Individual Tree Data Standard Consultation: Phase 2

Working Together for Trees: A New Standard for Individual Tree Data Collection - 2nd Phase consultation

The Individual Tree Data Standard

The Individual Tree Data Standard (ITDS) was developed to establish common-practice principles for data collection that underpin the way that data on individual trees are collected. The project began in 2018. The ITDS was developed using two workshops - with representatives from government agencies, research institutions, software developers/ data management systems, tree officer associations, arboricultural consultants and charities - as well as a number of one-to-one consultations. In November 2019, the whole sector was invited to feedback on the draft standard in a public consultation that closed in February 2020. Seventy organisations/ individuals responded to the consultation with representation from across the sector and across all four nations of the UK.
The public consultation recommended several adjustments to the ITDS. This 2nd round of consultation is designed to show how we have implemented those adjustments and to give stakeholders a chance to respond to our changes. The following text describes the common themes to emerge from the consultation and then how to participate in the next round of consultation. It is not expected that there will be another round of consultation. We aim to publish the standard in 2021.

Key themes from the public consultation

The following key points and responses emerged from the public consultation:

- The standard provides a common language for individual tree description. It defines the format in which the data should be stored.
- The standard needs to provide a clear explanation of each variable and why it has been selected.
- The standard should align with BS5837 where possible.
- Surveyors should be encouraged to measure trees where possible, rather than estimate values.
- Remove the option to use ranges and allow surveyors to estimate variables if it is not possible to measure directly.
- Not every variable needs to be collected in all use cases. 5 variables are included in the 'minimum' data that should be collected by all, the remainder are optional with some being 'highly recommended'.
- The standard is designed for all users, not only for citizen science activities.

How do I participate in the 2nd round of the consultation?

Each element of the draft Individual Tree Data Standard is presented below followed by text boxes in which you can enter your response to the inclusion and justification of each data field, you do not need to comment on every data field. Once you have finished please hit the 'Submit' button at the bottom of the page. Please note there is no option to draft your response and then return to it later, in which case we'd recommend drafting your responses in a separate document and then copying them across once you're ready to submit. You can download a .pdf version of the draft tree data standard below.

Draft Individual Tree Data Standard

The consultation period will close at **5pm on Friday 13th November 2020**.

Confidentiality and data protection

- A summary of responses to this consultation will be published on the Forest Research and Treezilla websites and will be disseminated via social media. An annex to the consultation summary will list all organisations that responded but will not include personal names, addresses or other contact details.
- We may publish the content of the responses to this consultation to make them available to the public without your personal name and private contact details (e.g. address, email address, etc).
- There may be occasions when we (the Open University, Forest Research, TreeWork Environmental Practice and Natural Apptitude) will share the information you provide in response to the consultation, including any personal data with external analysts. This is for the purposes of consultation response analysis and provision of a report of the summary of responses only, and will at all times be compliant with GDPR regulations.
- If you have any comments or complaints about the consultation process, please address them to: treezilla@open.ac.uk

Please select the following in order to demonstrate acceptance of the conditions outlined above and to take part in the consultation:

I understand the purpose of this study as explained here and in the information sheet and how data from this survey will be used ☐ I voluntarily agree to participate in this study ☐ I agree to my quotes/ opinions from this survey being used (anonymously) to inform the development of the data standard ☐

Participating in this consultation is your choice and voluntary. You are free to withdraw from the project and request the destruction of information you have provided (no later than the ******** 2020). To withdraw your information, please contact treezilla@open.ac.uk.

About You

Your name
☐ Email address
☐ Organisation and job title (if you're replying as an individual, please type 'Individual'):
☐ I would like to be contacted with future updates on the data standard. You may unsubscribe at any time from receiving updates by emailing treezilla@open.ac.uk ☐

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The Individual Tree Data Standard

Summary of the Data Fields

Click here to see a summary table of the data standard data fields

For each data field, the following information will be presented. Please read it before considering your response.

