



GTTN

Global Timber
Tracking Network

GTTN WG2 – concepts revisited

Reviewed concept of the service providers directory and the reference database. Where we are and where we came from.

Document version: 18 December 2017

Table of Contents

1	Initial requirements for the services to be developed	5
2	Reviewing the state of the art from Phase 1 and reflecting on the user needs in the GTTN phase 2 kick off meeting	6
2.1	Status of the software implementation of the GTTN database and its user interface at the end of GTTN Phase 1	6
2.2	Further development of the software implementation of the GTTN database and its user interface after GTTN Phase 1	9
2.3	Discussion of the task setting at the GTTN phase 2 kick off meeting_	14
2.3.1	The Expert Database – i.e. the Service Providers Directory _____	14
2.3.1.1	Keeping data up to date	14
2.3.1.2	Method suitability and Making a Claim	14
2.3.1.3	Once a claim has been formulated: Selecting a lab	15
2.3.1.4	Other points	15
2.3.2	The reference database	16
2.3.2.1	Hosting and Safety	16
2.3.2.2	Inventory of data	16
2.3.2.3	Willingness to share data	16
2.3.2.4	Links to External databases	17
2.3.2.5	Design and New Features	17
3	Updated design of the service providers directory for GTTN phase 2	17
3.1	Immediate service improvement needs	18
3.1.1	Updating the SPD information	18
3.1.2	Adding functionality: “Email the service provider”	19
3.2	Different requirements for different users	19
3.2.1	Enforcement officials	19
3.2.2	Due diligence: commercial operators, trade and retail	20
3.2.3	Scientists	21

3.3	An approach for tailoring the SPD for the user groups	21
3.3.1	SPD for enforcement officials	21
3.3.2	SPD for due diligence users	22
4	Updated design of the reference database for GTTN phase 2	26
4.1	Introduction	26
4.2	Design option #1 - a distributed service	26
4.3	Design option #2 - a centralized service	26
4.4	Proposal on implementation of GTTN Reference database	27
Annex 1	GTIN Phase 1 Client Software User Manual	31
Annex 2	Law enforcement best practice flow diagram for timber	31

Dissemination level

[X]

PU	- Public (must be available on the website)	
RE	- Restricted to a group specified by the consortium (including the donor)	X
CO	- Confidential, only for members of the consortium (including the donor)	

Version indication

Version	Date	Distribution (who have reviewed)
0.1	20171010	GTTN secretariat
0.2	20171218	GTTN secretariat

Contributors

Chapter	Name (Affiliation)
all	Tommi Suominen (EFI); Jo Van Brusselen (EFI)

Reviewers

Chapter	Name (Affiliation)

1 Initial requirements for the services to be developed

The GTTN database is one of the main outputs to be developed by the GTTN project and should provide georeferenced DNA and isotope data for important (priority) species. The database is a crucial prerequisite to make available to the world's present data for the application of the methods by industry, academia and regulatory authorities. The GTTN database should provide users along the supply chain with information on species identification and the verification of the origin (country, region, concession) of wood and wood products.

Furthermore, it should provide information on available scientific methods and tools (genetics, stable isotopes and wood anatomy), and contact information on certified labs for sample analysis.

Thus, the main aims of the data base are:

- to provide interested external users (e.g. timber industries, public authorities) with the information which approach (wood anatomy, DNA test, stable isotopes) is available to check their specific claim (declared tree species and / or geographic origin) and whom to contact to perform the testing;
- to provide internal user (groups that have put their data into the data base, signed a data sharing agreement, successfully participated in ring tests for standardisation and are ready to provide the lab services) with a safe password protected access to a data repository centre on geographic reference data (genetics + isotopes)

It is expected that during this project phase the GTTN database is developed that has the minimal elements to be operational (must have elements), with data of public funded research projects secured (ITTO Africa, ITTO Indonesia) and applicability tested.

This activity includes:

- Review the existing GTTN database (as developed in GTTN Phase I) and assess its potential use
- Develop an updated concept (must have characteristics) on the data base and discussed with the GTTN steering committee/ expert groups
- Developing and testing of the GTTN database
- Enter data of public funded research projects into the data base (ITTO Africa, ITTO Indonesia)

- Secure maintenance (database and data updates) and population (adding data) of the database.

An important database aspect is also ensuring that the database and the content are secure and cannot be misused. While the GTTN project should mainly contribute to the development of the database, the final location of the database should be defined during the project implementation phase. The GTTN coordinator should look for a strategic partner that could provide the adequate environment for hosting the GTTN database.

2 Reviewing the state of the art from Phase 1 and reflecting on the user needs in the GTTN phase 2 kick off meeting

2.1 Status of the software implementation of the GTTN database and its user interface at the end of GTTN Phase 1

In the first phase of GTTN, the conceptual development of the requirements of the system went hand in hand with the software development efforts. This resulted in three different iterations or prototypes of the system, each building on the user feedback to the previous prototype. The second iteration centers on making a claim with need to identify species and/or the geographic origin of the timber sample, and then listing the laboratories that can analyse this claim. Below are attached some screenshots (with explanatory text) from GTTN phase 1 user manuals to illustrate how the previous claim-based approach was functioning.

Once logged in as a user, a new menu section, CLIENT, will show up on the task bar. As a Client, you may choose to “Create a new Species Claim”.

Under “Create new Species Claim”, the “Version_date” and “Claimant Name” will already be set to the current date of entry and the user's organization name.

