Project proposal

Visibility in a prehistoric landscape

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1 Introduction

The landscape in its most general sense is and has always been intrinsically linked to the life of human beings. Our understanding of how variations in the landscape affects people who interacts with it, whether it is foraging, building structures, creating rock-carvings or just walking about, is limited (Llobera 2001). The interest amongst archaeologist to understand the importance of the landscape cannot be over estimated (cf. Bradley et al. 1994, Fisher et al. 1997, Lake et al 1998).

This project will contribute to the discussion on the benefits of using GIS when analysing visibility in a prehistoric context.

There are few means of communication in the prehistoric community, especially before the development of a written language. Vision and sound would have been the two main tools for communicating over longer distances. A possibility to overlook the landscape should have been important in the prehistoric community. Aspects like communication between people or identifying threats from other humans or wild animals must have been determining factors when deciding the location of a new settlement. Archaeologist have also discussed the importance of intervisibility as an important factor when locating e.g. monuments, barrows, and hill forts (Lake et al. 1998)

Viewshed analysis is one tool for investigating visibility in a landscape. The technique provides an estimation of an area visible in 360^{o} from a selected point. There are several examples were viewshed analysis within an archaeological context have been undertaken, mostly concerning mounds and barrows (Wheatley 1995, Fisher et al. 1997, Van Leusen 2002, Beale 2005). Wheatley and Gillings (2000) have identified several problems regarding viewshed analysis in past landscapes. Issues such as palaeoenvironment/ palaeovegetation and object-background clarity are important when deciding what actually can be seen in the landscape.

The reconstruction of a palaeoenvironment/ palaeovegetation is not a straightforward task. The climate in Scandinavia during the mid-bronze age was warmer compared to today's climate (approximately the same as Mediterranean today) (Wikipedia 2007). The land use and vegetation land cover in the research area today is not the same as 3000 years ago and has to be recreated using environmental archaeological methodology such as palyonology (cf. Long et al. 1998, Martín-Consuegra et al. 1998). Several attempts have been undertaken to use models and software as a way of solving the problem of estimating vegetation land cover based on pollen from lake or bog sediments (Sugita et al. 1999, Eklöf et al. 2004, Middleton and Bunting 2004). This project will utilize a much more simple way to create a land cover. The method is depending on certain assumptions regarding plant preferences (soils, topography etc) and human interactions with the landscape (farming, forestry etc.).

Object-background clarity, i.e. to discern an object from the background, is dependant on the viewing distance (Wheatley and Gillings 2000). Objects more than a few hundreds metres away can be very difficult to recognise unless there are some degree of prior knowledge. The Higuchi viewshed method can be used to visualize viewing distance. The method provides circles indicating a degrading visibility by the distance away from the viewing point (Wheatley and Gillings 2000). The circles represent, according to Higuchi, near-distance (60 times the height of dominant tree species), middle-distance (1100 times the height of dominant tree species), and far-distance (to infinity) (Whitley and Gillians 2000, Maples 2004). Within near-distance, a specific human being can be identified. Within a middle-distance, a human can be separated from the background but not individually identified. Beyond middle-distance, no object can be separated from the background (Maples 2004).

Based on a soil type map, pollen data, and botanical expertise, a prehistoric land cover map will be produced for a rock-carving site in Ullevi, Gnesta sn, Södemanland, Sweden. The research area has some important characteristics that will make the view-shed analysis meaningful and interesting. Firstly, two Bronze Age settlements were discovered when investigating the area in 2002 (Hjalmarsson (2003). These were partly excavated and dated to approximately 1100 BC. Secondly, the landscape is undulating and has some hilly areas as well water bodies. The site was during the Bronze Age situated at a cove connected to Östersjön. The area is affected by land uplift and the coastline has shifted about 15-20 m. Thirdly, the site have varying soil types that suggests variation in vegetation. Fourthly, the area contains possible sediment basins for pollen data.

One of the two settlements in Ullevi will be chosen as the origin of the viewshed analysis. Based on the analysis the following questions may be answered: Can the settlement be seen from the sea? Can the settlement be seen from other settlements? From were can monuments/graves be seen? From were can (potential) agricultural fields/live stock be seen?

1.1 Aim

This project aims to create a map showing the visibility in a Bronze Age landscape based on a viewshed analysis. The project will also outline a methodology for producing a land cover map of a prehistoric landscape where viewshed analysis can be performed.

1.2 Objectives

To create a pre-historic land cover map.
To create a digital elevation model were the height of vegetation cover has been taken into consideration.
To perform a viewshed analysis.
To visualize viewing distance using Higuchi circles.

2 Data

Datasets that are needed are a digital terrain model, a soil map, a coastline shift map, vegetation data, and archaeological data (see Table 1).

Table 1. Datasets needed for the completion of the pre-historic visibility map.