Description
A description of the variable being collected
• What is being collected?
• How it should be collected?
• Why it should be collected?
~~~~~~

Rationale
Description of why the variable should be included in the standard
• Why should the variable be collected?
• Why use the proposed format
• Results from previous user surveys
• Use in existing tools, methods, protocols, etc

The Description and Rationale fields cross-cut. Information will be included here if it will only be used to support the variable's inclusion in the standard and will not be part of the final standard.
This will not be part of the final standard

Consultation comments
Brief summary of the comments received in the previous standard consultation
Not all comments will be included
Common themes and key points identified
Purpose is to explain why there have been changes from the previous consultation
This will not be part of the final standard

For each data field please indicate your response by selecting one of the following options from the dropdown list.

Fine Happy with the variable as presented in the standard.
No need to add comments

Minor change Agree that the category is required, however would like slight change to wording or sub-classes

Major change Agree that the category is required, however significant changes to sub-classes, proposed variables and/or format are required

Remove Fundamentally disagree with collecting this category

N/A Not applicable to me/my role/my proposed use of the Standard
No need to add comments

Data fields

Tree ID [Minimum data]

Description
Unique identifier assigned to each tree in the database. The identifier belongs to the tree and should not be changed between surveys.
The Tree ID must be unique. The Tree ID can be a simple sequential number or a composite of other information. The format should be dictated by the organisation's requirements. For example, in crowd-sourced datasets it can be combined with Organization ID to make the identifier unique. Possible formats for tree ID:[Area=London{1};Site=Richmond Park{33};Tree number=623] are: Sequential number{623}, Composite text{London-Richmond Park-623}, Composite number{1-33-623}, Complex number{001033000623}

Type: Text

Rationale
• An ID which uniquely identifies every tree in the database.
• Shorthand to allowing easy retrieval of the tree record.
• Allows changes to the tree to be tracked and records to be updated
• Text format suggested so that different systems can be combined which may not use alphanumeric.
• Inclusion of an Organization ID in the Tree ID ensures Tree IDs remain unique if databases are combined.

• 81% of respondents already record this variable, according to the pre consultation questionnaire
• Matched to a field in 43% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Give examples of recommended format

Response:

Comments

Tree location Coordinates [Minimum data]

Description
GIS geopoint variable describing the location of the tree. The geopoint should be defined as latitude and longitude in the European Terrestrial Reference System 1989 ETRS89 (EPSG::4258).

Type: Geopoint

Units: metres

Precision: Min 5dp

Rationale
• Allows individuals to find the tree to undertake maintenance work or to complete a repeat/follow-up survey.
• Allows visualisation of trees using GIS and to conduct further spatial analysis.
• Specific location is also needed for reusing of data e.g. ground truthing for remote sensing.
• ETRS89 adjusts for tectonic drift; therefore the coordinates will return the surveyor to the same location even in 40 years when the location would have drifted in other reference systems.
• Complies with INSPIRE: data sets covering European locations should use ETRS89
• 100% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 47% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Change name to remove ambiguity
• More specification in formatting

Response:

Comments

Data collection date [Minimum data]

Description
Date on which the data was collected in the ISO8601 format (YYYY-MM-DD). The collection date will be updated on each re-survey.

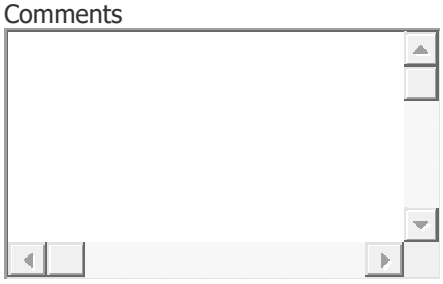
Type: Date

Precision: 1 day

Rationale
• Allows users to see if the information is out of date, and to track trees which may have been removed
• Allows users to track tree change over time
• Needed for comparisons of this data with remotely sensed data
• Matched to a field in 20% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• More specification in formatting

Comments



Tree species name [Minimum data]

Description
The tree identified at least to genus and preferably to species level, with cultivar/variety if known. All entries should be from the BSBI species list. Trees which cannot be identified at the Genus level and trees missing from the species list should be recorded as "Unknown". Using a common list allows users to enter the data as Scientific, Common name or code which can be easily interpreted by the database and data re-used. Scientific name is recommended.

Type: List

Options: BSBI species list

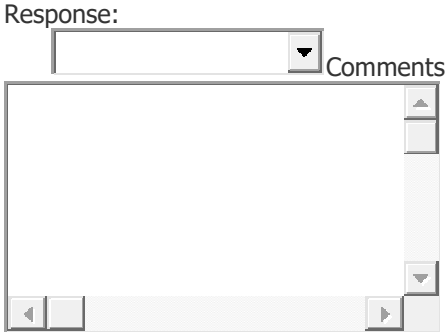
Rationale
• Species name is key information for understanding the tree and any data associated with it.
• Need to have a single link between the database and tree species name table.
• Input into the database should be by scientific name, which is more standardised and less commonly duplicated than common names.
• However, in most systems, user should be able to swap seamlessly between: Scientific name, Common name and synonyms.
• 100% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 73% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

BSBI species list was chosen as the best fit for the following criteria:
1. Available electronically/digitised version
2. Includes most species and almost all UK ornamental species
3. Independently managed and kept up-to-date
4. Widely adopted/ accepted by tree community

5. Contains the following information [Minimum]: Scientific species name; Common species names; Genus