You will then be directed to a validation page. On this example page (below), you are given two approaches for species identification (Wood Anatomy and DNA Barcoding), as well as the laboratory names and their respective countries. Clicking on the binocular button on a given laboratory entry line will display the contact details for the lab.

Species Identification [Verify Origin](#)

▼ Show Species Claim

Version_date :
 Claimant Name :
 Description :
 Taxon Name :

Validation approaches for species identification:

Wood Anatomy

Laboratories with Wood Anatomy Expertise:

Name	Country	
Chinese Academy of Forestry	China	
Forest Products Laboratory	United States of America	
Johann Heinrich von Thunen-Institut	Germany	

DNA Barcoding

Laboratories with DNA Barcoding Expertise:

Name	Country	
Forest Research Institute Malaysia	Malaysia	
Johann Heinrich von Thunen-Institut	Germany	
EMBRAPA	Brazil	
University of Adelaide	Australia	

If you (optionally) also wish to validate the timber provenance, then click on “Verify Origin” to specify a claim for the geographical origin of the species. Select the country or specify the latitude and the longitude¹.

Geographical Origin

▼ Show Species Claim

Version_date : 05/18/2015

Claimant Name : Treeinformatics

Taxon Name : Bagassa tiliaefolia

Related Name :
Description :

☰

▼ Show Origin Claim

Country Name : Unspecified

Latitude :
Longitude :

☰

Validation approaches for geographical origin:

Stable Chemical Isotopes

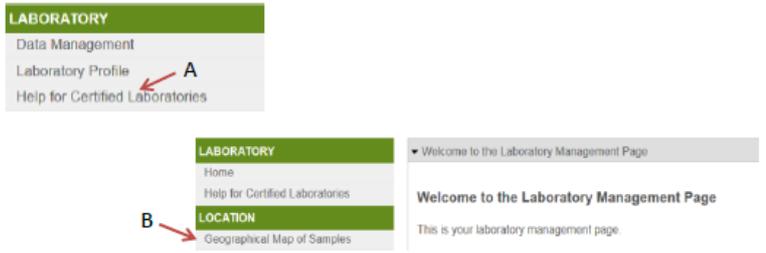
Laboratories with Chemical Isotope Expertise:

Name	Country	
Agroisolab	Germany	
FERA	United Kingdom	
Josephinum	Austria	

Genotyping

Laboratories with Genotyping Expertise

Name	Country	
Johann Heinrich von Thunen-Institut	Germany	
University of Adelaide	Australia	
EMBRAPA	Brazil	
Forest Research Institute Malaysia	Malaysia	



Type in the taxonomic name of the species (i.e. *Milicia excelsa*) you are searching for in the filter bar above the map (1).

A number within a circle will pop up (2). This represents populations or samples that are clustered around that region. By clicking the circle, you can zoom in. When you zoom in, the circle will explode into more circles (3). Each number represents the density of populations or samples found within the region. When you zoom in, single data points show up as labelled blue balloons or equivalent, (4).

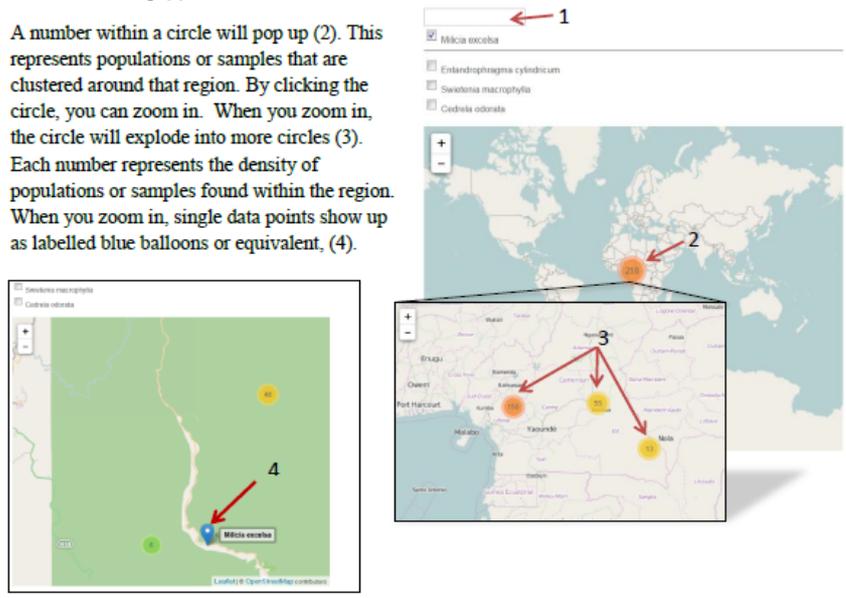


Figure 1 Map based browsing of reference data by geographic origin:

2.2 Further development of the software implementation of the GTTN database and its user interface after GTTN Phase 1

After the GTTN phase 1 ended, a simplified interface was developed,



Figure 2 The simplified version of the GTTN tool for WRI, by Richard Bruskiewich

This tool was then reimplemented by WRI within the Forest Legality Initiative's Drupal CMS. Screenshots of this implementation follow. The following pictures present the WRI Service Providers Directory as it's development version stands currently (only sample datasets used for slides)

Service Providers Directory

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat.

