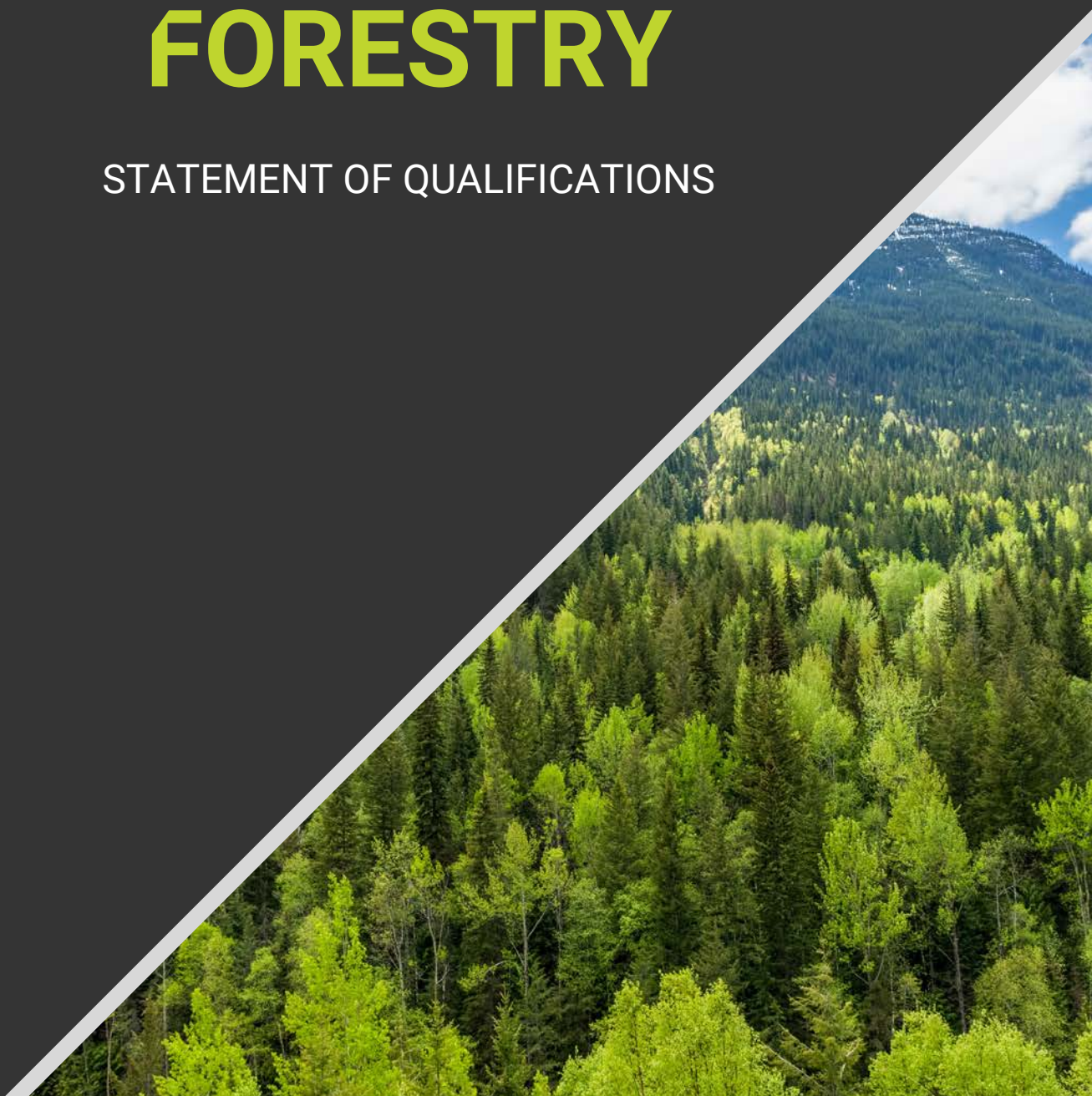
2021

FORESTRY

STATEMENT OF QUALIFICATIONS



SUMMARY OF EXPERIENCE

Ecora's Forestry Team provides an integrated approach to strategic planning and decision support across the Forestry sector. With well over 100 years of combined technical expertise, our diverse Team of highly competent professionals prides itself on the delivery of innovative and efficient solutions to complex resource management problems.

The Ecora Team utilizes industry leading software and technology to build client-focused solutions to natural resource problems. We offer data collection, data management, and analytical support at all points along the decision-making process, from the forest to the board room.