6. Provision of change management process e.g. change of taxonomy

Feedback from the consultation
• Clearer explanation of why we chose BSBI
• Prevent entry of cultivars

Response:



Stem Diameter 1 [Minimum data] ; Stem diameter 2-6 [Highly recommended data]

Description
Diameter of the tree's [2nd, 3rd, 4th, 5th,6th] largest stem measured at 1.5m height. On multi-stemmed trees up to six stems can be recorded; stems should be recorded in size order, starting with the largest. On resurvey the data for all six of the largest stems should be re-entered in size order, starting with the largest stem. Stem diameter should be rounded down to the nearest whole centimetre. Where possible stems should be measured directly rather than estimated. However, where Stem Diameter must be estimated, users should use a combination of direct measurement and estimates of diameter throughout the survey process to calibrate estimates and ensure a higher level of accuracy.

Type: Integer

Units: cm

Rationale
• Key metric for describing size of the tree
• Relatively easy to measure.
• Basis for many tools and methods
• 1.5m is chosen over 1.3m because this is generally standard in arb (e.g. BS5837), in forestry 1.3m is normally used. The 20 cm difference would not normally make a significance difference in the stem diameter measured unless the tree is immature, of a smaller diameter, or abnormal trunk growth, e.g. swelling. Protocols exist to mitigate these issues in most tree survey methodologies e.g. measuring above and below a swelling, at points equidistant from the standard measurement height.
• Most users will not be able to accurately capture information at the sub-centimetre level. Power users will have skills/tools to capture to the 0.1 cm precision.
• Trees may have multiple stems, we limit to the 6 largest stems in order to maximise data capture whilst not breaking DB integrity
• 6 stems allow entry for most tools and methods (e.g. BS5837=5 stems, i-Tree Eco=6 stems)
• Some stems may be excluded but they are unlikely to be significant in describing the overall size of the tree.
• Starting with the largest stem is not essential, merely a practical way to make sure the 6 largest stems are measured.
• Whilst it is probably that the relative size difference between stems will persist between surveys (i.e. The largest stem in the first survey will be the largest stem in the next survey), this cannot be assumed.
• 81% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 83% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Align with BS5837
• Remove bandings
• Do we need 6 stems?
• Measure in mm?

Response:

Comments

Organization ID [Highly recommended data]

Description
Unique identifier which signifies the organisation collecting [or holding] the data. It is expected that this identifier will not change between tree surveys. The ID needs to be both unique for each organisation and resolvable to full details about the organisation or individual it represents.
Not essential for data held by a single organisation; highly advisable where there is an intention to share the database outside of the organisation. Essential for crowd sourced datasets. Allows data consumers to contact the tree owner/manager to get access or ask follow-up questions; this may have to be achieved through the data holder in the first instance. A useful Rule of thumb: use an Organisation ID if more than one tree has the same Tree ID within the database.

Type: Text

Rationale
• Allows tracking and updating of tree data from different organisations.
• Can be used in conjunction with Tree ID to identify a tree for further investigation or to update on resurvey
• Text format suggested so that different systems can be incorporated and to allow meaningful names to be used.
• Could be randomly assigned based on username
• 42% of respondents already record this variable, according to the pre consultation questionnaire
• Matched to a field in 17% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Change name to prevent ambiguity
• Owner ID variable removed and separated into Organization ID and Surveyor ID to reflect comments

Response:

Comments

Tree Tag [Highly recommended data]

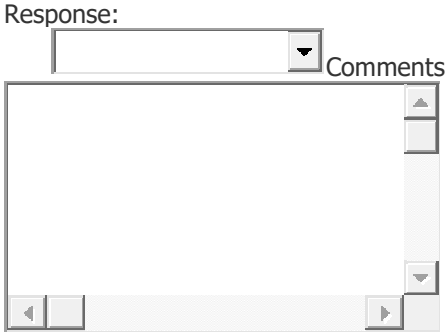
Description
Include tree tag number where added or already present on the tree. Should be captured exactly as recorded. Ideally the tree tag number would be a sequential number linked to the Tree ID; in reality this will be difficult to maintain when recording for a large number of trees. If multiple tags are present on the tree separate using a ; e.g. "0010; 15; T21"

Type: Text

Rationale
• Commonly used in many surveys
• Useful for identifying an individual tree, especially where there are multiple trees at a location

Feedback from the consultation
• Suggested by respondents in the consultation as a way to stop "double counting" through re-surveys and integration of data from different surveys

Response:



Surveyor ID [Highly recommended data]

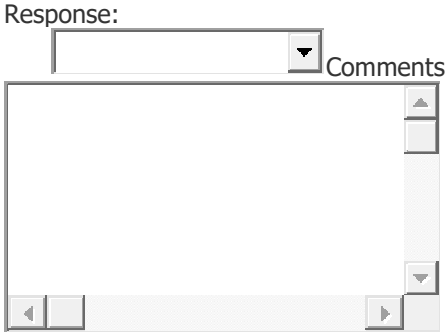
Description
Unique identifier signifying the individual who most recently updated the data. This will be updated at each survey. In recording this information GDPR rules should be observed i.e. using an unique code instead of surveyor name so that it does not identify an individual where the data is available publicly.
Keeping this data allows you to identify the surveyor increasing accountability and improving data quality i.e. it allows contact with the surveyor if an issue is identified e.g. pest or disease. Without this information it is not possible to effectively manage your data. This information should still be collected if the organisation consists of a single individual as the organisation will evolve overtime adding and changing personnel.

Type: Text

Rationale
• Creates provenance for the tree data
• Allows follow-up questions after survey of the tree
• Helps with Quality Control

Feedback from the consultation
