



# Electronic Measurement Solutions

Examples in log scaling and  
standing forest inventory



# Haglölf Sweden AB

Långsele -  $63^{\circ}10'42.19''\text{N}$  -  $17^{\circ}4'10.93''\text{O}$





# Haglof Company Group



## ■ Haglöf Company Group



□ Haglöf Sweden AB, Sweden 1943



□ Haglöf Production, Sweden 1971



□ Haglof Inc, USA 1981



□ Haglof UAB, Lithuania 2001



# Haglof Company Group

- Family business in 4th generation
- Close to 70 years workshop experience and measuring instrument manufacturing
- World leading development of field measuring instruments
- Distributors in more than 70 countries
- Export worldwide



# Other Interesting Facts

- Sweden is approximately 450,000 km<sup>2</sup>
- California is approximately 404,000 km<sup>2</sup>
- US was founded in 1776
- Stora Enso has business documents dating back to 1288
- In other words, they had been in business for 488 years when the US became a country



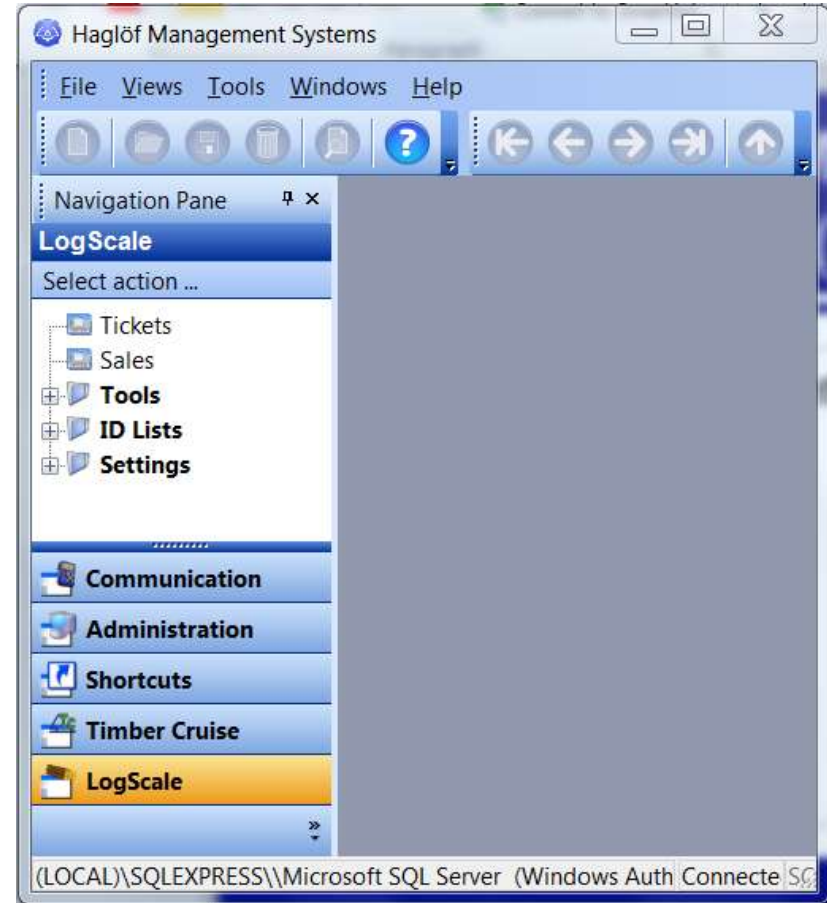
# Other Interesting Facts

- Sweden is only slightly larger than California with approximately 1/4 of the country above the arctic circle, yet forestry has been a key element in their economy for over 700 years and continues in that role today.
- Swedish forestry operations have evolved to epitomize accuracy and efficiency, which comes through in every Haglof product.



# Haglof Management System (HMS)

- Provides a common desktop interface
- Incorporates flexible application suites
- Leverages powerful SQL database
- Integrates fully with mobile field solutions



- Can be deployed either on Windows Mobile devices, or computer calipers.
- Since the focus today is on measurement, I'll emphasize the use of computer calipers that provide both field computing and electronic measurement.