Based in western Canada, Ecora offers forestry services throughout the world, in multiple languages to a wide range of client groups including private forest investment firms, pension funds, federal and provincial governments, large and small forest licence holders, indigenous communities, environmental organizations, and community forests.

SAMPLE CLIENT LIST

- British Columbia Timber Sales
- Campbell Global
- Canadian Forest Products Ltd.
- Cheam First Nation
- Global Forest Partners LP
- GreenWood Resources
- Halfway River First Nation
- Interfor Corporation
- Mosaic Forest Management
- Natural Resources Canada
- The Nature Conservancy
- New Forests
- Osoyoos Indian Band
- OneFortyOne Plantations
- The Province of British Columbia
- Tolko Industries Ltd.
- Westbank First Nation
- West Fraser Timber Co. Ltd.
- Weyerhaeuser

SERVICES OFFERED

Ecora is a world class provider of integrated strategic forest estate modeling, data management and geospatial services, carbon analysis, forest inventory and ecology. We provide our clients with strategic solutions focused on automation, efficiency and the optimization of their natural resources.

Resource Analysis

Ecora's Resource Analysis Team is a leading provider of strategic decision support and forest estate modelling services. With well over 100 years of collective analytical expertise we optimize management decisions, while balancing environmental, social and economic return from your resources.

Ecora specializes in answering complex, strategic-scale natural resource questions. We have experience in a wide range of powerful analysis tools, but we do not limit ourselves to specific software. We employ the most appropriate tool for a particular question; with our technical background and experience we easily learn new analytical tools. When different parts of a problem are best addressed by different tools, we use scripting languages like Python and R to chain together inputs and outputs from each tool. When no existing software is available for a particular analysis, we write our own.

Forest Resource Analysis

- Strategic timber supply forecasting
- Spatial optimization
- Fibre delivery optimization
- Discounted Cash Flow (DCF) modelling
- Tactical and operational planning
- Integration of enterprise-level fibre supply optimization with operational and tactical planning

Forest Estate Modeling Software

- Patchworks
- Woodstock
- aiTree
- FPS/Atlas
- Woodlot for Windows
- SELES

Carbon Accounting

- Annual and historical carbon footprint
- Optimization of carbon and timber values
- Carbon offset project development
- Forest carbon protocol review and selection
- Experience with FCOP, ARB, and VCS protocols
- Custom incorporation of carbon attributes into your inventory
- Land use planning
- Cumulative effects analysis
- Multiple-Criteria Decision Analysis (MCDA)

Growth and Yield

- VDYP / TIPSY
- FPS
- FVS
- YTGEN

Scripting and Programming

- Increasing efficiency and chaining together workflows
- Documenting workflows
- Creating custom analysis tools
- Python, SQL, Bash, R and others

Geospatial Analytics

GIS used to be just about maps, but things have changed. Ecora has revamped this standard by using geospatial tools to visualize, create, analyze and ultimately build better products for our clients. We develop efficient solutions to understand more than just the map, but all the data behind it. We are flexible and driven by innovation and creativity!

ESRI based solutions

- ArcGIS Enterprise and Arc
- GIS OnlineDevelopment – Maps, Apps, Tools & Scripts
- Dashboards & Story Maps
- Mobile solutions (Collector, Survey123, Explorer & Field Worker)

Data Management & Administration

- Relational geodatabase design & maintenance
- Data generation & editing
- Spatial enabling
- Georeferencing historical or non-digital maps for Traditional values

Geospatial Analysis

- Spatial concepts, functions, and relationships
- Manipulation of imagery, GPS, satellite photography and historical data
- Clustering
- Spatial Aggregation
- Statistics and Change Detection
- Comparative analysis and benchmark of geospatial data and solutions

Resource Planning

- Forest Management Systems (LRM, Phoenix, Electronic Submissions - ESF or RESULTs)
- Overlay Analysis (vector and raster)
- Floodplain Management: Analysis using DEMs and Remotely Sensed data; Floodplain Mapping
- 3D Maps or Scenes for visualization
- Geovisualization

Scripting and Programming

- Creating and strategizing scripts and programs for increasing efficiencies and workloads.
- Python, SQL, Perl, C, R and others

LiDAR Solutions

- Acquisition planning and contracting
- Creating DEMs and DSMs
- Estimating forest density and height
- Contour and Slope Analysis