Species Names

- Any -

Helper description of filter (optional)

Common name

- Any -

Filter description text

Expertise

- Any -

Helper description of filter (optional)

Lab location

Europe - Any -

Continent and Country Information

APPLY **RESET**

Figure 3 - The user chooses one of the fields for searching – here filtering the data by lab location

Common name
 Mahogany - Any -
 Filter description text

Expertise
 - Any -
 Helper description of filter (optional)

Lab location
 - Any -
 Continent and Country information

APPLY **RESET**

- Displaying 1 - 2 of 2
- ▶ IVALSA
 - ▶ IVALSA, Trees and Timber Institute

Figure 4 results for searching by common name

Displaying 1 - 2 of 2

▼ IVALSA

Contact Details	Person: Dr. Nicola Macchioni, Head Of The Wood Anatomy Laboratory At Ivalsa - Cnr, Simona Lazzeri, Laboratory Technician, Dr. Alan Crivellaro, Contract Researcher
General Details	
Microscopic Slides	
Samples for Exchange	
Sample Availability	
Samples Available	
Samples Wanted	
Sample Catalogue	
Samples List	
Testing Expertise	
Testing Expertise Species	
Remarks	
Additional Details	

Email:
lazzeri@ivalsa.cnr.it, crivellaro@ivalsa.cnr.it

Address:
Istituto per la Valorizzazione del Legno e delle Specie Arboree - Consiglio Nazionale delle Ricerche (Trees and Timber Institute - National Research Council), (FLW), Via Madonna del Piano, 50019 Sesto Fiorentino (Florence), Italy.

City:
Florence

▶ IVALSA, Trees and Timber Institute

Figure 5 the SPD currently displays detailed contact information for the experts

Lab location

Europe - Any -

Continent and Country Information

APPLY RESET

Displaying 1 - 13 of 13

- ▶ Customs Port of Rotterdam and Customs Laboratory
- ▶ European Plant Science Laboratory (EPSL)
- ▶ IVALSA
- ▶ IVALSA, Trees and Timber Institute
- ▶ Laboratory for Wood Biology and Xylarium, Royal Museum for Central Africa
- ▶ Naturalis Biodiversity Center
- ▶ Naturalis Biodiversity Center, Leiden University
- ▶ Royal Botanic Gardens, Kew
- ▶ Timber collection, National Museum Wales
- ▶ University of Natural Resources and Life Science Vienna
- ▶ University of Natural Resources and Life Sciences – BOKU
- ▶ University of Vienna; Vienna Institute for Archaeological Science (VIAS)
- ▶ University of Warsaw Botanic Garden

Figure 6 labs listed match the filter "Europe"

Expertise

Visual - Any -

Helper description of filter (optional)

Location

- Any -

Continent and Country Information

APPLY RESET

Displaying 1 - 15 of 15

- ▶ Commonwealth Scientific and Industrial Research Organization
- ▶ Commonwealth Scientific and Industrial Research Organization 1
- ▶ Customs Port of Rotterdam and Customs Laboratory
- ▶ European Plant Science Laboratory (EPSL)
- ▶ Facultad de Ciencias Agrarias y Forestales
- ▶ IVALSA, Trees and Timber Institute
- ▶ Laboratory for Wood Biology and Xylarium, Royal Museum for Central Africa
- ▶ Naturalis Biodiversity Center, Leiden University
- ▶ Queensland Department of Agriculture
- ▶ Queensland Herbarium

Figure 7 The labs listed match the filter for "Visual" expertise

2.3 Discussion of the task setting at the GTTN phase 2 kick off meeting

Prime objective of this session: "The GTTN database is one of the main outputs to be developed by the GTTN project". We must have a clear understanding and a joint agreement on the objectives of the work. The discussions in this session should help to consolidate stakeholder views, both on the supply and demand side, and help make progress toward: "an updated concept (must have characteristics) on the database" and this result should be then discussed with the GTTN steering committee/ expert groups". The database consists of two separate service elements, the data repository and the expert catalogue.

2.3.1 The Expert Database – i.e. the Service Providers Directory

The development of the expert database should be a priority. "There is a real need for enforcement authorities to know from where they can get information." A large fraction of the functionality of the expert database has already been implemented by GTTN phase 1. The discussion focused around the following topics:

2.3.1.1 Keeping data up to date

How to ensure that labs will keep their information up to date, and do they even need to agree to be listed? Inventories of labs would need to be refined by e.g. continuing the efforts of TRAFFIC.

2.3.1.2 Method suitability and Making a Claim

Different methods may in principle be suitable to answer different questions, but reference data availability will affect whether a method can be used to assess a particular claim in terms of species or geography verification.

Different requirements will also apply to the accuracy levels required from the methods in due diligence/due care applications where requirements may be somewhat less restrictive when compared to forensic applications that have to produce results with an accuracy that does not leave room for interpretation when used in legal court proceedings.

Method availability based on reference data presence could be used by actors to "reverse engineer" and map out where data are not available, and tag shipments according to this info – to ensure that the origin/species could not be easily validated at point of import. It has been debated whether the reverse engineering poses a serious risk or not.

However in principle, a user interface based on a decision tree should be helpful for users to precisely specify the questions that they need answers for. Some possible questions can be: what tree species is a product composed of? What is the geographical origin of the wood? When was the timber harvested?

We should also leave the possibility to make open claims for the experts to answer (Wood anatomist: They might ask me to tell me something about this table, the customer request can be very vague).

An observation was that dating/ date of logging can be a very relevant factor. This becomes an important question when looking at products where cascade input is used, or e.g. old furniture. For older samples, the species may be currently CITES listed, but at the time of harvest (e.g. 50 years ago), the utilization of the species was legal. In products with a recycled/cascaded component – what if a fraction of the product recycled comes from a CITES species?