# Peripheral Devices



GPS



Vertex  
Laser



Bar Code  
Scanners



Digitech Tape



Vertex IV



# Log Scale

Accurate and efficient log measurement and management



# Log Scale Components

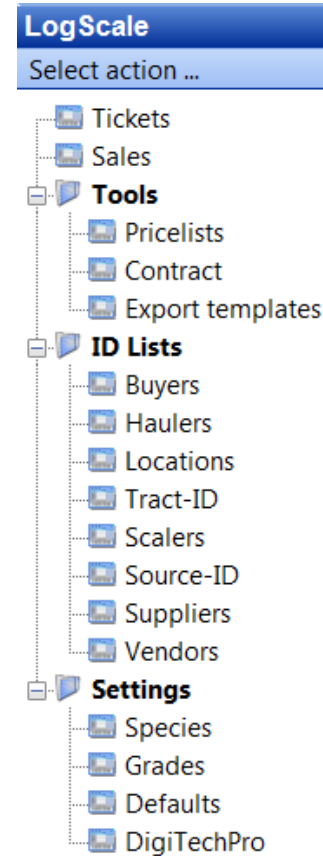
- LogScale Suite in HMS
- LogScaleDP on the Digitech Professional Caliper
- Digitech Tape
  - Logger's tape if not cut-to-length
- Log tags
- Barcode scanner





# HMS LogScale Suite

The LogScale Suite in HMS provides a common, user-friendly PC interface with several key functions.





# HMS LogScale Suite

- Create species lists
- Create product grade lists
- Create multiple price lists
- Setup contracts
- Send scaling templates to caliper
- Import/export log scale data
- Manage log inventories
- Generate reports



# HMS LogScale Suite

- Broad range of volume output
- Log rules programmed in
- Short learning curve
- Fast and accurate

The screenshot shows a dialog box titled "Select volume unit/basis" with a close button in the top right corner. It contains a table with three columns: "Name of function", "Abbreviation", and "Basis". The table lists various logging functions and their corresponding units and bases. At the bottom of the dialog are "OK" and "Cancel" buttons.

Name of function	Abbreviation	Basis
International 1/4	Int-1/4	Int4-mbf
International 1/8	Int-1/8	Int8-mbf
Doyle	Doyle	Doyle-mbf
Bruce/Shumacher	BruceShum	BruceShum-m...
Scribner West-Side	ScribWS	ScribWS-mbf
Japanese Agricultural Std.	JAS	JAS-m3
Huber	Huber	HUB-m3
Cubic-feet inside bark	Cubic-feet	Cunit
Cubic-feet inside bark, p...	Piece	Piece
Cubic-feet on bark	Pound	Ton



# LogScale Setup

- Start by building a species list
  - Up to 5 character codes and full names.
  - Set bark thickness by species.

Code	Name	Single Bark-reduction (Inch)	Single Bark-reduction (mm)
ASH	Ash	0.3	8.0
BEECH	Beech	0.2	5.0
CEDAR	Cedar	0.2	5.0
CHRY	Cherry	0.2	5.0
CYP	Cypress	0.2	5.0
GUM	Gum	0.4	10.0
HICK	Hickory	0.3	8.0
PERS	Persimmon	0.4	10.0
POPL	Poplar	0.2	5.0
ROAK	Red oak	0.3	8.0
SPRUCE	Spruce Pine	0.3	8.0
SYP	Southern Pine	0.5	13.0
WOAK	White oak	0.3	8.0

# LogScale Setup

- Next build a list of grades or products

Code	Name	Pulpwood
SW	Sawlog	<input type="checkbox"/>
PW	Pulpwood	<input checked="" type="checkbox"/>
CULL	Cull grade	<input checked="" type="checkbox"/>
1	Grade 1	<input type="checkbox"/>
2	Grade 2	<input type="checkbox"/>
3	Grade 3	<input type="checkbox"/>
LG_4	User definable codes	<input type="checkbox"/>
LG_5	User definable codes	<input type="checkbox"/>