• Owner ID variable removed and separated into Organization ID and Surveyor ID to reflect comments

Response:



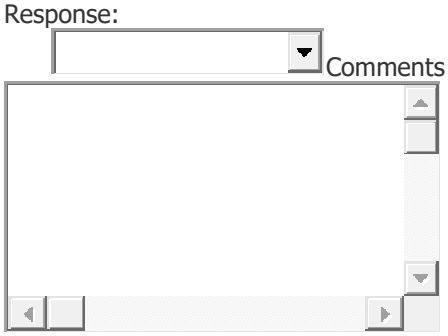
Description of tree location [Highly recommended data]

Description
Free text field [Optional]. Purpose is to allow surveyors to capture additional information required to find the tree. Surveyors may need to enter a range of information preventing defining the the format of the field. Examples of use might include storing additional location information like post code, what3words, street name, identifying a specific tree within a group of trees or where the tree location might be hidden e.g. tree is in passageway between house number 45 & 47.

Type: Text

Rationale
• Commonly used in many surveys
• Tree location coordinates may not always be enough to identify a tree e.g. where an electronic map is not part of the system, GPS signal is unreliable, or the tree exists amongst other trees.
• Free text field allows different methods to be used
• 0% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 37% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review.

Response:



Comments [Highly recommended data]

Description
Any information considered relevant to the specific tree. Free text field [Optional].

Type: Text

Rationale
• Allow users to capture any information useful or interesting to them but not included in other data fields.
• Free text field to allow different formats to be incorporated
• Needed as a catchall in case project priorities/needs change faster than the database can be updated.
• Using formatting allows easy searching for information e.g. #Strimmer Damage: Severe; with potential to extracted into a new field

Response:

Comments

Total tree height [Recommended data]

Description
Vertical distance from the ground to the tip of the tree. (For trees without a clearly defined tip, measurement should be to a point that is vertically above the ground-level centre of the stem (i.e. vertically above the tree end of the baseline) and that equals the maximum height of the crown, as best can be judged). Where tools and experience allow total tree height should be collected to nearest 0.1m, otherwise total tree height should be rounded to the nearest whole metre. The total height should include any dieback at the tip (this distinguishes the measurement from height to top of crown). Total height should be measured where possible from a distance of at least one tree length away from the tree.

Type: Double

Units: metres

Precision: up to 1 decimal place, i.e. 10cm

Rationale
• Key metric for describing size of the tree
• Basis for many tools and methods.
• Most users will not be able to accurately capture information at the sub-metre level.
• Power users will have skills/tools to capture sub metre accuracy; most users should capture to a metre or 0.5 metre accuracy.
• 72% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 60% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Align with BS5837
• Scrap bandings
• Should all height measurements be treated as estimates?

Response:

Comments

Photograph of tree [Recommended data]

Description
Clear photograph(s) of the tree to help with species identification, finding the tree in the landscape and to track change over time. Photograph should centred on the tree, zoomed in as close as possible while still showing the whole tree, sharp/focused and clear of fingers. Where possible an object of known size should be included to give scale e.g. building, car, person
Photographs are highly recommended for citizen science projects where further validation may be required. Photographs are also useful in locating trees on resurvey.
Picture name should link back to tree and variable without need for additional information. Name needs link to TreeID [and Organisational ID], Date uploaded/taken and Number in sequence i.e. first picture of the tree = 1. For example: Picture of tree added for the 1st time [ID=13] taken 08June2020 = 000013_Tree_08062020_1 Picture of leaf [ID-1071], 3rd time a leaf picture has been taken (3rd resurvey) on the 05May2020 = 001071_Leaf_08052020_3

Type: File

Rationale
• Highly recommended in Citizen Science projects to validate Tree Species ID either by the surveyor or data manager where QA and repeat visits are not usually possible since citizen science data is highly variable in quality.
• We suggest citizen science projects make this a required field; would be too onerous for large professional surveys.
• Photographs of trees are useful for locating specific trees for resurvey
• Allows building of timeline of how the tree has grown /changed over multiple surveys (e.g. establishment success in development sites)
• Photographs allow simple validation to be conducted on species ID and tree size.
• May be possible to undertake validation using machine learning in the future.
• Matched to a field in 10% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Provide guidance on taking a photo
• Propose a format for naming the photograph

Response:

Comments

Photograph of leaf [Recommended data]

Description
A clear, close-up photograph of the foliage, if present, to help with identification. This will usually take the form of a single leaf or several leaves where this is not practical (e.g. most conifer species). Leaf should be on the tree, or collected from the tree, as leaves near the base of trees do not always belong to that tree. Some species have different leaf types on the same tree; users are encouraged to look over the whole tree and capture the range of foliage shapes present on the tree. Photographs will ideally be taken during the growing season.
Photograph should be centred on one organ (i.e. leaf); centered; sharp; without fingers; Natural or neutral blurred background and without damage or disease if used for tree identification purposes. However, photo of leaf may be useful for pest and/or disease identification.