Data	Format	Scale/resolution	Source	Note
Elevation data - DTM	.asc	50m	Lantmäteriet Swedish national land survey	Need to be edited in MS Excel
Soil map	.shp	1:50,000	Sveriges geologiska undersökning, Geological survey of Sweden	
Coastline shift	.jpg	1:100,000	Sveriges geologiska undersökning, Geological survey of Sweden	Need to be digitized and registered
Vegetation data	.xls	-	Environmental archaeology lab.	
Archaeological data	excavation drawings	-	Hjalmarsson (2003)	Need to be digitized and registered

The DTM is delivered by Lantmäteriet in an ASCII text format containing coordinates and elevation data for a 50 x 50 m grid covering the research area.

Bronze Age settlements will be digitized from excavation drawings from Hjalmarsson (2003).

Coastline adjusted to land uplift for the research area will be bought from Sveriges geologiska undersökning (SGU). The dataset is delivered in jpg format in intervals of 100 years. In order to be utilized in this project it needs to be registered and digitized into a shape format.

A soil map covering the research area will be purchased from SGU. The soil data is delivered in shape format covering 10 km^2.

Vegetation data based on pollen analysis will be purchased from the Environmental Archaeology Lab in Umeå, Sweden. They have experience in recreating pre-historic landscapes and have the capacity to perform the data collection, analysis, and interpretation. The data will be delivered in MS Excel format, were vegetation types have been assigned to soil types. The soil map and the DTM will be used by the Environmental Archaeology Lab as supplementary datasets for their analysis.

The Swedish coordinate system SWEREF99 will be used through out the project. A complicating issue is that Sweden changed system in January 2007, from RT90 to SWEREF99. One of the reasons were to adapt to a European system were spatial data more easily can be transferred between nations and used across boarders (Lilje et al. 2002). Data from Lantmäteriet (Swedish national land survey) is delivered in the new system. Other datasets, archaeological data and datasets from SGU, are produced in the old system and will be converted to SWEREF99 before use.

3 Hardware/Software/Equipment

The compilation of data sources and the viewshed analysis will be conducted in ESRI ArcView 3.3 and MS Excel. The software SweTrans 2.4 (from SweGIS, http://www.swegis.se) will be used as an extension in ArcView to convert any shape file necessary to appropriate coordinate system. Necessary software and computer equipment are available in house.

4 Methodology

In the following, a detailed outline of the procedures necessary for undertaking the project will be described. An overview of the datasets and procedures involved are presented in a general flowchart (see Figure 1). A more detailed flowchart has also been generated in order to facilitate the understanding of the methodology (see Figure 2).

The extent of the research area will be represented by a 10 x 10 km polygon shape file and all datasets will be clipped using this theme.

4.1 Archaeological data

Data on the Bronze Age settlements in Ullevi will be retrieved from Hjalmarsson (2003). The map of the excavation trenches and the location of the rock art site are scanned and registered to the national grid of Sweden. The centre point of the settlements and the rock art site are digitized and saved to a point shape file. One of the settlements will be reselected and converted to a shape file to be used as a viewpoint for the viewshed analysis.

4.2 Coastline shift data

The jpg file from SGU needs be registered to the Swedish national grid and digitized into two classes of polygons: sea and landmass, named “PolygonLand1100BC” and

"PolygonSea1100BC" respectively. The landmass polygon will be used for clipping the soil datasets to remove data from the present landscape. The sea polygons will be merged with the remaining landmass and named "Water". The PolygonSea1100BC will be converted to a polyline theme "PolylineSea1100BC" and used when creating a coastal zone (see section 4.3).