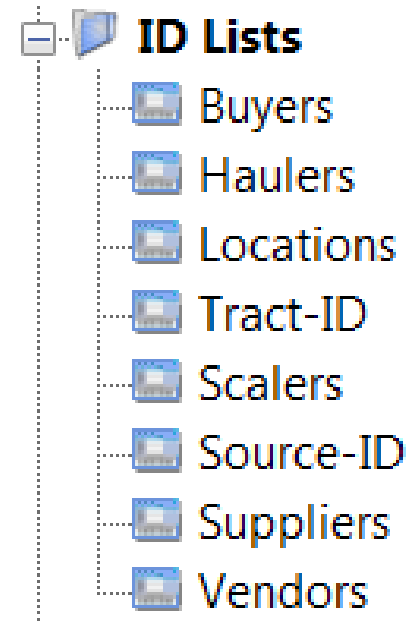


# LogScale Setup

## ■ Set default values for tickets

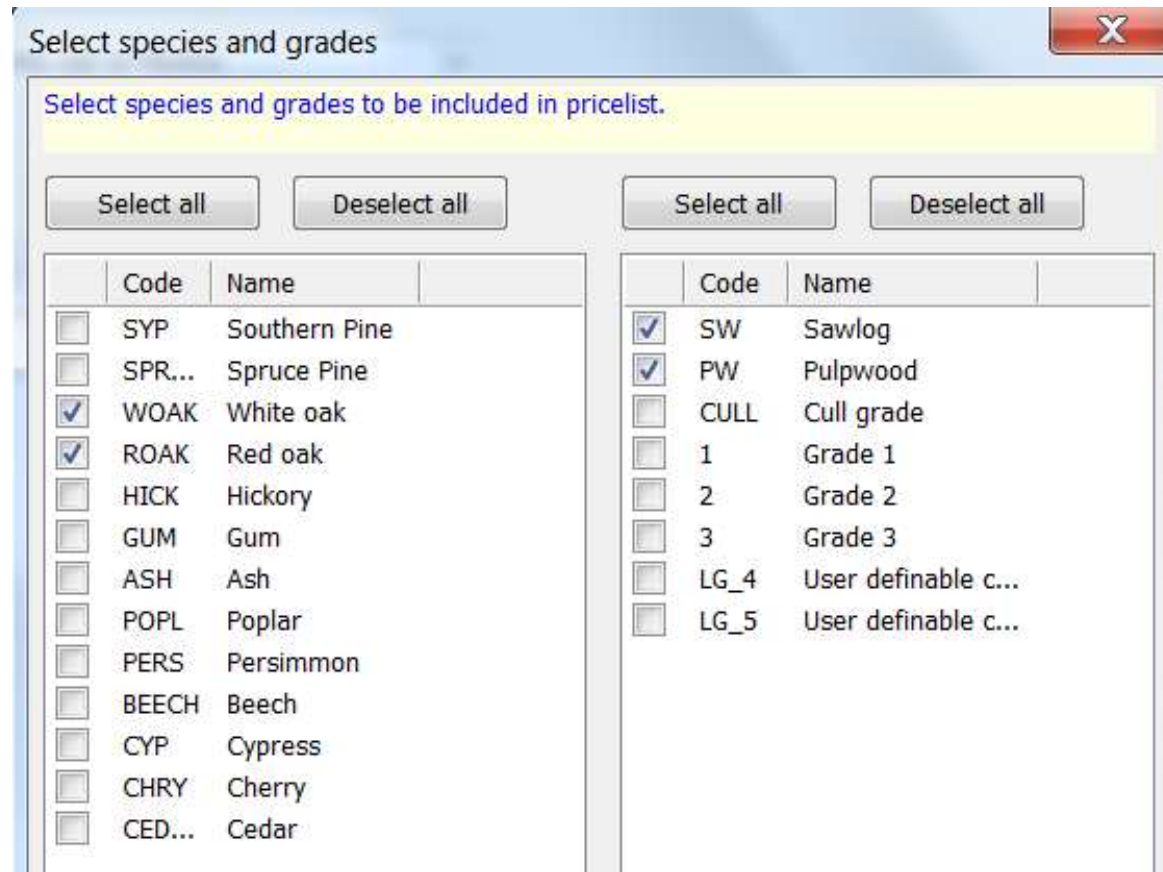
Default settings		Extra volume-functions (max 20 at the same time)				
<b>Settings</b>		Sel.	Name of function	Abbreviation	Basis for calc.	Origin
Sawlog volume unit	Doyle-mbf	<input type="checkbox"/>	International 1/4	Int-1/4	Int4-mbf	Standard
Pulpwood volume unit	Cunit	<input type="checkbox"/>	International 1/8	Int-1/8	Int8-mbf	Standard
Deduction type	PERCENT	<input type="checkbox"/>	Doyle	Doyle	Doyle-mbf	Standard
Load type	SHORT LOG	<input type="checkbox"/>	Bruce/Shumacher	BruceShum	BruceShum-mbf	Standard
Frequency	1	<input type="checkbox"/>	Scribner West-Side	ScribWS	ScribWS-mbf	Standard
Log length (inch)	0	<input type="checkbox"/>	Japanese Agricultural Std.	JAS	JAS-m3	Standard
Log length (m)	0	<input type="checkbox"/>	Huber	Huber	HUB-m3	Standard
Southern doyle	No	<input type="checkbox"/>	Cubic-feet inside bark	Cubic-feet	Cunit	Standard
Round scaling	No	<input type="checkbox"/>	Cubic-feet inside bark, piece	Piece	Piece	Standard
Taper IB	0.125	<input type="checkbox"/>	Cubic-feet on bark	Pound	Ton	Standard

- You can create lists of buyers, haulers, locations, tract ID's, scalers, source ID's, vendors and suppliers.
- These values can be set for each contract and/or ticket.