Picture name should link back to tree and variable without need for additional information. Name needs link to: TreeID [and Organisational ID], Date uploaded/taken and Number in sequence i.e. first picture of the tree = 1. For example: Picture of tree added for the 1st time [ID=13] taken 08June2020 =

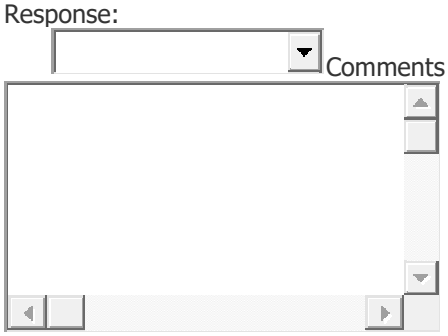
000013_Tree_08062020_1 Picture of leaf [ID-1071], 3rd time a leaf picture has been taken (3rd resurvey) on the 05May2020 = 001071_Leaf_08052020_3

Type: File

Rationale
• Highly recommended in Citizen Science projects to validate Tree ID either by the surveyor or data manager where QA and repeat visits are not usually possible since citizen science data is highly variable in quality.
• Photographs allow simple validation of species ID; leaves are one of the key ways to confirm identification of a tree.
• May be possible to undertake validation using machine learning in the future.
• Not required as leaves will not always be present.

Feedback from the consultation
• Provide guidance on taking a photo
• Propose a format for naming the photograph

Response:



Photograph of stem [Recommended data]

Description
A clear, close-up photograph of the stem to help with identification. Photograph should clearly show the bark pattern necessary. Photograph should be centred on the stem; zoomed in as far as possible; Centered; sharp; without fingers; Natural or neutral blurred background
Picture name should link back to tree and variable without need for additional information. Name needs link to TreeID [and Organisational ID], Date uploaded/taken and Number in sequence i.e. first picture of the tree = 1. For example: Picture of tree added for the 1st time [ID=13] taken 08June2020 = 000013_Tree_08062020_1 Picture of leaf [ID=1071], 3rd time a leaf picture has been taken (3rd resurvey) on the 05May2020 = 001071_Leaf_08052020_3

Type: File

Rationale
• Highly recommended in Citizen Science projects to validate Tree ID either by the surveyor or data manager where QA and repeat visits are not usually possible since citizen science data is highly variable in quality.
• Photographs allow simple validation of species ID; bark patterns are one of the key ways to confirm identification of a tree.
• May be possible to undertake validation using machine learning in the future.
• Not required as bark patterns are less reliable in species identification than other plant organs.

Feedback from the consultation
• Provide guidance on taking a photo
• Propose a format for naming the photograph

Response:

Comments

Photograph of Flowers/fruits [Recommended data]

Description
A clear, close-up photograph of the flowers or fruit, if present, to help with identification. Flower or fruit should be on the tree, or collected from the tree, as flowers/fruit near the base of trees do not always belong to that tree.
Photograph should be centred on one organ (i.e. flower/fruit); Centered; sharp; without fingers; Natural or neutral blurred background and without damage or disease.
Picture name should link back to tree and variable without need for additional information. Name needs link to TreeID [and Organisational ID], Date uploaded/taken and Number in sequence i.e. first picture of the tree = 1. For example: Picture of tree added for the 1st time [ID=13] taken 08June2020 = 000013_Tree_08062020_1 Picture of leaf [ID-1071], 3rd time a leaf picture has been taken (3rd resurvey) on the 05May2020 = 001071_Leaf_08052020_3

Type: File

Rationale
• Highly recommended in Citizen Science projects to validate Tree ID either by the surveyor or data manager where QA and repeat visits are not usually possible since citizen science data is highly variable in quality.
• Photographs allow simple validation of species ID; fruits and flowers are one of the key ways to confirm identification of a tree.
• May be possible to undertake validation using machine learning in the future.
• Not required as fruits and flowers will not always be present.

Feedback from the consultation
• Provide guidance on taking a photo
• Propose a format for naming the photograph

Response:

Comments

Tree Status [Recommended data]

Description
A general description of the tree's status. Status change should also track the tree's lifecycle. e.g. Tree -> Stump, or Tree -> Dead -> Removed. Useful for tracking a tree’s status in the database, particularly when tree records are being removed or archived.

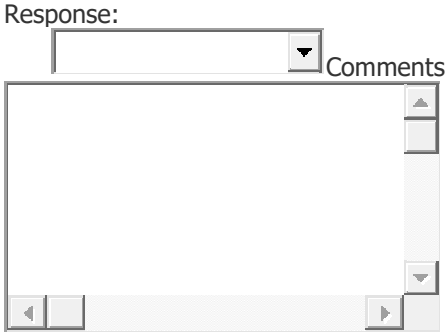
Type: List

Options: Tree; Dead; Stump; Absent (Removed)

Rationale
• Variable can also be used to manage the tree's life cycle status within the database (e.g. Good -> Poor -> Dying -> Stump -> Removed)
• Stumps are included to deal with trees which coppice or tree stumps in tree pits.
• Absent (removed) should close the tree record.
• Useful for management of tree stock, such as estimating removal costs (e.g. associated with ash dieback)
• 81% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 37% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Split field into two separate field on 'Condition' and 'Status' to prevent confusion

Response:



Tree management [Recommended data]

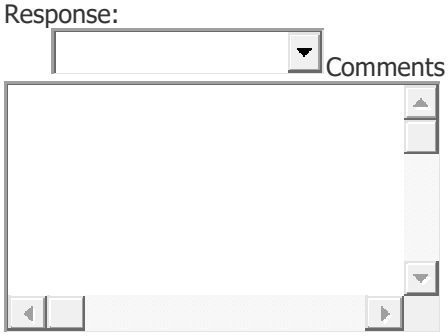
Description
Noting any evidence of recent or historic management, such as coppicing, pollarding, crown reduction.

Type: Text

Options: Coppiced; Pollarded; Crown reduction; Crown raise; Crown thinned; Limb reduction; Topped; Pruning for safety

Rationale
• May help to identify a tree (e.g. pollarded lime).
• Could help to establish management regimes or assess quantity of tree stock that has been or needs to be managed.
• Provides further information and clarity on potential anomalies in tree growth data.
• Linked to BS3998:2010 (Categories: Coppiced; Crown lifting; Crown reduction; Crown thinning; Lapsed coppice/lapsed pollard; Pollard; Topping)

Response:



Planting year [Tree age data]

Description
The year the tree was planted. Planting year should be recorded at planting. Where tree has been grown on in a nursery it should be combined with age at planting to give true age of tree.

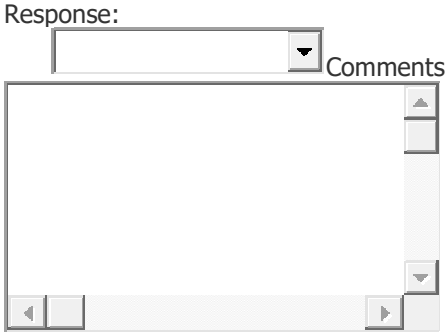