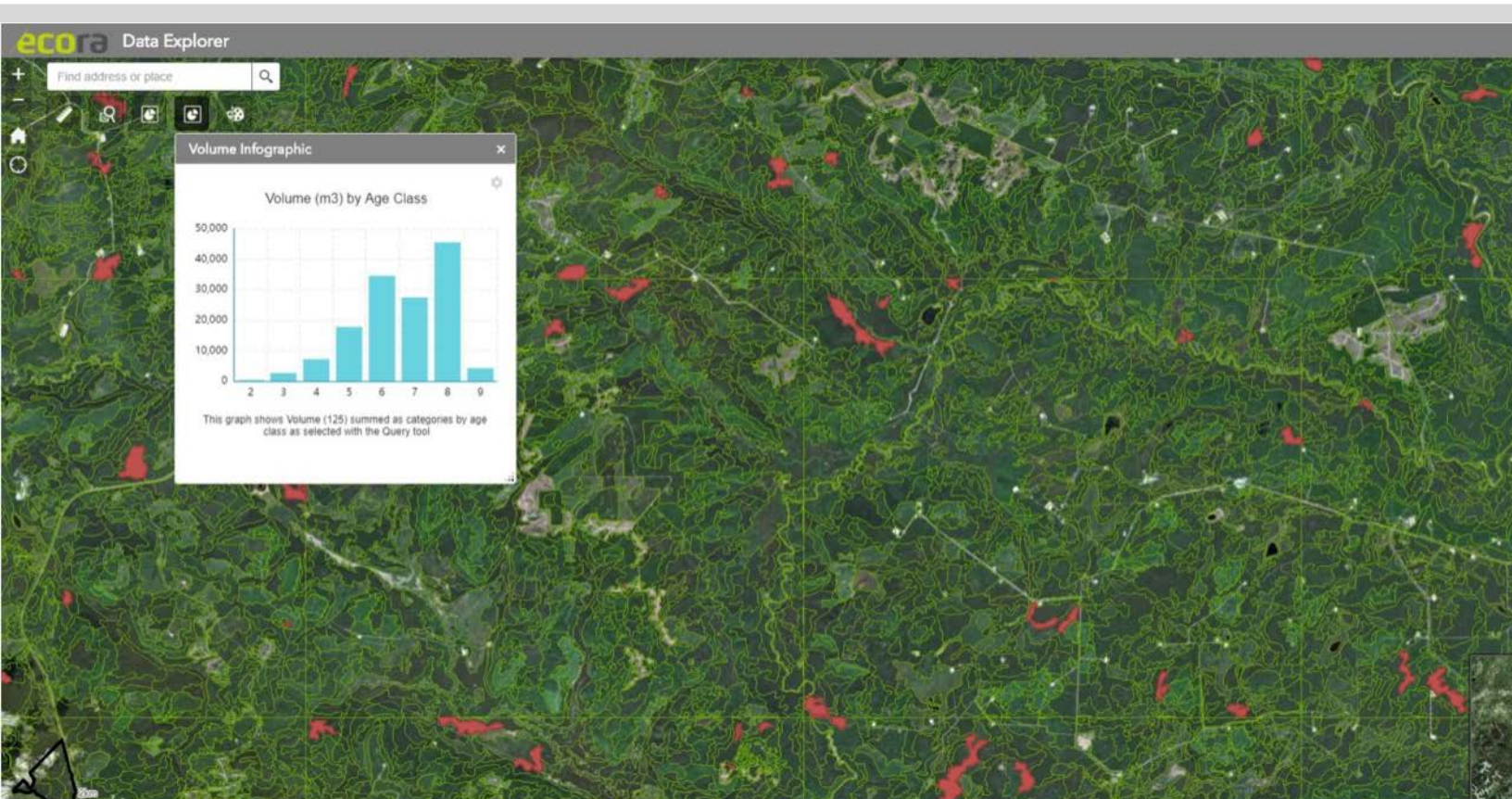
Drone Solutions

- Flight Planning
- Ecora has a fleet of 5 drones (4 quadcopters and 1 fixed wing) all equipped for the aerial collection of remotely sensed data — specifically high-resolution imagery and video.
- Ecora's drone pilots hold either basic or advanced licenses for the operation of remotely piloted aircraft systems as required by Transport Canada
- Ecora uses photogrammetry software to create the following products from the raw imagery:
    - High resolution geo-referenced orthomosaics
    - Digital terrain model
    - Digital surface model
    - Contour lines
    - 3D models and textured mesh
    - 3D point cloud