# LogScale Setup

- Create at least one pricelist selecting species and grades to include



- Set the price and basis by species and grade.

**LogScale - Create pricelist**

Name: Mexico Notes: Export red and white oak to Mexico.


Created by: BRIAN

Date: 12-03-23

**WOAK - White oak** ROAK - Red oak

Grade	Price	Basis
SW	300.00	Int4-mbf
PW	15.00	Cunit

- Create a new contract, give it a name then select the price list you want to use.

A screenshot of a software dialog box titled "New contract" with a red close button in the top right corner. The dialog contains a text input field with the label "Enter name of contract" and the text "New Buyer" entered. Below this is a section labeled "Select pricelist to be included in contract." with a list box containing three items: "India 1", "Turkey", and "Mexico". The "Mexico" item is currently selected and highlighted in blue.

- The contract contains all of the information you need for scaling logs, as well as calculating volumes and values for a given customer

LogScale - Create contract

Name: New Buyer  
Created by: BRIAN  
Date: 12-03-27  
Measuringmode: Metric  
Buyer: [dropdown]  
Hauler: [dropdown]  
Location: [dropdown]  
Tract-ID: [dropdown]  
Scaler: [dropdown]  
Source-ID: [dropdown]  
Vendor: [dropdown]  
Supplier: [dropdown]

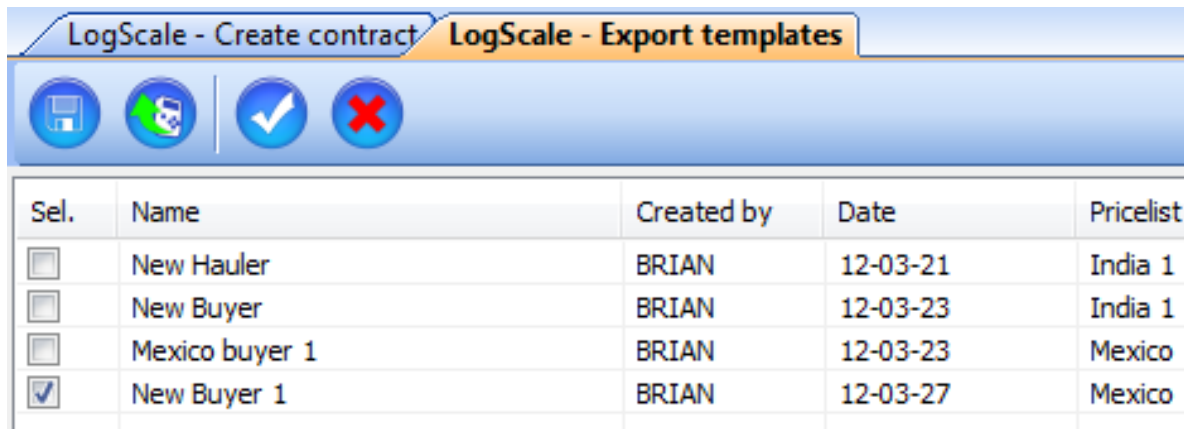
Selected pricelist: Mexico  
Set default species: ROAK - Red oak  
Set default grade: SW

Set trim for log-length  
Trim (ft): 0.5  
Trim (cm): 15

Notes

WOAK - White oak		ROAK - Red oak	
Grade	Price	Basis	
SW	300.00	Int4-mbf	
PW	15.00	Cunit	

- Contracts can be exported as templates to move the necessary settings over to the caliper for scaling.

A screenshot of a software window titled "LogScale - Export templates". The window has a blue header bar with two tabs: "LogScale - Create contract" and "LogScale - Export templates". Below the tabs is a toolbar with four icons: a floppy disk, a circular arrow, a checkmark, and a red X. The main area of the window contains a table with five columns: "Sel.", "Name", "Created by", "Date", and "Pricelist".

Sel.	Name	Created by	Date	Pricelist
<input type="checkbox"/>	New Hauler	BRIAN	12-03-21	India 1
<input type="checkbox"/>	New Buyer	BRIAN	12-03-23	India 1
<input type="checkbox"/>	Mexico buyer 1	BRIAN	12-03-23	Mexico
<input checked="" type="checkbox"/>	New Buyer 1	BRIAN	12-03-27	Mexico

- New tickets can be created either on the caliper, where the data can be measured and captured electronically, or on the desktop where the log data can either be entered manually or imported from another source.
- You must select a contract to use on each ticket.





# Database

- Ticket data is written to an SQL database for managing the log inventory.
- As a log is entered into the database, its status is noted as “in stock”.
- Status can be changed from “in stock” to “sold” using the sale routine.



