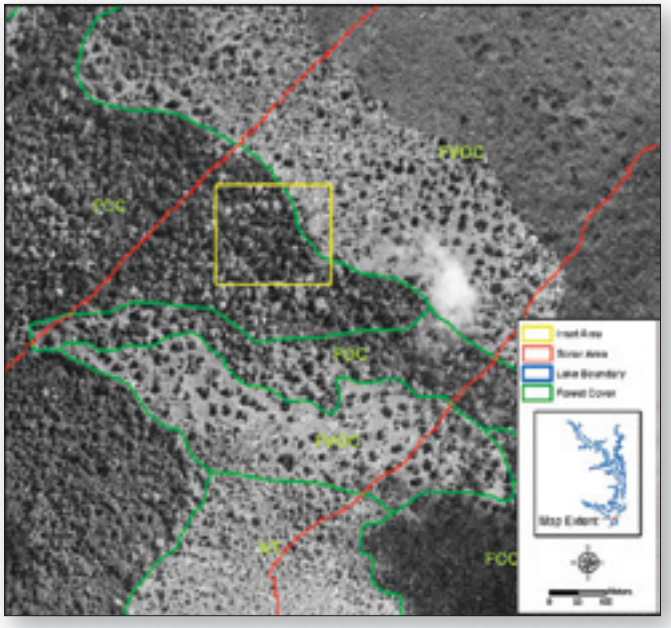
Salvaging Timber from the Volta Lake

A Project by CSR Developments

Laying the Groundwork Through Extensive Research

The Volta Lake project proposed by CSR Developments will put Ghana at the forefront of a **new global industry** – submerged timber salvage. The company is undertaking **world-class research and development** to prepare for this large-scale tree salvage operation. It has systematically brought together **leading-edge practices and technologies** from forestry, offshore oil and gas operations, marine engineering, as well as the **advanced sonar and remote sensing fields.**



Historical aerial photo of the lake.

CSR Developments is working closely with industry-leading R&D interests in Europe, North America and Africa.

In Ghana, it is partnering with the **Forest Research Institute of Ghana** (FORIG), the **Volta Basin Research Project of the University of Ghana** and government ministries.

The company has also been working with individuals from **Oxford University, Kwame Nkrumah University of Science & Technology, Louisiana State University, University of British Columbia,** and many other organizations, experts and stakeholders.

Tree Salvage Trial

Since salvaging trees from an underwater forest is an emerging industry, an **initial trial** had to be undertaken to test operational procedures, as well as survey key environmental issues.

In November of last year, CSR Developments extracted 14 trees utilizing **Volta River Authority** staff and engineers under a permit from the **Environmental Protection Agency.**

The trial yielded valuable data on tree **size, species and timber quality,** as well as for operation design.

In addition, the potential impacts of salvage operations on **water quality and fisheries,** two critical environmental receptors, were studied. This has provided important information for the **Environmental and Social Impact Assessment** (ESIA).

Wood Quality

The company's R&D program includes active research into the physical, chemical, and end-use properties and quality of wood in the major underwater inventory. Research to-date provides a strong indication that the timber **will meet stringent international market requirements.**

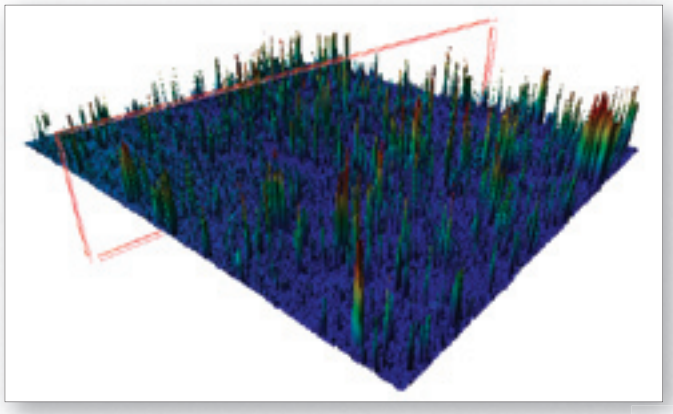
Operations will extract **many tree species in great demand** in markets around the world – as well as others currently considered as lesser-known species. The goal is to describe the properties of all of these – and to **expand market opportunities** for those that are less well known.

Through the **partnership with FORIG,** CSR Developments has access to specialized tropical hardwood research facilities and scientists. Several successful studies have already confirmed that the salvaged wood matches and in some cases exceeds **expectations.**

Ongoing research includes **expanding the list of studied species** and further work in fundamental and end-use properties of the underwater inventory.

Submerged Forest Inventory

One essential element in a tree salvage operation of this scale is determining the **quantity, quality and location** of the submerged trees. For this purpose CSR Developments has undertaken an **extensive timber inventory** to assess the salvage operation's potential.



Sonar scan showing submerged forest.

This involved entirely **new methodologies, tools and equipment** developed especially for this purpose.

The **highly complex** and difficult inventory process was conducted both in Ghana and Europe and completed in 2007. This work began with reviewing all available sources of information on the submerged forests, including **maps and historical records,** and interviewing individuals familiar with the area.

It also involved digitizing and piecing together over **2,000 aerial photographs** taken prior to flooding.

Inventory Highlights

This first-of-its-kind study created a comprehensive and reliable inventory of the submerged forest based on historical data, maps and aerial photographs, as well as leading-edge sonar technology.

- The inventory identified substantial areas containing 100 species of trees including Afrormosia, Danta, Ebony, Odum, Papao, Sapele and many others.
- More than two thirds of the trees are estimated to have commercial value with good or medium quality.
- The submerged timber is generally very well preserved due to its high density and durability and the low oxygen levels in the lake.

In combination with the **latest sonar technology,** this painstaking research enabled locating individual trees under water and provided critical information on the submerged **tree inventory, topography and structure** of the underwater forests. Many tree samples have also been taken.

CSR Developments is working with **FORIG**, a world-class wood technology and forest research institute in Ghana, to **identify and test** these lake samples.

This will ensure that key properties, including **appearance, durability and workability,** match wood from other Ghanaian forests, since the Volta Lake trees have been submerged for more than 40 years.

While the **analysis of historical data** provides a good estimate, it cannot confirm what is actually in the lake today.

Volta Lake Project Summary

- Company founded in 2005 with strong Ghanaian roots
- 25-year concession covering 350,000ha of the lake
- $15 million invested, $100 million in next 4 years
- Employment, community development and lake transportation safety
- Creating financial, environmental and social returns
- Partnering with government, NGOs and local communities

In a **second phase** of the survey, scientists, engineers and analysts from a broad range of fields will use proprietary systems to **map the submerged forests.**

It will use data collected by **specialized marine vessels** equipped with the **latest sonar and imaging systems,** customized to the conditions of the Volta Lake.

The data will be **down-loaded via satellite** to company computers in Canada and analyzed to create a highly accurate inventory of the submerged forests, using **Geographic Information Systems** (GIS) and proprietary algorithms.

Additional, high-resolution **sonar imaging** will be undertaken during operations to **guide salvage equipment** to specific forest areas and even individual trees.

Contact: Clark Sustainable Resource Developments (GH), Ltd. | P.O. Box CT 5991 | Cantonments | Accra
0277.51.17.12 | 0244.20.84.31 | 021.52.08.00
Media: Rev. Robert Johnson, Communications Director | robert.johnson@csrdevelopments.com | http://www.csrdevelopments.com