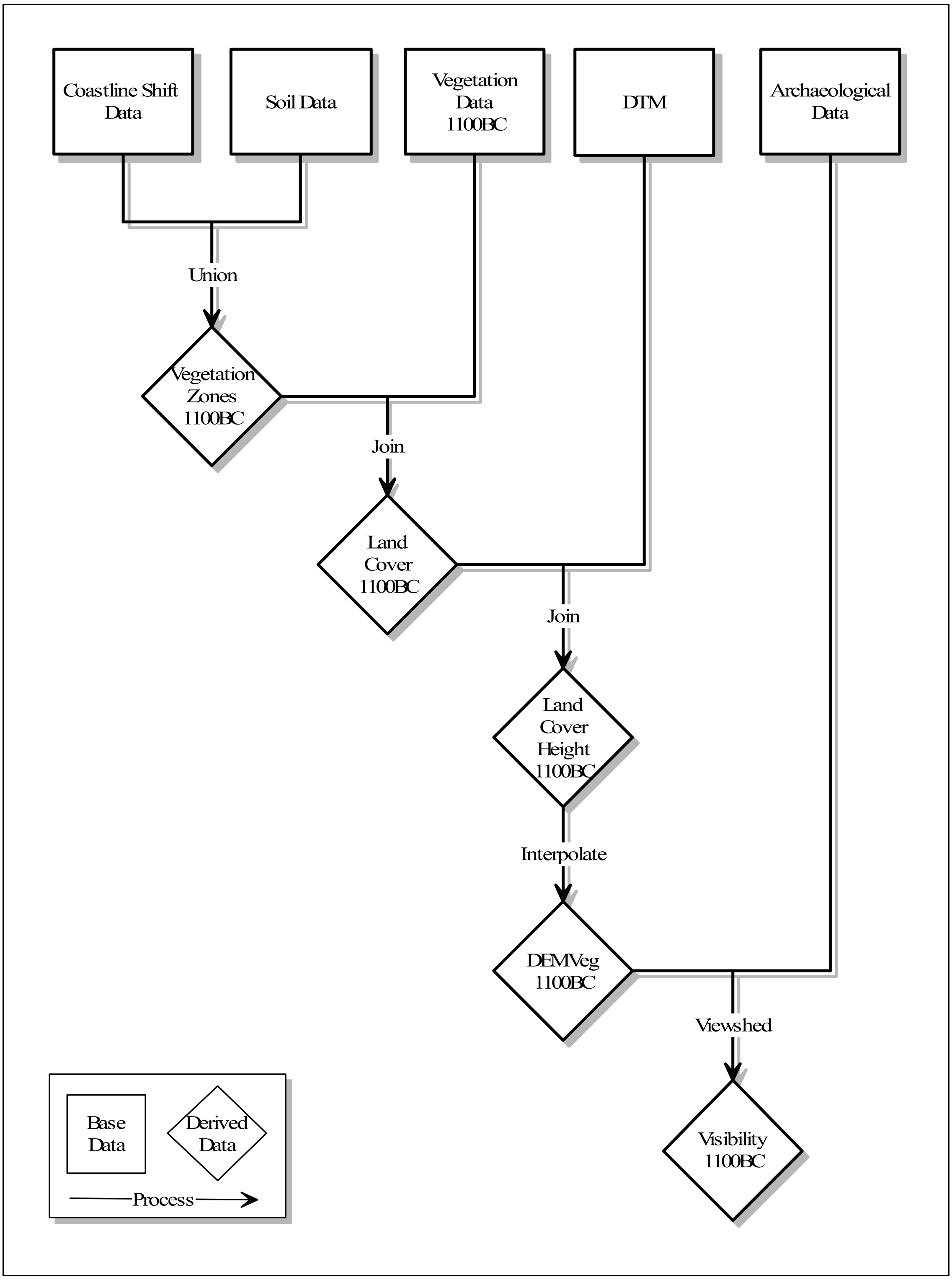

Figure 1. A general overview of the datasets and processes involved in creating a visualization of visibility in a prehistoric landscape.

4.3 Soil data

The attribute in the soil dataset from SGU table contains several different levels of soil classifications, from general to detailed classes. The generalised class attribute (gravel, sand, silt, clay, moraine, glacial sediment, organic soil, water) will be used to create the final soil map. The sub classes belonging to each major class has to be dissolved in to larger polygons. The attribute will be named "SoilType" and the file will be named "SoilTypeData".

Coastal zones or areas close to lakes are not represented in the soil data from SGU and has to be created. They are assumed to have different vegetation compared to adjacent SoilType polygons and to create a coastal zone, the "PolygonSea1100BC" file has to be converted to a polyline using e.g. Xtools (Mike DeLaune, Oregon Department of Forestry, USA). The resulting polylines are buffered to 10 m and the buffer theme "10mBufferCoast1100BC" is added to the file "SoilTypeData" using the union tool and saved to a temporary file. The features within the buffer has to be selected using the buffer attribute "10m" and unified into one polygon. The resulting polygon will be named "Coastal zone". The file is converted to a new shape file named "VegetationZones" and will be clipped using the landmass polygon theme "PolygonLand1100BC" (see section 4.2) to recreate the landmass that was available in 1100BC.

The resulting theme consists of the major soil classes (gravel, sand, silt, clay, moraine, glacial sediment, organic soil) including a coastal zone and the sea level of 1100 BC and merged with "PolygonSea1100BC" it will create the file "VegetationZones1100BC". The attribute "SoilType" will be used as a common field in several files in order to establish one-to-one relationships, i.e. joining tables.

4.4 Vegetation data

The Environmental Archaeology laboratory will deliver a MS Excel file containing the attributes "VegetationClass", "Species", "AverageHeight", "MaximumHeight", SoilType". The file will be converted to tab delimited text format, named "VegetationData1100BC", and joined to "VegetationZones1100BC" using "SoilType" as the common field, a file "LandCover1100BC" is created.

4.5 Elevation data

The term DTM will be used when describing the earth surface. A new term, *DEMVeg*, will be introduced when describing the height of the land cover (including the vegetation of the past).

The DTM ASCII text file from Lantmäteriet contains meta data and needs to be edited in MS Excel to remove the header. The resulting file consists of three columns of data: X, Y, and Z. To simulate the height of the vegetation, an additional height has to be added to the DTM. By using the theme containing the major soil classes, all of the elevation data contained within each soil class can be selected using the Select-by-theme tool. A column for soil type-attribute will be added and the selected points will be named according to the corresponding soil type using the Calculate field-tool. The final file will be named "DTMLandCoverType". This procedure is important and will facilitate the subsequent procedure of joining vegetation height data (from the "LandCover1100BC") to the DTM. Based on the vegetation height data and the DTM data, new height values can be calculated by simple addition. The final dataset will be named "LandCoverHeight1100BC". The derived height values will be interpolated using TIN to create a digital elevation model, "DEMVeg1100BC".