# Sales

- A Bluetooth barcode scanner can be used to capture log tag numbers on the DP terminal when selling logs.
- The tag numbers can be imported into a new sale in HMS to retrieve the sold logs from the database, create a sale report and change the log's status to "sold".



# Timber Cruise

The most robust, flexible and comprehensive forest inventory solution available





# Timber Cruise Components

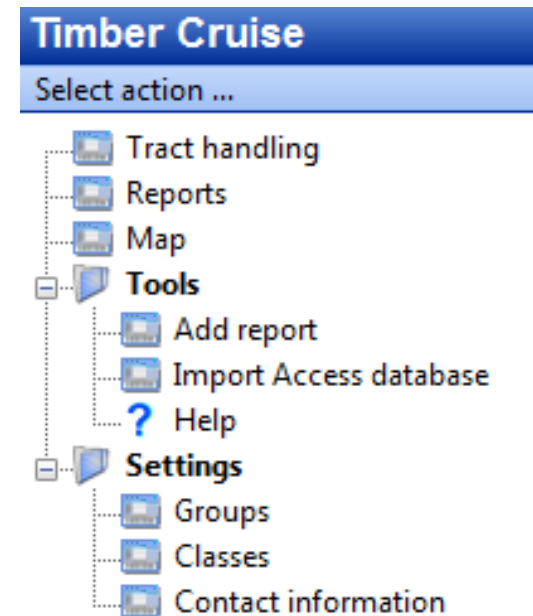
- Timber Cruise Suite in HMS
- TCruise Desktop
- TCruiseDP on the Digitech Pro caliper
- Bluetooth GPS
- Vertex Laser or Vertex IV (360 package)





# HMS Timber Cruise Suite

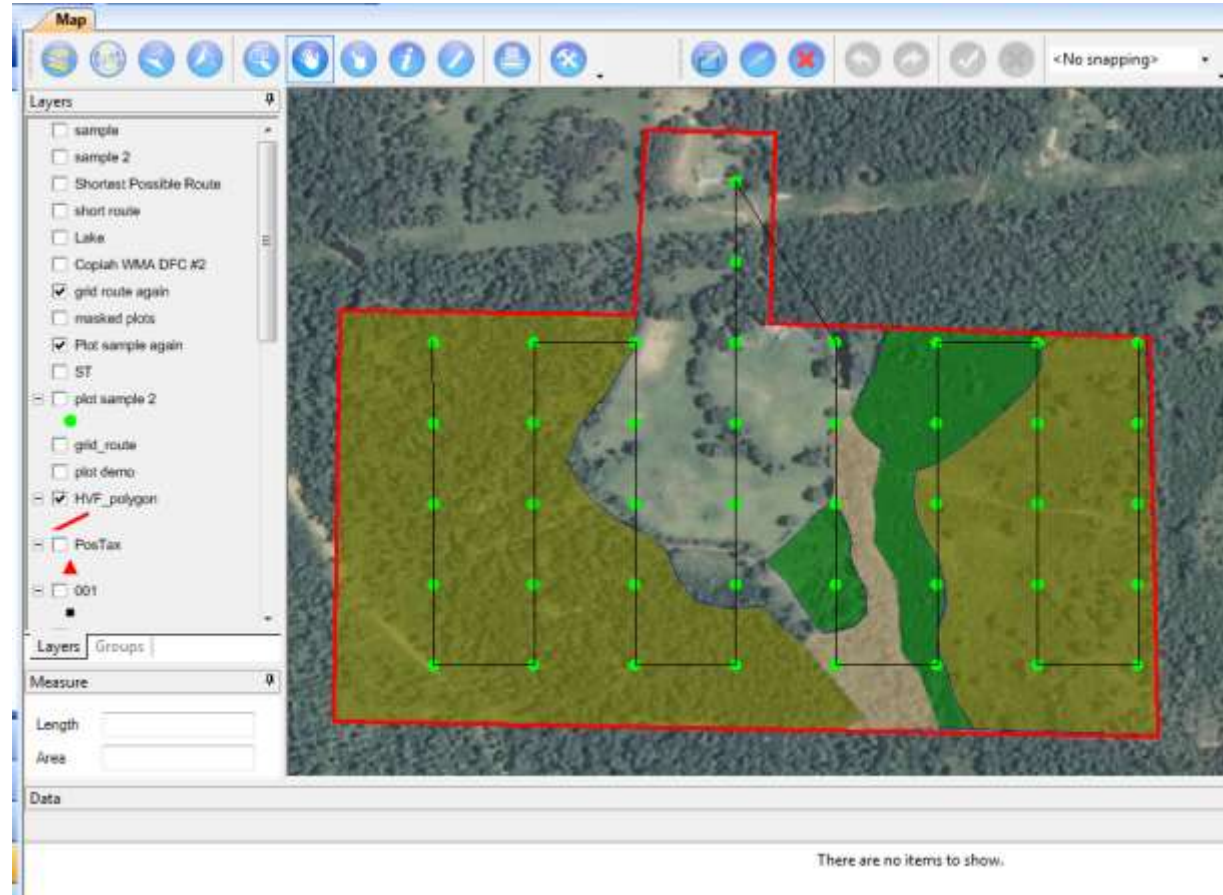
- The Timber Cruise Suite in HMS provides a common, user-friendly PC interface with several key functions.
- Writes data to a powerful SQL database