Type: Integer

Units: Year

Rationale
• Should be captured at planting and is therefore quick/easy to complete.
• Combined with other variables give useful information on growth rates.
• Can be used as a surrogate for other variables e.g. Life expectancy
• 67% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 20% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review.

Feedback from the consultation
• Clearer explanation of the field

Response:



Age at planting [Tree age data]

Description
Age of tree at planting in years. Age of tree should be recorded at planting. Age of tree can be combined with age at planting to give true age of tree. Particularly important where semi mature trees have been planted, common in urban areas.

Type: Integer

Units: Number

Rationale
• Needed (in conjunction with planting year) to fully account for the tree's age. Should be captured at planting
• Trees in the urban environment are often planted after being grown in a nursery for several years.
• Combined with other variables give useful information on growth rates.
• Can be used as a surrogate for other variables e.g. Life expectancy
• 67% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 20% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Clearer explanation of the field

Response:

Comments

Life stage [Tree age data]

Description
Life stage of the tree. Broad categorisation based on physical characteristics of the tree.
Categories are based on the categorisation from Trees in Towns 2:
1. Young: obviously planted within the last three years (unless as a heavy or extra-heavy standard).
2. Semi-mature: recently planted and yet to attain mature stature; up to 25% of attainable age.
3. Early mature: almost full height, crown still developing and seed bearing; up to 50% of attainable age.
4. Mature: full height, crown spread, seed bearing; over 50% of attainable age.
5. Over mature: full size, die-back, small leaf size, poor growth extension.
6. Ancient: A tree that has reached a great age in comparison with others of the same species (subset of over-mature)

Type: List (Single choice)

Options: young; semi-mature; early-mature; mature; over-mature; ancient

Rationale
• Planting year and Age at planting will not always be available.
• Age can be difficult to ascertain without expensive/time consuming surveying.
• Can be used for landscape scale management.
• Can be used to estimate likely longevity
• 67% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 33% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review.

Feedback from the consultation
• Clearer explanation of the field

Response:

Comments

Height to top of tree crown [Tree Canopy data]

Description
The vertical distance between the ground and the level of the highest foliage (top of crown). Should be collected during the growing season. Measurement should not include dieback at the tip.

Type: Double

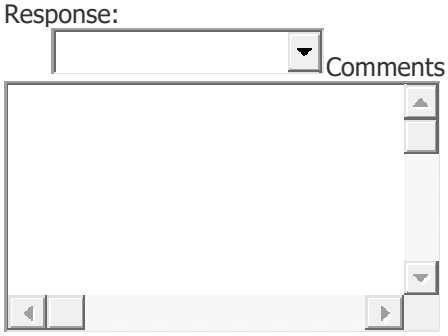
Units: metres

Precision: up to 1 decimal place, i.e. 10cm

Rationale
• Crown information is extremely useful for assessing Ecosystem Services e.g. Air pollution removal.
• Will give important information for future management of trees i.e. conflict between houses and trees.
• One of the dimensions which describes overall canopy size.
• Most users will not be able to accurately capture information at the sub-metre level.
• Power users will have skills/tools to capture sub metre accuracy; most users should capture to a metre or 0.5 metre accuracy
• 39% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 17% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review.

Feedback from the consultation
• Align with BS5837 by splitting Crown length into Height to top of the Tree crown and Height to crown base

Response:



Height to crown base [Tree Canopy data]

Description
The vertical distance between the ground the lowest significant branch (epicormic growth is not included within this measurement if it is not part of the crown). Should be collected during the growing season.

Type: Double

Units: metres

Precision: up to 1 decimal place, i.e. 10cm

Rationale
• Crown information is extremely useful for assessing Ecosystem Services e.g. Air pollution.
• Will give important information for future management of trees i.e. conflict between houses and trees.
• One of the dimensions which describes overall canopy size
• Most users will not be able to accurately capture information at the sub-metre level.
• Power users will have skills/tools to capture sub metre accuracy; most users should capture to a metre or 0.5 metre accuracy
• 39% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 17% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Align with BS5837 by splitting Crown length into Height to top of the Tree crown and Height to crown base
is needed.

Response:

Comments

Crown radius 1-4 [Tree Canopy data]

Description
A measure of crown radius: the length of a straight horizontal line from the edge of the crown on one side of the tree to the centre of the tree's main stem; often described as the spoke method. Crown radius 1 should be used to store one of the following: (1) Crown radius at the Northern Cardinal point, (2) Half the radius when the crown diameter has been measured at two points (first measurement) (e.g. Length measured N->S & E->W or Min and Max length dimensions) (3) half the average crown width (4) average crown radius

Type: Double

Units: metres

Precision: up to 1 decimal place, i.e. 10cm

Rationale
• Crown information is extremely useful for assessing Ecosystem Services e.g. Air pollution.
• Will give important information for future management of trees i.e. conflict between built infrastructure and trees.
• One of the dimensions which describes overall canopy size.
• Format allows BS5837 to be captured natively; other measurements can be easily aligned.
• Most users will not be able to accurately capture information at the sub-metre level.
• Power users will have skills/tools to capture sub metre accuracy; most users should capture to a metre or 0.5 metre accuracy.