4.6 Viewshed analysis

Based on the position of one of the settlements in the archaeological dataset, a point is created in a new shape file named “ViewPoint” and will be used to calculate a binary viewshed. The area representing the visible part of the landscape will be selected from the viewshed raster theme and converted to a shape file, “PolygonViewshed”. A Higuchi viewshed will be constructed based on a procedure described by Wheatley and Gillings (2000) were a distance layer is created and reclassified to the intervals 0-300 m, 300-5,500 m, >5,500 m, assuming a predominant tree height of 5 m (see chapter 1). The raster image is converted to a polygon and clipped by the PolygonViewshed-file. The resulting file, “Visibility1100BC” is the final interpretation of what a person standing close to a Bronze Age settlement in Ullevi might be able to see considering the contemporary vegetation.

4.7 The outcome

The final map will be in 1:50,000, which is suitable for the size of the research area and the size of the printed A3 colour map (297x420 mm). The research area is 10 x 10 km and translates to 20 x 20 cm on the map, which leaves space for additional text and image information.

5 Time and cost analysis

Digitizing coastline and the archaeological data will take less than two hours, if suitable ground control points can be found in the maps. Edit the soil data, i.e. dissolve subclasses of soil types, and add a coastal zone to the theme will take 1 hour. Edit the DTM to create a DEM-Veg, i.e. adding vegetation height to the elevation points will take 1 hour. Merge and join various datasets will take 0.5 hour. Interpolate the DEM-Veg will take 0.5 hour. Select a viewpoint from the archaeological data, perform the viewshed analysis, and construct the Higuchi circles will take 1 hour. The cost estimation of working hours is based on an hourly fee of £50.

Item	Description	Amount		Cost (£)	Cost (SKr)	Note
Elevation data	DTM, 50x50m grid, asc-format	10	km2	£179	2,600 kr	See Appendix 1
Soil map data	shp-format	10	km2	£83	1,200 kr	See Appendix 2
Coast line shift data	1 period, jpg-format	10	km2	£62	900 kr	See 0
Vegetation data	Pollen analysis	10	km2	£3,903	56,600 kr	See 0
Archaeological data	Excavation report	1		£7	100 kr	
Various GIS tasks		4	h	£200	2,896 kr	See chapter 5
Digitization	Coast line shift and archaeological data 20 polygons	2	h	£100	1,448 kr	See chapter 0
Printing	A3, colour	500		£185	2,680 kr	See Appendix 5
Additional	Postage etc.			£100	1,450 kr	
Cost				£4,719	68,424 kr	
VAT				£826	17,106 kr	*
Total Cost				£5,545	85,530 kr	