# Inventory Planning & Design

- HMS includes a dedicated GIS that is fully integrated with the inventory application.





# Inventory Planning & Design: GIS Module

- Delineate stands
- Measure areas
- Generate sample plots
- Export navigational routes or waypoints
- Data rendering and visualization
- Publish maps
- Perform numerous other GIS functions useful for forestry



# Inventory Planning & Design: TCruise

## ■ TCruise Templates

- Plot, point, or double point sample designs
- Separate reproduction, sub-merchantable, pulpwood, and saw timber plot/BAF factors
- Timber trespass (stump) cruise
- Merchandise tree logs by grade and product
- Export cruise parameters as templates for use in the field



- Area inventory
  - Walk around a stand to calculate and store area
  - Export GPS data as KML files for display in Google Earth or GIS





# Inventory Data Collection

## ■ Plot Inventory

- Import cruise template into caliper
- Import plot waypoints/route into caliper
- Select plot from list in TCruiseDP
  - Distance and azimuth noted
  - Basal area noted for completed plots
- Navigate to plot using caliper and a Bluetooth GPS
- Receive audible alert when arrive at plot
- Establish plot center and collect forest inventory data.



# Inventory Data Collection

- Mostly automated
  - GPS navigation to plots
  - Diameters and heights (Vertex) measured and captured electronically
  - Ultrasound plot/point sample determination
  - Reduced human error
  - Increased accuracy and productivity

# Data Processing

- Import field data back into TCruise Desktop
- Run by groups
  - Data is inserted into SQL database

Tract ID	Tract Acres	Cruise Method	Cruise Date	Tract Location	Tract Owner	Cruiser
AA7116	7.3	Point sampling	12/01/2011	0088	Angelina	LMP
Copiah WMA DFC #2	6230.0	Plot sampling	12/31/10	Copiah	MDWFP	WL bureau staff
Haas-Hirsch	80.0	Plot sampling	3/24/2011		Haas-Hirsch	Clay Dowies
HVF 2 15 11	0.5	Plot sampling	02/15/11	S 35, T 4 N, R 15 W Lamar County, MS	Katharine Thomas	Brian Mitchell
HVF 3 Sample	0.5	Plot sampling	01/13/11	HVF	Katharine Thomas	Brian Mitchell
St. Martin Stand 1	936.0	Plot sampling	06/13/2011	St. Martin		Management Crew
Strip Cruise Tract	57.9	Plot sampling	04/01/2011	Arkansas	Unknown	Will Tomlinson
TCruiseDP V 1.04 Test	1.0	Plot sampling	05/04/11	Madison	Haglof	BRIAN
Warwick	52.0	Plot sampling	10/31/2011			D&B