2.3.1.3 Once a claim has been formulated: Selecting a lab

Different criteria can be used when selecting the lab to analyse the claim, perhaps creating a filter for the experts by attributes (e.g. geographic proximity, amount of time to analyze a sample). Accreditation of labs as a measure of credibility was also discussed, but the discussion voted led to leaving out the lab accreditation for the moment. The type of lab/institution will affect willingness to provide service. E.g. university labs might not be interested or allowed to perform analysis services for commercial actors, but might be willing to do so in an academic context.

It would be possible to have a function to get a quote from a lab. The idea here was that after defining your claim and seeing the list of labs, there could be a button to press to “Ask for a quote for your claim”. The system would after guiding the user through defining the claim, know the claim details, and could formulate an email request to the lab with the specifics and the information that this request comes through the GTTN portal. This in turn might motivate the labs to keep the GTTN portal information up to date on their service provision capacities. If the description of the services they can provide is too narrow, they’ll miss out on business, but if it is too broad then they will get requests for work that they can’t address, causing inefficiency.

2.3.1.4 Other points

Usability was emphasized in many comments: the expert database should be practical and accessible to non-experts and might not be very interested in

different scientific methods. They just want their questions answered. Once the service is deployed, awareness raising is needed to promote the service to relevant people.

2.3.2 The reference database

2.3.2.1 Hosting and Safety

The institute hosting the service should be carefully selected. It is not only a question of technical capacity, but the host should also be seen as: neutral, accepted, safe and be free of conflicts of interest. The access to database should be controlled through secure accounts. The access rules regarding who manages access and takes decisions on who has access and who not, needs to be settled.

2.3.2.2 Inventory of data

We should first have an overview of who has what data: species, site, data type and where reference samples are physically hosted. We should list publicly funded samples e.g. as provided by a government AND secure confirmation that these are ALSO available for users. The session discussion asked how to ensure reliability of data - how to ensure data correctness, e.g. through some sort of classification? One answer was that people who see possible errors should be able to flag these and suggest possible corrections. Part of discussion intersected with the expert database discussion on lab certification.

2.3.2.3 Willingness to share data

A key barrier to implementation of a functional service in Phase 1 of GTTN was the participants' hesitation to share reference data. The issue of willingness of institutes to share their data should be addressed as a matter of priority (noting that most of these are funded by public bodies), e.g. by better identifying what could be the potential benefits for the institutes. The discussion focused around how to motivate stakeholders to share data by service design. For example that you can only have access to data if you share: if you contribute a lot, you can access a lot. Similarly, it was suggested that we could only promote lab expertise on the expert portal based on data inputs, and thus motivate data provision.

While the prime mission of the GTTN is to facilitate actors to carry out analysis of claims, often on a commercial basis, a need exists to differentiate between commercial and public labs that contribute data. In some countries research data (e.g. Bolivia) cannot be used for commercial purposes as per legislation.

2.3.2.4 Links to External databases

Should we have a centralized or distributed database system? Even with the centralized system, some partners might only store metadata in the db. In e.g. wood anatomy there are large existing databases with lots of images, which surely cannot be entirely copied. How do we incorporate these? This goes down to the level of metadata used to describe those databases. If each record is described by metadata and that metadata can be provided in bulk through some metadata service, it might be possible to access individual records of those distributed databases via our GTTN service. If there is only a db level metadata record, we will have to only direct the user to this external source's search interface. The conclusion from the database linkage discussion was that the database should be a hybrid solution that contains both metadata describing the data available from participating labs by request and contain actual data with its relevant metadata descriptions. This solution allows smaller labs to directly deposit their data in the database. Data providers did request that it should be possible to upload large data dumps into the reference database. If labs are not inclined to share their data openly with everyone, the "data search" interface will lead the user to the record describing the data and instead of a "Download data" button, there will be a button to "Send request to lab for reference data".

2.3.2.5 Design and New Features

The reference database should be simple and realistic to maintain to ensure that it can be managed over time with reasonable (limited) resources. It would be useful to have some economic background information – to highlight economically important timber species. For some species, 1 out of 50 subspecies might be of any economic interest – this affects prioritization of e.g. data collection/provision to the database. This could be e.g. captured by integrating information from Trade statistics, such as from the EFI Trade Database (<http://193.185.149.20/tradedb/index.php/queryreport>).

3 Updated design of the service providers directory for GTTN phase 2

The GTTN phase 1 simplified prototype 3 and the consequent WRI reimplementation of the phase 1 design within the Forest Legality Initiative's Drupal CMS aimed to accomplish a simplification of the interface that eliminates all aspects from the reference database and simplifies the GUI to bare essentials

(see pictures n, m, ..). However, for the use cases¹ defined for GTTN, we wish to improve the design of this service for targeted user groups, to introduce a walk-through sequence of questions to help the user elaborate their “question” to a level that an expert can provide a useful answer. However, service users do not necessarily know exactly what they want to know and how they wish to find out about it (see also 2.3.1.2).

As the finalisation of the Service Providers Directory is a shared top priority, over summer 2017, EFI and WRI agreed to join forces and team up to finalise the implementation of the SPD. The SPD will be promoted as a joint effort by the GTTN network partners. There is a real and urgent need for enforcement authorities as well as for due diligence applications by traders, industry and retail to know where they can get analysis competence from. The below discussion stems from the meetings held in Madrid (Sept -17) and the WG2 meeting in Washington D.C. (Oct -17).