* UK (17,5%) and Swedish (25%) VAT respectively

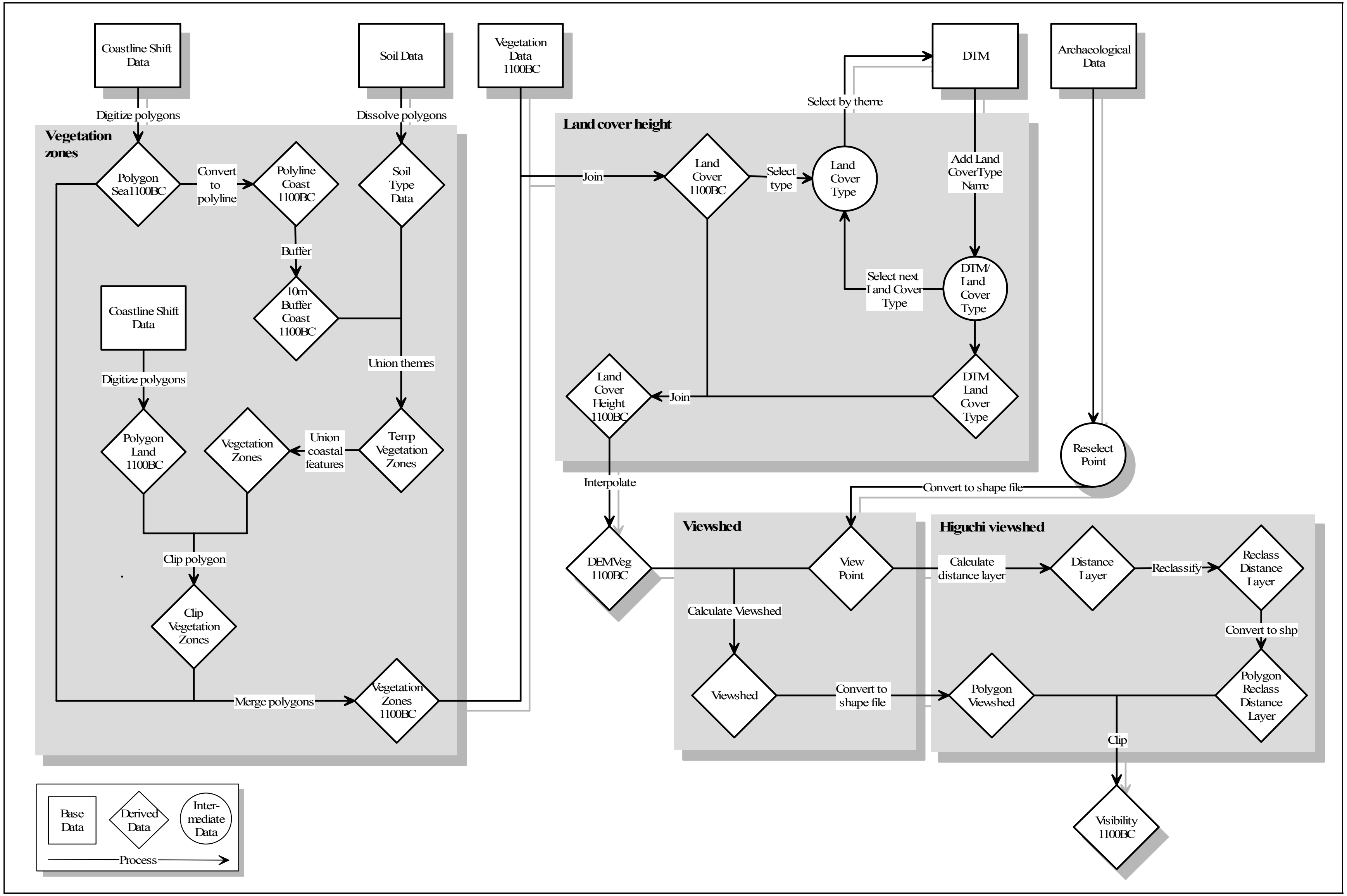

Figure 2. Flowchart showing detailed steps and necessary procedures for producing the final map.

6 Conclusions

In order to be able to solve the main problems of recreating a prehistoric landscape, certain assumptions have to be made.

In undulating landscapes where farming has been undertaken, the likelihood for a colluvium to form is probably very high (Zolitschka et al. 2003). The farming practises might have been undertaken for hundreds or even thousands of years in the area. The indications of farming, particular the formation of colluvia, can be investigated during field visits, but the scope of this project is to create the visibility map based on ready-made datasets and field investigations are too costly to fit within the proposed budget. It will be assumed there have not been any landslides or formation of large colluviums that could have altered the top soil characteristics to a major extent.

Wet areas (bogs etc.) are important features in the landscape and can affect the line-of-sight. They have to be assumed to have been at the same state today as 3000 years ago. It is difficult to know when a wetland formed or dried up without an extensive field investigation.

Any pre-historic remains from the selected period (in this case the Bronze Age, 1100BC) such as settlements are assumed contemporary. ^{14}C-dating is an invaluable tool for archaeologist when dating remains from prehistoric societies. However, the time span between the youngest and the oldest dating within a settlement can be several hundreds of years. This may well reflect the actual period the site were in use, but may also be a consequence of the error inherent in the ^{14}C-technique it self.

According to Lantmäteriet (Lantmäteriet 2006), the accuracy of the DTM is in average 2.5 m and the position is decided by the 50m grid. There is no simple way to improve the accuracy. The DTM will probably smooth the surface and remove small features. A detailed survey of the topography using a total station would create a better model, but would be too costly.

The coastline shift map is delivered in the scale 1:100,000. The rather small-scale map will ad extra uncertainty when estimating which parts of the land that actually were above sea level and available for various land uses. According to Leif Andersson (SGU), the coastline data does contain two kinds of uncertainties, a spatial error, estimated to +/- 2 metres, and a temporal error estimated to +/- 100 years. Again, there is no simple way to achieving better accuracy, other than to perform time-consuming fieldwork and costly laboratory work.

The vegetation data contains two kinds of uncertainties. Firstly, it is difficult to have knowledge about the exact position of different vegetation types (Wheatley and Gillings 2000). Assigning pollen data to the ”right” soil type polygons is not a straight forward task and is highly dependent on the skill and experience of the interpreter. Secondly, even if the preference regarding soil type and soil moisture of certain tree types or plants can be known, the local variations can be influenced by humans, which can alter the land use. The prehistoric land users can drain wet lands or cut down forests to gain access to more land that can be used for farming or grazing, or they can cut down trees to be used for construction work.

The viewshed analysis cannot produce more than a suggestion when it comes to visibility. Factors like atmospheric conditions and the eyesight of the persons in the landscape will certainly affect the actual visibility (Fisher et al. 1997).

Despite the difficulties, the project is important and can further the understanding of the reconstruction of past landscapes using modern environmental methodology and GIS.

7 Report on digitization

The aim of the digitizing exercise was to estimate how much time it would take to digitize a set of polygons. A subset of Sands of Forvie NNR vegetation classification map (University of Glasgow 1972) was used. The subset contained 94 polygons and took 4.7 hours or 3 minutes per polygon to digitize (see Table 2). The time spent in total to produce the map was approximately 8 hours (see Table 4). When the polygons were digitized, they were at the same time named according to the coding system used in the paper map.

The legend of the original map was used to create attributes for the polygons. The attribute table was produced in MS Excel and exported as a tab separated text file and in ArcView, the attribute table was joined to the polygon table (dbf).