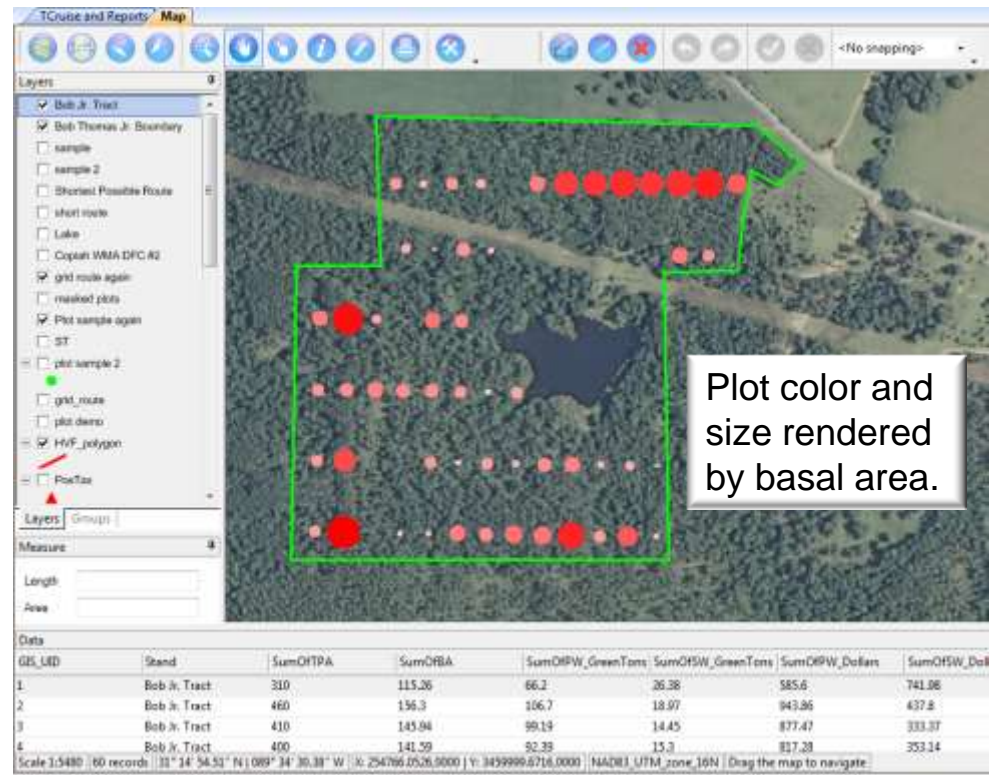
# Data Processing

- Once inserted into the database, from the Tract Handling page you can:
  - Filter reports/tracts
  - Run reports
  - Attach external information and/or data
    - Websites
    - Contracts
    - Pictures
  - Jump to plot points on map

# Data Visualization

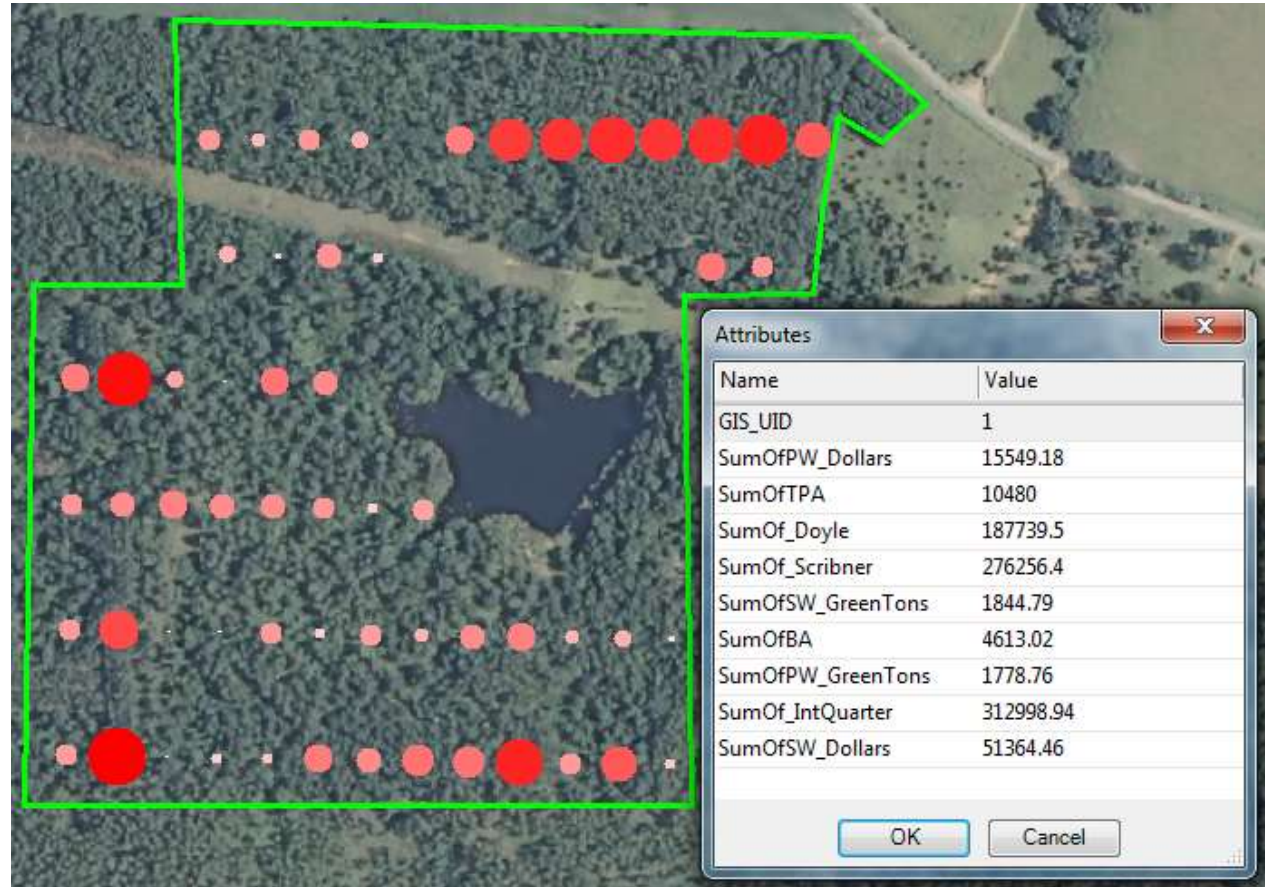
Once the plots are populated on your map, you can visualize a summary of the plot data by rendering the plot symbols by any of the summary values.