• 67% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 37% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Align with BS5837
• Scrap bandings

Response:

Comments

Crown shape [Tree Canopy data]

Canopy Shape

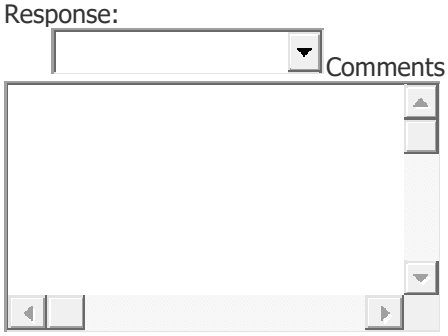
Description
This is a simple description of the volumetric shape of the tree crown and must be recorded as one of the following options: Oval, Columnar, Cone, Rectangular, Weeping and Spherical. Can be used in conjunction with crown dimensions to improve estimates of leaf area index and ecosystem services.

Type: List (Single choice)

Options: Oval; Columnar; Cone; Rectangular; Weeping; Spherical

Rationale
• Crown information is extremely useful for assessing Ecosystem Services e.g. Air pollution.
• Will give important information for future management of trees i.e. conflict between houses and trees.
• The shape can be used to improve the accuracy of the canopy dimensions entered.
• Based on the TDAG Tree Species Selection for Green Infrastructure: Guide for Species.
• Matched to a field in 7% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Response:



Crown missing [Tree Canopy data]

Description
An estimate of the amount of crown that is missing and the amount of crown that is diseased, recorded as a percentage. Note: this is not the percentage of functional crown. Areas of canopy removed through management (e.g. limb removal), areas of the canopy which have died or are in a poor state of health should all be included.

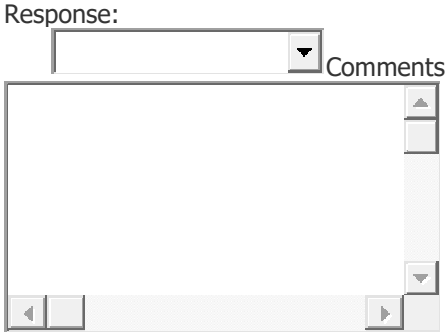
Type: List (Single choice)

Options: 0 - <25%; 25 - <50%; 50 - <75%; 75 - <100%

Rationale
• Crown information is extremely useful for assessing Ecosystem Services e.g. Air pollution.
• Allows correction of the canopy estimated created from the other dimensions.
• 25% bands chosen as 10% bands was thought to be too difficult to judge and gives little extra useful information
• Matched to a field in 13% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• 10% categories too hard to estimate and of limited benefit

Response:



Crown Light exposure [Tree Canopy data]

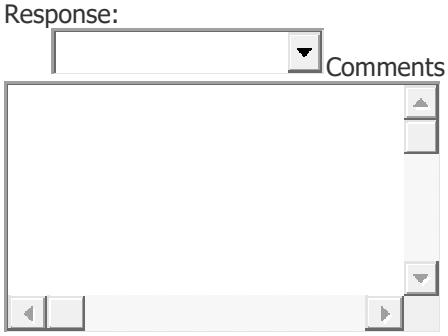
Description
Number of faces/sides of the crown that receive direct sunlight. There is a maximum of 5 faces: four sides, assessed as vertical planes, and the top, assessed as a horizontal plane. The face should be not counted if an object is higher than any part of the crown, or the object is as high as the tree and within one crown width of the main stem.

Type: List (Single choice)

Options: 0; 1; 2; 3; 4; 5

Rationale
• Some trees are shade tolerant, and some are strongly light-demanding.
• Available light will affect growth rate, tree form and tree condition; helps create context to understand other variables.
• Based on i-Tree Eco methodology

Response:



Tree Condition [Tree Health data]

Description
A general description of the tree's condition. The description applies to the whole tree, encompassing the crown, trunk and roots.
1. Good: no evidence of disease or damage. Full leaf, no die-back, good branch structure.
2. Fair: minor evidence of disease/damage. Minor deadwood. Not life threatening.
3. Poor: extensive evidence of disease or damage. Dieback in crown, poor callus growth on wounds.
4. Dead/Dying: obviously moribund, severely diseased.
These can be matched to A,B,C,U in BS5837 respectively

Type: List (Single choice)

Options: Good; Fair; Poor; Dead/Dying

Rationale
• Allows the condition of the tree to be captured.

• Used in many tools/methods.
• If additional tree health data is collected this field is required so that the severity of any impact is known.
• Excellent & Very Good removed as they give little information on the tree and are difficult to categorise.
• Not fully aligned with BS5837; corresponding field is designed to look at whether the tree should be retained
• 81% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 37% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Split field into two separate field on 'Condition' and 'Status' to prevent confusion

Response:
Comments

Symptoms [Tree Health data]

Description
List of common symptoms indicating ill health in the tree. List includes symptoms common on UK tree species and which can be identified in the field. Select all that apply.

Type: List (Multiple choice)

Options: Blistering of bark; Blisters on leaves; Death; Defoliation; Dieback of canopy; Dieback of twigs or branches; Discolouration of bark; Discolouration of leaves; D-shaped exit holes; Exudation of liquid/gum; Fruit bodies present ; General decline; Lesion on a stem, branch, or twig; Lesion on leaf; Mis shapened fruits; Patches of dead bark; Spots on leaves; Wilted shoots or flowers

Rationale
• Too many potential symptoms to list all possibilities.
• Most important symptoms which affect UK species are included.
• All symptoms listed can be easily identified in the field.
• List is used over free text to allow easily combination of data

Response:
Comments

Suspected pests and diseases [Tree Health data]

Description
List of suspected pest and diseases affecting the tree. List includes pest and diseases that affect common

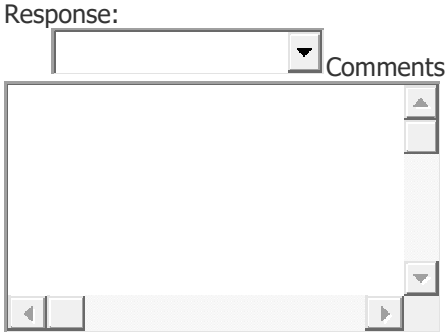
UK tree species, and which can be identified in the field. Select all that apply

Type: List (Multiple choice)

Options: Acute oak decline; Anthracnose; Bacterial canker; Blossom wilt and shoot blight; Cankers; Chalara ash dieback; Chronic oak decline; Coral spot; Decay fungi; Dutch elm disease; Fireblight; Giant leaf blotch; Heterobasidion; Honey fungus; Leaf blotch; Leaf spot; Nectria canker ; Needle diseases; Phytophthora bleeding canker; Phytophthora root disease; Pocket plum; Powdery mildew; Rust; Scab; Shoot blight; Shot-hole; Silver leaf disease; Sooty bark disease; Tar spot; Verticillium wilt; White spot

Rationale
• Too many potential pest and diseases to list all possibilities.
• Most important symptoms which affect UK species are included.