The final map (see Figure 3) was reproduced on a transparency film (please find a copy attached at the end of the proposal).

Table 2. Time spent on digitizing and adding attributes

Task	Time (hours)
Pre-processing (registering the map)	2.5 h
Digitization	4.7 h
Polygons per hour (total time incl. registering etc.)	11
Post-processing (quality control and printing)	0.6 h
Adding attributes	0.5 h

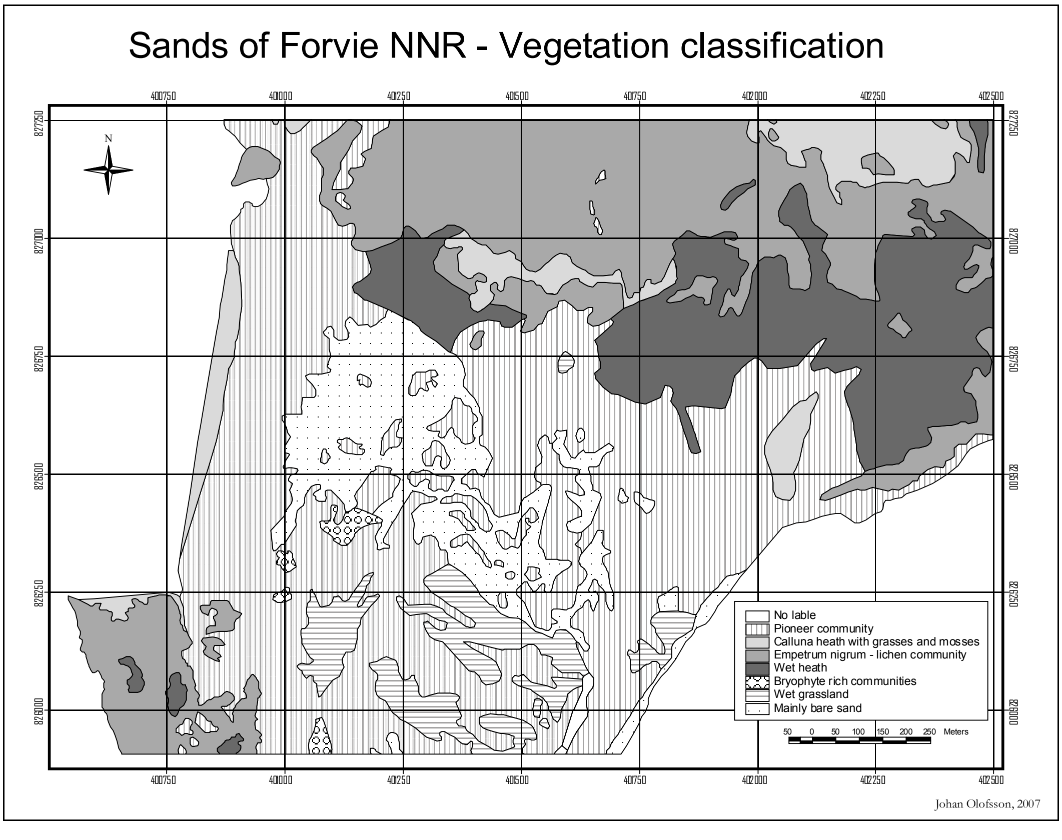

Figure 3. The final map with added attributes, based on Sands of Forvie NNR vegetation classification map produced by University of Glasgow 1972.

Table 3. Attribute table showing the first 30 polygons (94 in total).

Vegetation attributes Sands of Forvie

Shape	ID	Class	Description
Polygon	1	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	2	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	3	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	4	2	Carex arenaria grassland. Dune pasture - Festuca, Poa, Agrostis. Nardus stricta grassland. Dwarf community with abundant Sagina (pearlwort) and mosses, e.g. Polytrichum juniperum.
Polygon	5	2	Carex arenaria grassland. Dune pasture - Festuca, Poa, Agrostis. Nardus stricta grassland. Dwarf community with abundant Sagina (pearlwort) and mosses, e.g. Polytrichum juniperum.
Polygon	6	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	7	4	Empetrum nigrum - lichen community, Calluna less evident. Large patches of lichens especially Cladonia sylvatica. Ammophila sparse.
Polygon	8	4	Empetrum nigrum - lichen community, Calluna less evident. Large patches of lichens especially Cladonia sylvatica. Ammophila sparse.
Polygon	9	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	10	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	11	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	12	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	13	4	Empetrum nigrum - lichen community, Calluna less evident. Large patches of lichens especially Cladonia sylvatica. Ammophila sparse.
Polygon	14	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	15	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	16	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	17	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	18	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	19	1	Pioneer community Ammophila diffuse. Ammophila community - pure dense stands. Carex arenaria - Ammophila 'grassland'.
Polygon	20	4	Empetrum nigrum - lichen community, Calluna less evident. Large patches of lichens especially Cladonia sylvatica. Ammophila sparse.
Polygon	21	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	22	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	23	2	Carex arenaria grassland. Dune pasture - Festuca, Poa, Agrostis. Nardus stricta grassland. Dwarf community with abundant Sagina (pearlwort) and mosses, e.g. Polytrichum juniperum.
Polygon	24	2	Carex arenaria grassland. Dune pasture - Festuca, Poa, Agrostis. Nardus stricta grassland. Dwarf community with abundant Sagina (pearlwort) and mosses, e.g. Polytrichum juniperum.
Polygon	25	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	26	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	27	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	28	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	29	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.
Polygon	30	4	Empetrum nigrum - lichen community, Calluna less evident. Large patches of lichens especially Cladonia sylvatica. Ammophila sparse.
Polygon	31	3	Empetrum nigrum - Calluna heath with grasses and mosses. Calluna heath, grasses rare. Wet heath, damp Calluna - Erica tetralix heath with Empetrum nigrum.