3.1 Immediate service improvement needs

3.1.1 Updating the SPD information

The information on available expertise contained in the SPD is largely coming from an inventory conducted by TRAFFIC, and has been appended with information provided by the International Association of Wood Anatomists (IAWA). With the service providers dataset being now 2 to 3 years old, to ensure reliability and credibility of the SPD, an update needs to be implemented. When external users start to use the SPD, first impressions are important for the willingness of the users to continue using the service and return to it. Out of date contacts will not be useful to any user, and would dis-incentivize them to return to the service. This would work against the objective to establish the SPD as a useful platform for support to e.g. enforcement authorities. The low-cost approach to actualize the data would be to ask the currently listed Service Providers to revisit and update their information record, through a specifically developed secure database interface. Another option would be to update the information indirectly by one or more organisations (e.g. with a regional focus

¹ Use case: description of the different pathways through which users wish to interact with and extract content from a database, typically through a graphical user interface (GUI). Use cases are typically elaborated in workshops with stakeholders that a GUI is developed for.

of responsibilities). In October, the US Forest Service (USFS) has shown intention to contract TRAFFIC to implement this task (to be confirmed).

3.1.2 Adding functionality: "Email the service provider"

Before releasing the service, the plan is to remove the contact details of individuals and implement an "email to service provider" functionality that allows contacting the experts with a service request, or a request for a quote for service. For the service providers, this will link the service users directly to the service providers via the SPD-facilitated requests for analysis work.

It is assumed that this will on the one hand incentivise the service providers to maintain the information on the SPD regarding what analysis competence they have, in order to avoid unnecessary contact requests or missing out on requests, if their competence description is too narrow. We will also need to make a facility to allow for the users to update their own contact and competence description data.

3.2 Different requirements for different users

Different timber tracking methods may be suitable to answer different questions, however reference data availability is typically a key constraint to whether a method can be used to assess a particular claim in terms of verification of species or origin. However the question might also be "what species and from where, is this sample", which poses a much more difficult analysis question to solve.

Different requirements will apply to the accuracy levels required from the methods in due diligence/due care applications where requirements may be somewhat less restrictive when compared to forensic applications that have to produce results with an accuracy that does not leave room for interpretation when used in legal court proceedings.

For the SPD there are at least 3 identified user groups or correspondingly, 3 main use cases. The user groups are:

3.2.1 Enforcement officials

Enforcement officials such as customs staff, who need to check incoming shipments of wood or products made from wood at ports or border crossings. If there is suspicion related to the correctness or authenticity of the paper work on the shipment in question, such as suspicion on the claimed origin or species of

the shipment, the customs official needs to control whether the claims in question are valid. To this extent, an official may need external expertise to analyse the validity of the claim in question. The experts with suitable competence to do this work will depend on the tree species and geographic origin of the wood contained in the shipment. The official needs an answer he/she can understand and that is usable for determining the next step – essentially a true/false answer with very high level of confidence. If the degree of confidence provided by one analysis method is not enough, a combination of analysis using different methods might be required. The economic consequences of a seizure or even of delayed release of a shipment can be significant, and this decision will probably not be made lightly.

The SPD will be available globally, and enforcement officials operating in different legal frameworks will likely have differing demands towards the service (e.g. EUTR and Lacey act have somewhat different approaches; countries may require certain standards for certain purposes).

An important component of this use case is forensic use, including case building by law enforcement and the use of analysis results in legal proceedings. For such application, the analysis results will need to be able to withstand intense legal and methodological scrutiny. Laboratories may also be required to follow certain protocols and it can be that only laboratories with an official certification may provide courts with evidence.

3.2.2 Due diligence: commercial operators, trade and retail

Commercial operators need to exercise due diligence to manage both economic risks and risks to their reputation associated with the possibly to unknowingly import or use illegally harvested wood (depending on the legal framework the actor is operating in).

The term commercial operators is used broadly here and relates to the application of due diligence for trade along the forest value chain, i.e. making sure that wood fibre products' species and origin is known and that trade can occur with as low risk as possible for illegalities. Timber tracking services in this context could be sought by SFM-CoC certification bodies (e.g. PEFC, FSC); wood traders, forest-based industries and retailers.

To conduct due diligence, the commercial actors starting out with due diligence need to know who can perform a service, perhaps by single request at a time or then on a consistent basis. In the latter case, the SPD could serve as a platform

where the identification of potential service providers could lead to a contractual service partnership.

A single lab might not be able to provide service for all species and all countries, or the degree of confidence provided by one analysis method, might not be adequate for the user. A way of asking for targeted expertise for individual samples, needs to be retained.

3.2.3 *Scientists*

Scientists might also need to use the service, for example when they are not able to analyse a sample themselves, and do not know who else has the competence to do so. Also perhaps a sample cannot be exported from the country it is currently in, and they need to figure out if anyone can analyse it locally, without exporting it (might also be relevant for commercial operators – to ensure conformity to declaration before paying for shipping costs).

The date of logging can also be a very relevant factor. This becomes an important question when looking at products where recycled input is used, or e.g. old furniture. For older samples, the species is may be currently CITES listed, but at the time of harvest (e.g. 50 years ago), the utilization of the species was legal. In products with a recycled component – what if a fraction of the product recycled comes from a CITES species?

3.3 An approach for tailoring the SPD for the user groups

3.3.1 *SPD for enforcement officials*

We wish to introduce a walk-through sequence of questions to help the user formulate their “analysis question” to a level that an expert can provide a useful answer. It was proposed to build this walk-through for customs and law-enforcement officials responsible for screening incoming shipments to see if they are compliant with legislation. On the one hand, customs officials are in need of rapid screening methods that would help them to process shipments quickly with a good degree of certainty. However for cases that are singled out for further scrutiny to rule out false claims, methods are needed to give a result with high confidence, and potentially for use in court proceedings.