• Pest and Diseases present, or expected to arrive, in the UK are included.
• All symptoms listed can be easily identified in the field.
• List is used over free text to allow easily combination of data
• 61% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 17% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Response:



Photograph of pests, disease or significant wounds [Recommended data]

Description
A clear, close-up photograph of any symptoms of pests and/or diseases present, or of significant wounds that may be affecting tree health and/or structural integrity. Each photograph should focus on one symptom (i.e. fungal fruiting body, or bleeds on stem); Centered; sharp; without fingers; Natural or neutral blurred background where possible.
Picture name should link back to tree and variable without need for additional information. Name needs link to TreeID [and Organisational ID], Date uploaded/taken and Number in sequence i.e. first picture of pest or disease = 1. For example: Picture of tree added for the 1st time [ID=13] taken 08June2020 = 000013_Health_08062020_1

Type: File

Rationale
• Photographs of pest and disease are useful for:
• Photographs may be needed to confirm ID of pest and/or disease.
• Where pest, disease or damage is not of immediate risk, photos can be used to track changes in tree health and potential recovery over time.
• May be possible to undertake validation using machine learning in the future

Response:

Comments

Under canopy description [Site data]

Description
Broad description of dominant ground covers in the tree's planting situation. Area of interest is defined by the dripline (i.e. the area defined by the outermost circumference of a tree canopy where water drips from and onto the ground). All ground covers which represent more than 25% of area should be included. Surveyors may include groundcovers which are less 25% if they are felt to have a significant effect on the tree.

Type: List (Multiple choice)

Options: Concrete; Paving; Tarmac; Grass; Soil; Pavoirs (e.g. interlocking bricks); Flexible surfacing; Raised planting bed; Shrubs / scrub; Tree pit; Compacted ground

Rationale
• Soil/routing environment important driver in tree growth
• Captures information on: (1) Permeability, (2) Competition from vegetation & (3) Compaction
• 58% of responders identified the variable as minimum data in the pre consultation questionnaire

Feedback from the consultation
• Clearer explanation of the field
• Review option list

Response:

Comments

Soil textural class [Site data]

Description
Estimation of soil particle size from the proportions of sand, silt and clay. Information will normally be collected at planting using visual assessment or the "feel" method. Classes are based on the texture class intervals of the Soil Survey of England and Wales.

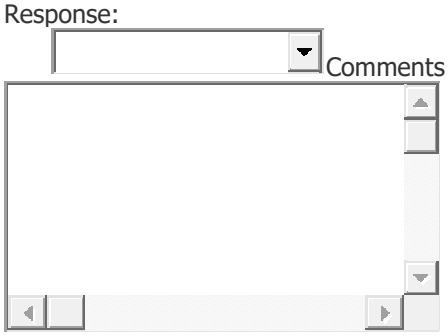
Type: List (Single choice)

Options: sandy; loamy sand; sandy loam; loam; silt loam; silt; sandy clay loam; clay loam; silty clay loam; sandy clay; silty clay; clay

Rationale
• Soil type is important for species selection.
• Soil is an important driver in tree growth.
• Data can be used to validate and improve local soil maps
• 19% of responders identified the variable as minimum data in the pre consultation questionnaire
• Matched to a field in 3% of the tools, methods, protocols, research needs, and existing datasets identified in the pre consultation literature review

Feedback from the consultation
• Clearer explanation of the field
• Fully align options with soil survey of England and Wales
• Intended to be recorded when the tree is planted
• Soil type should be a key factor when constructing a soil pit and/or choosing the appropriate tree to plant
• Can provide useful information to supplement into soil maps
• Needed to assess the growing performance of trees

Response:



Planting regime [Site data]

Description
Above ground estimate of whether the tree's root environment is restricted or not as a mature tree. Should be used when the tree has been planted and the soil volume available to the tree is not known. Open grown trees, those without any observable restriction of soil availability e.g. trees in grasslands, forests or parks, should be 'Unrestricted'. Soil pits with too little soil for the tree should be 'Highly restricted'. Normal/ well planned soil pits should be 'Restricted'.

Type: List (Single choice)

Options: Unrestricted; Restricted; Highly restricted; Unknown

Rationale
• Amount of soil available to the plant is crucial for it receiving enough water and for stability.
• If the exact volume is unknown, then this variable gives some indication of the amount of soil available.
• Can be estimated using a visual assessment

Feedback from the consultation
• Clearer explanation of the field
• Trees often fail because of lack of rooting area to support the crown
• Predictive maintenance of tree
• Draw people's attention to the importance of the underground area

Response:

Comments

Soil volume [Site data]

Description
Amount of soil available for the tree roots to grow (recorded in cubic-metres (m3)). Soil below 1.5m should not be included in the volume estimate. Estimates can be used if based on visual assessment of a disturbed soil pit. Will normally be completed at planting.

Type: Integer

Units: metres cubed

Precision: up to 1 decimal place

Rationale
• Amount of soil available to the plant is crucial for it receiving enough water and for stability.
• Increasingly tree pits are being designed and built for a specific tree, it is therefore useful to capture that information

Feedback from the consultation
• Clearer explanation of the field
• Creating a soil pit where the volume is known
• Examine cost of creating a soil pit compare to maintenance cost and tree's life expectancy

Response:

Comments

End of consultation document

Thank you for contributing to the consultation. To complete your submission, please click the 'Submit' button below.

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