- Trees Per Acre
- Basal Area
- PW Green Tons
- SW Green Tons
- PW Dollars
- SW Dollars
- Doyle
- Scribner
- IntQuarter



# Data Summary

- You can extract summary data from any plots on your map.





# Reports

- HMS uses Crystal Reports to create high-end professional-looking color reports customized with your personal header information.




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Website: [www.haglofinc.com](http://www.haglofinc.com)

*Detailed Summary Report*

Company Information

Company	<input type="text" value="Haglof Inc."/>
Address	<input type="text" value="100 Solleftea Drive"/>
Address2	<input type="text"/>
City	<input type="text" value="Madison"/>
Zip Code	<input type="text" value="39110"/>
State	<input type="text" value="MS"/>
Country	<input type="text" value="USA"/>
Phone	<input type="text" value="(601) 856 - 5119"/>
Fax	<input type="text" value="(601) 856 - 9075"/>
Email	<input type="text" value="Brian.Mitchell@haglofinc.com"/>
Website	<input type="text" value="www.haglofinc.com"/>

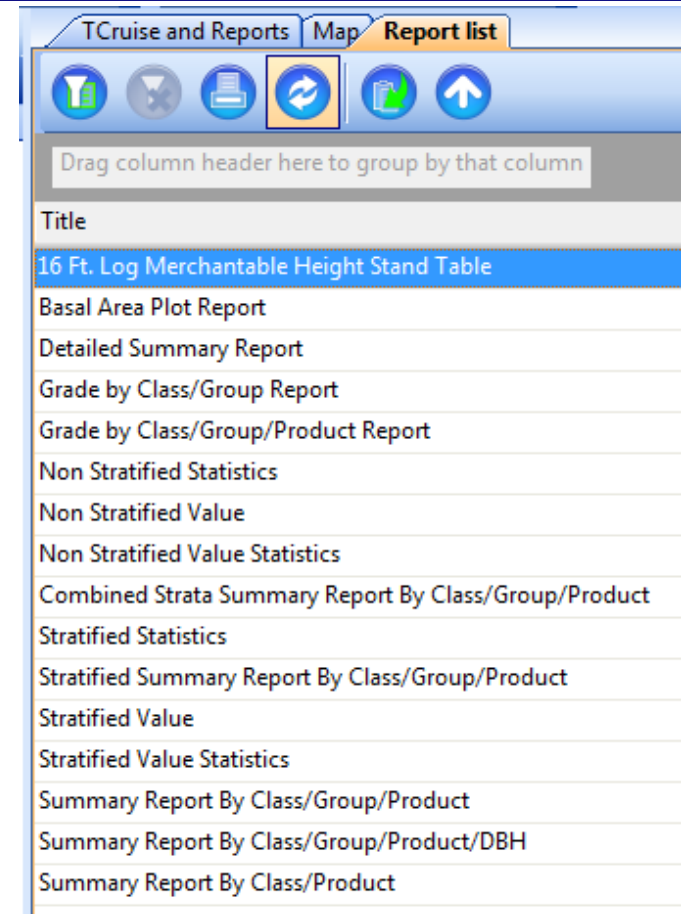


Reports only support picture formats bmp and jpg and with a maximum size of 450x450 pixels



# Reports (Continued)

- HMS includes a number of useful standard reports.
- We can create custom reports to your exact specifications.





# Summary

- HMS provides a common interface integrating powerful application suites leveraging an SQL database.
- LogScaleDP and the LogScale Suite in HMS collectively provide a very accurate and efficient system for scaling logs and managing log data.



# Summary (Continued)

- The Timber Cruise Suite and TCruiseDP integrate synergistically into a very robust forest inventory system that automates much of the inventory process.
- Your forest inventory and/or log scaling accuracy and efficiency as well as your bottom line can improve using this system.



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