The UNOCD Best Practice Guide for Forensic Timber Identification has produced an illustrative “Law enforcement best practice flow diagram for timber” for supporting the decision making process of a law enforcement officer. The best practice flow diagram (see figure 3 a and b, below) indicates the steps law

enforcement agents should follow when dealing with cross-border shipments of timber. The flow diagram represents the ideal case, and reality may dictate that actual processes need to differ to fit local conditions." As the SPD essentially only provides the inventory of expertise, this walk-through should simply lead the user to the relevant expert(s), with a clearly formulated question, and it might not be possible to support all points in the flow diagram.

- Potential weakness to avoid by design; empty combinations (no expertise available for selected filters, could show the closest match?)

3.3.2 *SPD for due diligence users*

In context of legal/commercial due diligence requirements, commercial operators need to be able to ensure that the wood that they are trading is of the species and origin that is claimed e.g. by a bill of lading or that a supplier is contractually required to deliver. The inspected product can be something that has already been delivered to operator requesting the analysis retroactively or still awaiting shipment at the producer. Due diligence in itself is a much wider domain, where the necessary systems need to be in place, so that the information on the source of the wood can be carried through the whole production chain, up to the product being delivered to the actor responsible for carrying out due diligence. For the actors practicing due diligence, the expertise discovery provided the SPD, would be relevant in controlling that the implemented due diligence system is performing as intended. Besides interest to act in accordance with legislation, companies need to also safe-guard their commercial reputation. The needs of actors responsible for carrying out due diligence, depend on how well established their own due diligence systems are:

Starting out: An actor starting a due diligence practice might be interested to know if there are legality problems with their current stock of goods, potentially already implemented, and currently on sale.

Some due diligence in place: Checking particularly when a shipment of high-risk species or of a high-risk origin, they will want to have more certainty on the validity of a trade claim.

Established due diligence system: Periodic quality checks (audits) to see if the systems is performing as intended, and need a new laboratory to perform independent checks. Also, in case of some new products/species, that are not covered by existing service contracts with laboratories.

Requirements to the SPD user interface for due diligence actors may for example contain: species, origin of wood, location of the customer, preferred service language, and frequency of service provision being sought.

Legend



Glossary

Rapid field identification: Tools and identification techniques available to non-experts; used to quickly establish a legal basis for intervention (e.g. seizure, provision of charging documents etc.); less accurate than *expert forensic identification* but adequate to establish grounds for further investigation.

Expert forensic identification: Scientific identification undertaken by experts according to strict standards; required for court proceedings; often a lengthy process; not required to establish grounds for further investigation (see *rapid field identification*).

Logistics: The detailed organization of a process. With respect to timber shipments officers should be aware of,
 * Chain of command and points of contact in the port for emerging issues
 * Requirement for, and availability of, additional security measures (e.g. locks, seals, guards, CCTV)
 * Availability and location of appropriate storage areas for shipments, both short and long term
 * Requirement for, and availability of, suitable equipment and manpower for moving shipments

