	*Y,N*
			River compartments	Outputs reported on specific parts of a river (e.g. banks, surface etc.)	*Y,N*
			Estuarine	Outputs reported on the area when freshwater meets the ocean	*Y,N*
			Beach	Outputs reported on the narrow strip of sand, pebbles or rocks that separates the land from the ocean.	*Y,N*
			Coastline	Outputs reported on the area where land meets the sea	*Y,N*
			Sea / Ocean	Outputs reported on the oceans or seas	*Y,N*
	Temporal resolution of outputs	The temporal resolution relates to the time-scales over which the plastic pollution assessment methodology informs. If a methodology informs on a daily basis for a year, then both of these timescales and all in between are informed by the methodology.	**Annual**	Outputs inform on a yearly timescale	*Y,N*
			Seasonal	Outputs inform on a seasonal timescale (e.g. spring, summer, autumn, winter; or wet season, dry season)	*Y,N*
			Monthly	Outputs inform on a monthly timescale	*Y,N*
			Daily	Outputs inform on a daily timescale	*Y,N*
			Sub-daily	Outputs inform on a timescale less than a day (e.g. hourly)	*Y,N*
	Economic / industrial sector resolution	The economic / industrial sector resolution relates to whether outputs are reported in relation to	**Economic sectors (e.g. tourism, fisheries, retail)**	Outputs inform on different economic activities (e.g. fishing, retail etc.). See the International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4 for a full list of economic sectors	*Y,N*

	economic sectors and companies	**Companies**	Outputs inform on a commercial business	*Y,N*
Waste management activity output resolution	The waste management activity output resolution relates to the waste management activities for which outputs are reported on.	**Waste generation**	Outputs inform on waste generation	*Y,N*
		Waste collection (formal)	Outputs inform on formal waste collection	*Y,N*
		Waste collection (informal)	Outputs inform on informal waste collection	*Y,N*
		Sorting for reprocessing	Outputs inform on waste sorting for reprocessing	*Y,N*
		Reprocessing	Outputs inform on waste reprocessing (recycling)	*Y,N*
		Disposal	Outputs inform on disposal	*Y,N*
		Littering / illegal dumping	Outputs inform on littering or illegal dumping	*Y,N*
		Open Burning	Outputs inform on open burning of waste	*Y,N*
Material resolution of outputs	The material / item resolution relates to the granularity at which plastic is assessed. This may be at overall plastic level, by polymers, items, or brands	**Plastic material-level**	Outputs are related to all plastic materials (e.g. plastic)	*Y,N*
		Polymer-level	Outputs are related to plastic polymers (e.g. PET, PP)	*Y,N*
		Item-level	Outputs related to specific plastic objects (e.g. drink bottle, plastic bag). This differs from a plastic product as it does specify the brand / company.	*Y,N*
		Brand-level	Outputs related to specific company brands of plastic items	*Y,N*
		Microplastics	Outputs are related to microplastics as well as macroplastics	*Y,N*
Unit of quantification	The quantification unit relates to whether the assessment methodology has outputs by count or by mass.	**Quantifies by mass**	Outputs are given by mass (e.g. kg, tonnes)	*Y,N*
		Quantifies by count	Outputs are given by count (e.g. number of items)	*Y,N*
Format of outputs and	The format and functionality of outputs	**Includes uncertainty**	Outputs are presented with a degree of certainty	*Y,N*

	model functionality	relates to the manner in which the outputs are presented or what functions they can perform	**GIS / maps**	Outputs can be shown in GIS interfaces or as maps	*Y,N*
			Outputs aligned with SDG sub-indicators	Outputs are aligned to report on the Sustainable Development Goal (SDG) sub-indicators.	*Y,N*
			Scenarios / forecasts	Ability to run scenarios to predict how interventions may impact plastic pollution or project outputs into the future	*Y,N*
			Wedges approach	Illustrates how interventions can be combined to meet targets	*Y,N*
	Outputs prioritize interventions	Interventions to mitigate plastic pollution are prioritized in order of importance based on their cost or expected impact.	**Prioritises interventions based on estimated cost**	Interventions are prioritized based on their estimated cost to achieve a desired impact	*Y,N*
			Prioritizes policy interventions by impact	Policy interventions (e.g. bans) are prioritized based on their estimated impact	*Y,N*
			Prioritizes engineering / service interventions by impact	Engineering and service interventions (e.g. improving infrastructure) are prioritized based on their estimated impact	*Y,N*
Available resources	**Data requirements**	The data requirements relates to the general data that may be required to feed into plastic pollution assessment methodologies, broken down by common categories.	**Plastic production / consumption data**	Data on the amounts of plastic produced or sold	*Y,N*
			Waste generation data	Data on the amounts of plastic which becomes waste	*Y,N*
			Waste composition	Data on what material fractions make up the waste	*Y,N*
			Plastic waste composition (polymers)	Data on what polymers make up the plastic waste	*Y,N*
			Plastic waste composition (items)	Data on what items make up the plastic waste (e.g. bags, bottles etc.)	*Y,N*
			Plastic waste composition (brands)	Data on what company branded items make up the plastic waste	*Y,N*
			Solid waste management data (e.g. collection, disposal)	Data on how solid waste is managed	*Y,N*

			Survey / clean up data	Data from clean up campaigns and environmental surveys	*Y,N*
			Hydrological data	Data on hydrological aspects such as precipitation	*Y,N*
			Remote sensing data	Data via satellite, aircraft, drones or cameras	*Y,N*
			Socioeconomic data	Data on the social and economic characteristics of the area	*Y,N*
			GIS data	Spatial data	*Y,N*
	Ability to use proxy / default data / secondary data sources	Ability to use default values or more readily accessible data to estimate required input data	**NA**		*Y.N, Some inputs or regions*