Table 4. Detailed time plan for producing a digital map.

Task	Time (min)	Note
Scanning the map	10	
Image processing in CorelDraw	10	
Registering the image (creating a world file)	15	
Initial digitization of key features (tracks) from Digimap	20	
Initial check of geometrical correctness (compared to	10	
Digitizing the border of the area	5	
Digitizing some features from the vegetation map	30	
Check preliminary map against original paper map	10	The preliminary digitization did not match the original map.
Re-registering the map	30	
Check preliminary map against original paper map	10	It fits to the original map.
Digitization and naming of vegetation polygons	280	Polygons are named (using numbering on original map) when digitized.
Checking the quality of the digitization	15	
Creating an attribute table	30	
Joining the tables	1	
Labelling the polygons	15	
Print the map on a transparency	5	
Sum	8.3	h

Summary		
Number of polygons	94	
Adding attributes to polygons	31	min
Polygons per hour (total time incl. registering etc.)	11	
Polygons per hour (digitizing and naming)	20	
Minutes per polygon (digitizing and naming)	3	min

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8.1 Internet resources

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[Accessed 3 of April 2007]

9 Appendix

Appendix 1. Offer on DTM grid data from Lantmäteriet, Swedish national land survey.

From: "GSD-Metria" <gsd-metria@lm.se>
Subject: SV: SV: Pricing for height data
Date: Wed, March 14, 2007 11:24 am
To: t04jo6@abdn.ac.uk

Hej igen, Johan.
Licens och leveranskostnad för det datat hamnar på 2 600 kr. Moms tillkommer med 650 kr.

Med vänlig hälsning,
Rikard

-----Ursprungligt meddelande-----
Från: Johan Olofsson [mailto:t04jo6@abdn.ac.uk]
Skickat: den 13 mars 2007 18:18
Till: GSD-Metria
Ämne: Re: SV: Pricing for height data //Hjälp/Rikard

Hej Rickard!
Det stammer bra (bade att jag ar svensk och att jag behover DTM grid-data). Jag haller pa och kostnadsberakna ett projekt och behover dokumentation att visa min skottska uppdragsgivare, dar av mitt brev pa engelska.

Med vanlig halsning,
Johan

-----Ursprungligt meddelande-----
Hello Johan?

Considering that your name is very typical swedish, is it possible that you speak swedish? Anyhow, I have to ask you what kind of height data you are looking for? Is it countour lines or is it digital terrain model (DTM) data (50 meter grid). According to your description I guess it´s DTM-data? DTM-data is available in grid, countour lines in shape or map info For documentation and demodata for DTM, follow this link http://www.lantmateriet.se/templates/LMV_Page.aspx?id=1009 (in swedish), for countour lines follow http://www.lantmateriet.se/templates/LMV_Page.aspx?id=1011 .Please let me know and I will give you the prices. If the area you want is in the shape of a square a min and max coordinate will do, otherwise a polygon is fine.

Best regards
Rikard Öberg
Metria, 801 82 Gävle, rikard.oberg@lm.se, www.lantmateriet.se,
vxl 026-633000, dir 026-633234, sms 0702-633234

-----Ursprungligt meddelande-----
Från: Johan Olofsson [mailto:t04jo6@abdn.ac.uk]
Skickat: den 12 mars 2007 20:18
Till: GSD-Metria
Ämne: Pricing for height data

Dear Sir/Madam,
I am costing a small project for a Scottish company and I am interested height data for creating a digital elevation model. The area is 10x10km and is situated at the East coast of Sweden. Which data formats are available (shape, grid...)? How would you like the area to be selected (center point or coordinates of a square...)? How much would this data set such cost (incl. VAT and shipping, preferable in euro or pound, but Swedish Krona will also do)?
Regards, Johan Olofsson

Appendix 2. Offer on soil map, Sveriges geologiska undersökning (Geological Survey of Sweden)

From: "kundservice" <kundservice@sgu.se>
Subject: Ang. Pricing for a soil map no 2
Date: Tue, March 13, 2007 7:13 am
To: t04jo6@abdn.ac.uk

Dear Sir

Thank you for your enquiry.

Printed maps in mapscale 1:50 000 or 1:100 000 are available for fixed areas 25 x25 km price from 90 SEK inkl. VAT. Digital formats normally in shape or MapInfo. Prices from 12 SEK per km2 + delivery cost (from 1200 SEK). Digital maps also available in raster format (jpeg or tiff).