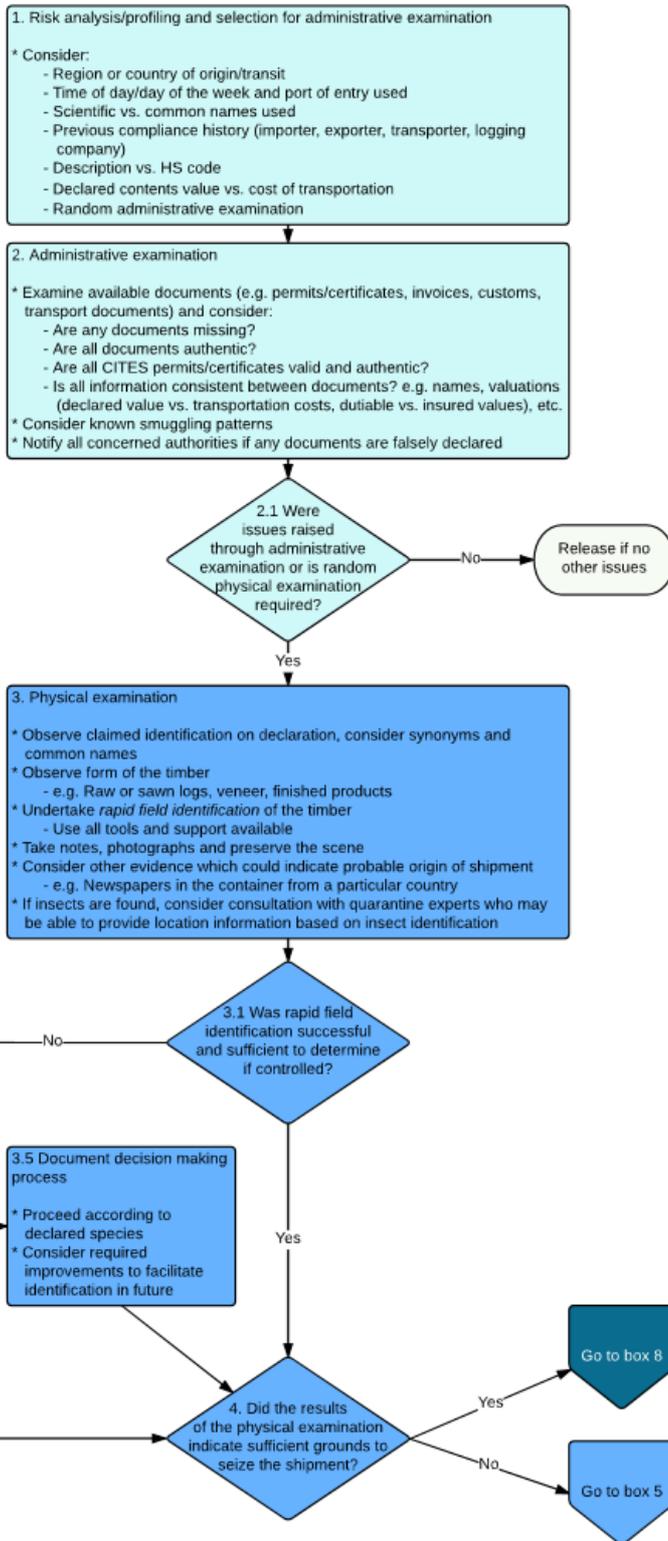


Figure 8a UNOCD Best Practice Guide for Forensic Timber Identification, Law enforcement best practice flow diagram for timber

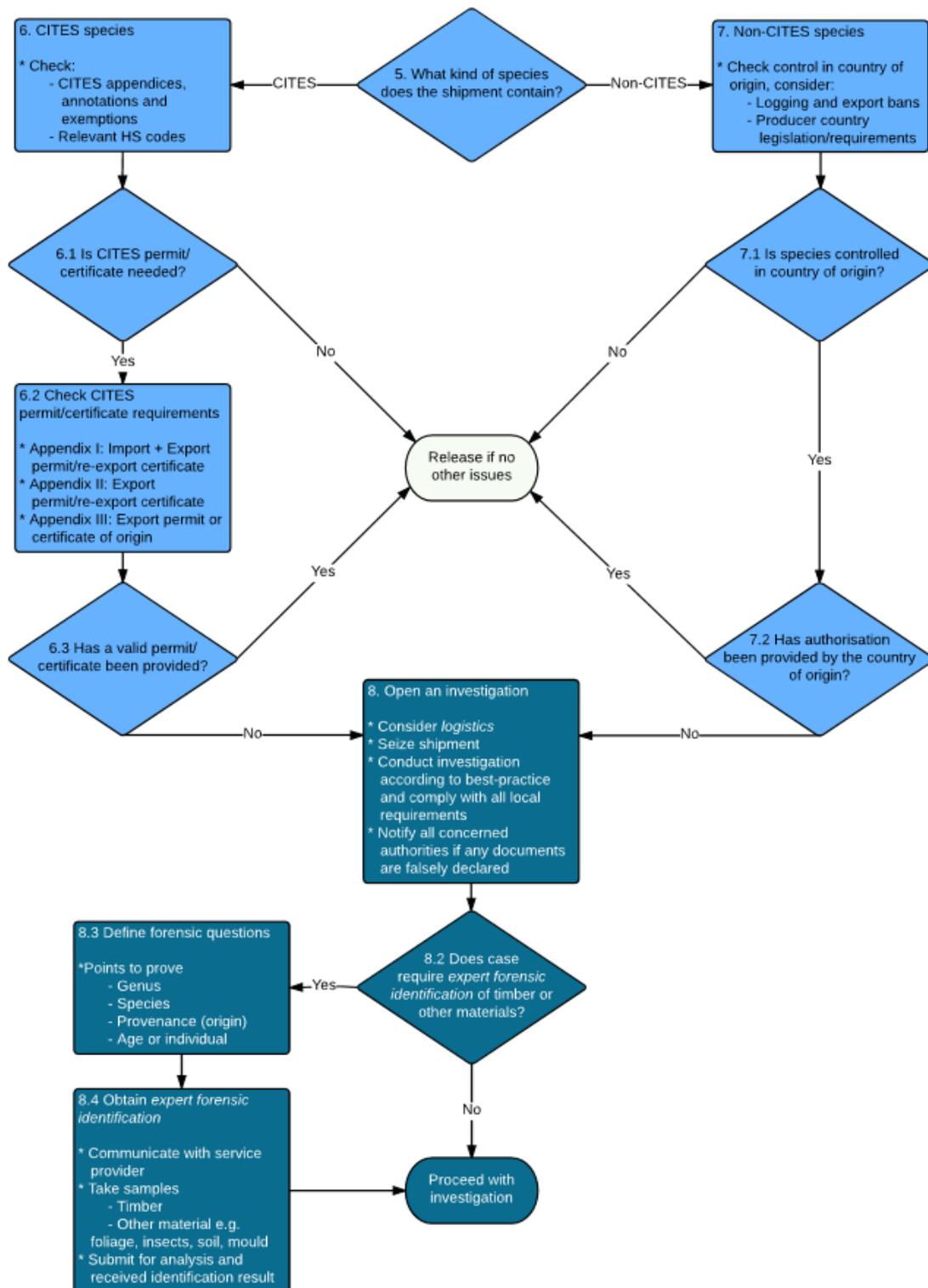


Figure 3b UNOCD Best Practice Guide for Forensic Timber Identification, Law enforcement best practice flow diagram for timber

4 Updated design of the reference database for GTTN phase 2

4.1 Introduction

Discussion over the beginning of the project has produced the following design options as a way of understanding the impacts of the design alternatives. Based on this elaboration, a solution has been proposed in the GTTN meeting in Washington D.C. (see chapter 4.4).