Forest Inventory and Mapping

Forest Inventory services include pre-inventory design, project implementation and quality assurance (QA), post-inventory audit, monitoring and inventory updates. Our customized inventory products mesh regulatory data standards with technical innovation and leading-edge technology. Specific areas where our team has a proven record of performance include, but not limited to the following:

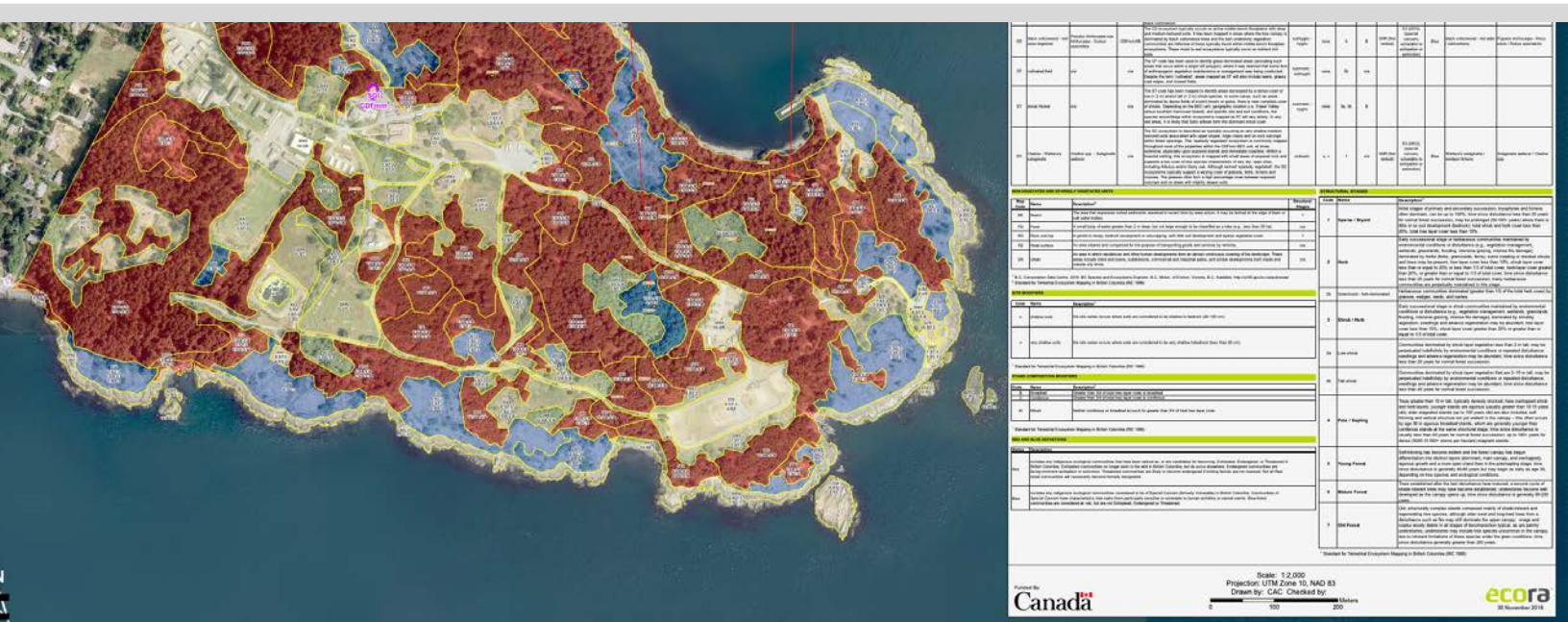
- Forest inventory — traditional photo based using softcopy technology
- Forest inventory — area or individual tree based using LiDAR and other remote sensing technology
- Pre-inventory design and project implement plan
- Project management and 3rd party quality assurance of inventory products
- Statistical sampling design and inventory attributes audit and adjustment
- Land cover classification and mapping - photo and remote sensing based
- Disturbances mapping and inventory update
- Silviculture survey and inventory update
- Road and stream inventory and mapping
- Change monitoring inventory
- Permanent/temporary sample plots design, installation, measurement, data compilation/analysis



Ecological Inventory and Analysis

Ecological principles and their successful application to forestry are integral to sound forest management planning and decision making. Our team of ecological experts and professionals have provided our clients with a broad array of products, including detailed ecological baseline data, sophisticated modelling for desired future outcomes, and support for strategic and operational plans and decisions. Our demonstrated project experience includes, but not limited to the following:

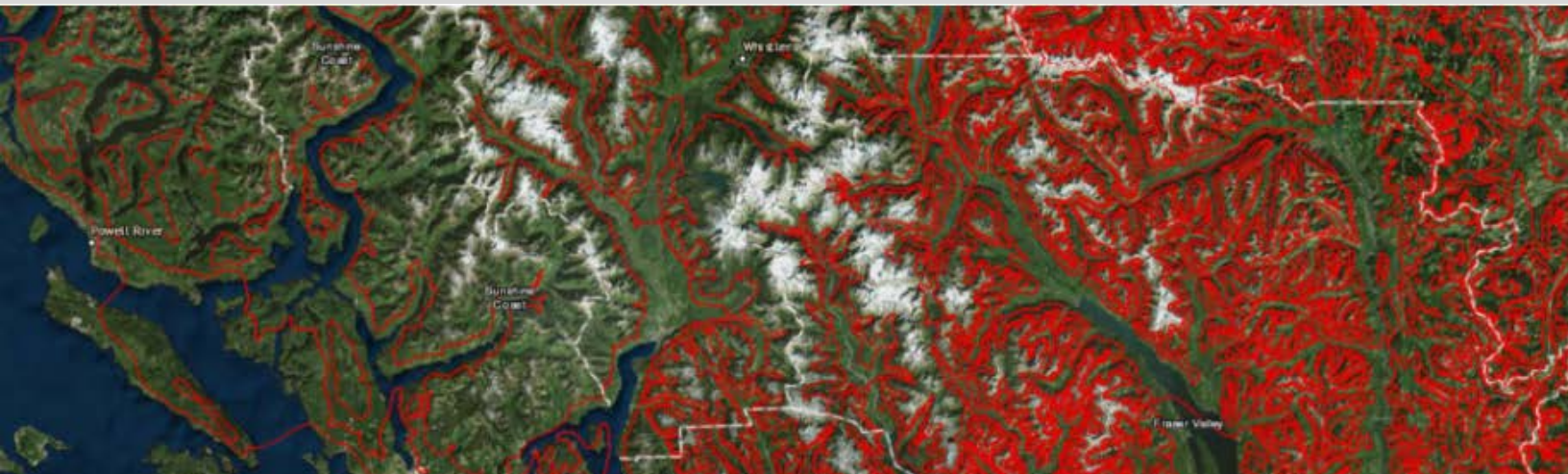
- Ecological baseline inventory and mapping — traditional photo based using softcopy technology
- Ecological baseline inventory and mapping — LiDAR and other remote sensing based predictive modelling using Machine Learning (ML) and expert knowledge
- Quality assurance and map accuracy assessment of ecological inventory and mapping products
- Biophysical modelling for site index prediction and field-based adjustment
- Ecological site classification and site-based productivity modelling
- Climate change mitigation and adaptation — drought/frost site mapping and species selection
- Biodiversity management plan and seral stage analysis
- Species and ecosystem at risk mapping and field assessment
- Wildlife habitat inventory (e.g., raptors, herons, songbirds, cavity-nesters, mustelids)
- Wildlife habitat assessment and supply modelling (e.g., goshawks, marbled murrelet)
- Riparian and wetland ecosystem mapping and field assessment
- Strategic land and resources management planning including value assessment
- Cultural and medicinal plants inventory and mapping
- Community and structure-based forest fire protection plans



Land Resource Manager (LRM)

Ecora is a leading provider in the support of implementation, customization, design and training associated with Trimble's Land and Resource Management software. Our team connects the intricacies of enterprise data management with an on the ground understanding of day-to-day forestry needs. We work with system end users to understand their daily workflows and processes and translate those into efficient and effective tools within LRM.

- Systems design and implementation
- System needs assessment and troubleshooting
- Data preparation, standardization and digitizing
- LRM implementation support
- LRM help desk support
- LRM user training
- Standard operation procedure (SOP) development and documentation
- Knowledge base website development
- LRM mapping and template design (Python Customization)
- LRM info type design
- Integration with other systems (Log Accounting, G&Y, Finance, ERP, Plant Wizard, Safety, etc.)
- Woodstock/LRM integration
- Roads and routed network datasets
- Reporting (Crystal Reports, SSRS, SQL, Access, xml)
- Database error checking and maintenance
- LRM configuration enhancements
- Database administration and optimization (Tuning)
- LRM mobile data configurations (Collector, Survey123, Explorer)



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