Geological Survey of Sweden
Kundtjänst/Kerstin Johansson
Box 670, 751 28 UPPSALA, Tel: 018-17 90 00 (9-11.30,12.30-15), Fax: 018-17 92 10
E-post: kundservice@sgu.se

---------------------------- Original Message ----------------------------

Dear Sir/Madam,

I'm costing a smaller project that is to take place at the East coast of Sweden and I am interested in buying a map showing the distribution of soil types (jordartskarta). What scale are these maps in? How much would a 10x10 km area paper map cost (incl. VAT and shipping). What digital formats are available?

I understand that SGU has developed a numerical model for estimation of coast line shift caused by land uplift. I'm mainly interested in one time period. How much is a map covering 10x10 km (incl. VAT and shipping) and which formats is this data available in?

Regards, Johan Olofsson

Appendix 3. Offer on coastline shift map, Sveriges geologiska undersökning (Geological Survey of Sweden)

From: "kundservice" <kundservice@sgu.se>
Subject: Ang. Pricing for a soil map
Date: Tue, March 13, 2007 9:10 am
To: t04jo6@abdn.ac.uk

Dear Sir

Complementary information about coast line shift caused by land uplift.

The cost for a map in jpeg-format in map scale 1:100 000 or smaller is 900 SEK each fixed 100 years.
Don't hesitate to contact us for further information.

Best regards
Kerstin Johansson
Kundtjänst, Box 670, 751 28 UPPSALA, Tel: 018-17 90 00
Fax: 018-17 92 10, E-post: kundservice@sgu.se

---------------------------- Original Message ----------------------------

Dear Sir/Madam,
I?m costing a smaller project that is to take place at the East coast of Sweden and I am interested in buying a map showing the distribution of soil types (jordartskarta). What scale are these maps in? How much would a 10x10 km area paper map cost (incl. VAT and shipping). What digital formats are available?

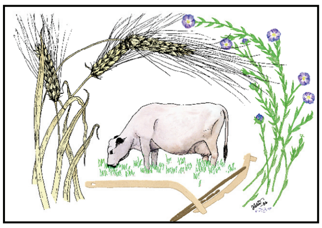
I understand that SGU has developed a numerical model for estimation of coast line shift caused by land uplift. I?m mainly interested in one time period. How much is a map covering 10x10 km (incl. VAT and shipping) and which formats is this data available in?

Regards,
Johan Olofsson

Appendix 4. Offer on a vegetation cover map from Environmental Archaeological lab.

UMEÅ UNIVERSITET
Miljöarkeologiska laboratoriet
Institutionen för arkeologi och samiska studier
KBC Plan 5, 90187 Umeå

UMEÅ UNIVERSITY
Environmental Archaeology Laboratory
Department of Archaeology and Sami Studies
KBC Plan 5, S-90187 Umeå, Sweden



Umeå 2007-04-01

A costing for a pollen analysis and the production of a vegetation map

Based on a soil map (supplied by you) vegetation land cover data for the period 1100BC covering the research area will be produced. The data will be delivered in MS Excel format.

The fieldwork will be done by two persons, during a two-day visit to Ullevi, Södermanland.

Pollen analysis and production of vegetation cover

Item		Qty.		Cost	Sum
1	Palynological analysis (per layer)	10		2,000 kr	20,000 kr
2	C-14 dating	2		4,000 kr	8,000 kr
3	Production of vegetation land cover data (xls format)	8	h	500 kr	4,000 kr

Additional costs

Item		Qty.		Cost	Sum
4	Field work	32	h	500 kr	16,000 kr
5	Rental car	2	days	600 kr	1,200 kr
6	Travel cost UME - ARN (return)	2		2,500 kr	5,000 kr
7	Accommodation,	2		400 kr	800 kr
8	Allowance for expenses	4	days	400 kr	1,600 kr

Total sum (SKr, excl. VAT), 25% University tax included (Item 1-3) 56,600 Skr

The tender is valid until 31 December 2007.

Roger Engelmark
Professor,
Head of lab.

Telefon	**Fax**	**Postgiro**	**E-mail**
+46 (0)90 – 786 52 92	+46 (0)90 – 786 76 63	15613-3	roger.engelmark@arke.umu.se

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Appendix 5. Offer on printing of 500 A3 colour copies from Immedia print.

From: "David Tremain" <immediaprint@uk2.net>
Subject: Re: Pricing for A3
Date: Wed, February 28, 2007 9:52 am
To: t04jo6@abdn.ac.uk

Hi johan

500 xA3 100gsm colour copies single sided £185.00
+vat £217.37 postage approx £9.00
files cmyk or rgb no problem

please email me your files and i will produce a sample for you

regards
david

immedia print

---------------------------- Original Message ----------------------------

Dear Sir/Madam,

I'm interested to know how much 500 copies, size A3 (100 gsm) in colour would cost to print (incl. VAT and shipping costs).
Would it possible to get a proof before printing all 500 copies?
Do you prefer CMYK or is RGB OK?

Regards,
Johan Olofsson