4.2 Design option #1 - a distributed service

- A distributed system could use information from external, already existing datasources. The level of understanding that the GTTN database can have on what data these databases contain, depends on the level of metadata descriptions in those services.
- If the records/pages are described by metadata systemetically, the situation is good. A meta data service for this data, is provided.
- Inaccurate or only database level metadata means that we can only have a cursory understanding of the contents → integration potential weak.
- This would allow us to build on other organisations know-how, while they maintain their own data separately
- **RISK:** can a distributed service be safe from external manipulation? If our service relies on external services, perpetrators could compromise the GTTN service by polluting the contents of any external service we are relying on for reference data. It would require those participating in the distributed service to follow certain data storage, API and maintenance protocols.

4.3 Design option #2 - a centralized service

- Better for ensuring security, we control all access and data.
- Still allows the full deposition of data and sharing only metadata
- The database should be a hybrid solution that contains both metadata describing the data available from participating labs by request and also contain actual data with its relevant metadata descriptions.
 - This solution allows e.g. smaller labs to directly deposit their data in the database.

- If labs are not inclined to share their data openly with everyone, the “data search” interface will lead to the record describing the data and instead of a “Download data” button, there will be a button to “Send request to lab for reference data”.

4.4 Proposal on implementation of GTTN Reference database

In the WG2 discussion it was suggested that the GTTN reference database could be built on the TreeGenes platform (<http://treegenesdb.org/>), today hosted by University of Connecticut and managed by the team of Jill Wegrzyn. Jill presented the TreeGenes platform in Madrid, which consequently lead to assessing the feasibility of using TreeGenes as an established and tested platform onto which GTTN could append its own reference data.

The description of Treegenes given by its about-section:

“The TreeGenes database provide a custom informatics tools to manage the flood of information resulting from high-throughput genomics projects in forest trees from sample collection to downstream analysis. This resource is enhanced with systems that are well connected with federated databases, automated data flows, machine learning analysis, standardized annotations and quality control processes. The database itself contains several curated modules that support the storage of data and provide the foundation for web-based searches and visualization tools.”

TreeGenes is built on an extension of the content management system Drupal², called Tripal³. A description of Tripal:

“Tripal is a toolkit for construction of online biological (genetics, genomics, breeding, etc), community database, and is a member of the GMOD family of tools.” “Genomics, genetics, breeding and other biological data are increasingly complicated and time consuming to publish online for other researchers to search, browse and make discoveries. Tripal provides a framework to reduce the complexity of creating such a site, and provides access to a community of similar groups that share community-standards, and interact to address questions and learn best practices for sharing, storing and visualizing complex biological data.”

Reflecting on the initial requirements given in chapter 1 and the elaborated requirements from the GTTN Kick-Off meeting in 2.3.2, many of the design

² <https://www.drupal.org>

³ <http://tripal.info/>

concerns of GTTN seem to be addressable by building on top of the body of work that TreeGenes has put in place.

Hosting and Safety:

Drupal comes with in-built access control, which is the basis for ensuring limited visibility of content, or restricting access to reference data. As a widely employed content management system, security receives a lot of attention, with security fixes systematically published. TreeGenes has user groups, for which access can be separately controlled. Technical safety of the software platform can be ensured to a satisfactory degree.

TreeGenes is hosted by University of Connecticut. TreeGenes (JW), has indicated that there would be no service fee for GTTN for hosting GTTN related data in TreeGenes. Additional calculation capacity for analysis functions is provided by supercomputers at TACC (Texas Advanced Computing Center).

The user requirement that the host should also be seen as: neutral, accepted, safe and be free of conflicts of interest – is a question that we must put to the user community. This is perhaps a key question, as many of the technical details with this collaboration seem to fall in place.

Inventory of data

As an existing database, TreeGenes has already a body of data in it. GTTN is well placed to motivate the data collection on e.g. the GTTN priority list of species. The methods for data entry are tested and standards are in place for the data format. TreeGenes currently covers:

- 1,774 species from 101 genera, at least one genetic artifact from each species
- Full genome sequence: 21 species
- Transcriptome/Expression resources: 4,120,817 sequences from 283 species
- 106 genetic maps from 35 species

Willingness to share data

In 2016 TreeGenes had 2,086 users from 862 organizations in 94 countries. So clearly there is a currently a body of users who consider the platform trustworthy enough to deposit their data.

For GTTN users, the ability to have access controlled user groups to confine reference data access to known users, might be a critical enabler.

The WG1 plays a key role in establishing GTTN standards for entering the data, which should facilitate systematic data provision. The conditions of Access and Benefit Sharing (ABS) are important to willingness to share. The possibility of incorporating royalties for reference data use might be considered: keeping track of who uses what data.

Links to External databases

Probably some organizations may not be willing to store their reference data 'out-of-house'. Some organizations may not have the resources to store their reference data safely in-house. TreeGenes implements a hybrid approach that enables both of these approaches.

Annex

Annex 1 GTTN Phase 1 Client Software User Manual



GTTN_Client_User_
Manual.pdf

Annex 2 Law enforcement best practice flow diagram for timber



Flow
Diagram_ED_edits.p

With support from



by decision of the
German Bundestag

www.globaltimbertrackingnetwork.org

The objective of the Global Timber Tracking Network (GTTN) is to promote the operationalization of innovative tools for wood identification and origin determination, to assist the fight against illegal logging and related trade around the globe. GTTN is an open alliance that cooperates along a joint vision and the network activities are financed through an open multi-donor approach. GTTN phase 2 coordination (2017-2019) is financed by the German Federal Ministry of Food and Agriculture (BMEL).