OBERALLMIG CLIMATE PROTECTION PROJECT

CCBA PROJECT DESIGN DOCUMENT
VERSION 6
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SWITZERLAND

Hubertus Schmidtke
SILVACONSULT AG
Neustadtgasse 9, P.B. 113
CH-8400 Winterthur
Switzerland
+41 (0) 52 214 0265
hubertus.schmidtke@silvaconsult.ch

On behalf of
Oberallmeindkorporation Schwyz
Brüöl 2,
Postfach 449
CH 6431 Schwyz
Switzerland
Tel.: +41 (0) 41818 50 60
oak@oak-schwyz.ch

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Introduction

The Oberallmeindkorporation Schwyz (OAK Schwyz)

The OAK Schwyz is an old family law corporation with more than 17'000 members all living in the canton of Schwyz. The OAK Schwyz was mentioned in writing for the first time in the 12 century and its origin goes back to the main process of formation of settlement of this mountainous region in the early middle ages. The OAK Schwyz is the main land owner in the canton Schwyz. According to the constitution (Ref. 39) the target is to manage the lands economically and to contribute to public welfare The OAK Schwyz is organised in three main sections: Alps, Forest, and Real estate & Finance. The OAK Schwyz owns 9036 ha of forests.

Standard and method of the Oberallmig Climate Protection Project

The Oberallmig Climate Protection Project is developed according the CCBA Standard. The Climate, Community and Biodiversity Alliance (CCBA) is a partnership between leading companies, NGOs and research institutes seeking to promote integrated solutions to land management around the world. With this goal in mind, the CCBA has developed voluntary standards to help design and identify land management activities that simultaneously minimize climate change, support sustainable development and conserve biodiversity.

The forest management of the OAK Schwyz is already certified according to the FSC Standard (Forest Stewardship Council www.fsc.org). The OAK Schwyz has passed the primary FSC audit in 2002. Recertification was in 2007. There is an annual audit. The number of the FSC certificate is SGS-FM/CoC-001215 (Ref. 36). FSC is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests. FSC is a certification system that provides internationally recognized standard-setting, trademark assurance and accreditation services to companies, organizations, and communities interested in responsible forestry.

The FSC label provides a credible link between responsible production and consumption of forest products, enabling consumers and businesses to make purchasing decisions that benefit people and the environment as well as providing ongoing business value. (www.fsc.org).

This FSC certification process includes also stakeholder participation. For the sections II, IV and V of this PDD information from the FSC audit process was used.

FCS Forest Certification

The forestry section of the OAK Schwyz has achieved the FSC certification (Ref. 18, 19).

The FSC Principles and Criteria for responsible forest management

The FSC Principles and Criteria describe how the forests have to be managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. They include managerial aspects as well as environmental and social requirements. In fact, FSC rules are the strictest and FSC's social and environmental requirements the highest.

Ten principles and 56 criteria form the basis for all FSC forest management standards. Based on these 10 principles, the FSC has developed further rules (called policies or standards) that further define and explain certain requirements stipulated in the 10 principles.

Here is a summary of some of the points the FSC Principles and Criteria require. Many of the points listed below will appear almost basic – but in many places even these basic requirements are not fulfilled. This is where FSC can have the biggest positive impact.

- Prohibit conversion of forests or any other natural habitat
- Respect of international workers rights
- Respect of Human Rights with particular attention to indigenous peoples
- Prohibit the use of hazardous chemicals
- No corruption – follow all applicable laws
- Identification and appropriate management of areas that need special protection (e.g. cultural or sacred sites, habitat of endangered animals or plants)

Overview of the FSC Principles and Criteria (Ref. 28 www.fsc.org)

Principle *1.:* *Compliance with all applicable laws and international treaties*
Principle *2.:* *Demonstrated and uncontested, clearly defined, long–term land* tenure *and use rights*
Principle *3.:* *Recognition and respect of indigenous peoples' rights*
Principle *4.:* *Maintenance or enhancement of long-term social and economic well-being of forest workers and local communities and respect of worker's rights in* compliance *with International Labour Organisation (ILO) conventions*
Principle *5.:* *Equitable use and sharing of benefits derived from the forest*
Principle *6.:* *Reduction of environmental impact of logging activities and maintenance of the ecological functions and integrity of the forest*
Principle *7.:* *Appropriate and continuously updated management plan*
Principle *8.:* *Appropriate monitoring and assessment activities to assess the condition of the forest, management activities and their social and environmental impacts*
Principle *9.:* *Maintenance of High Conservation Value Forests (HCVFs) defined as environmental and social values that are considered to be of outstanding significance or critical importance*
Principle *10.:* *In addition to* compliance *with all of the above, plantations must contribute to reduce the pressures on and promote the restoration and conservation of natural forests.*

The OAK Schwyz carbon sink project: "Oberallmig Climate Protection Project"

In 2001 the forestry section of the OAK Schwyz got a new management structure. Former separate part enterprises were united to one single management entity. A management director for the overall forestry section was engaged (Dr. Felix Lüscher).

From that time on carbon sequestration was taken as an option. From 2003 to 2005 the OAK Schwyz took part in the project of the Swiss Federal Office for Environment on the opportunities to account for sinks in the context of Art. 3.4 Kyoto Protocol (Ref. 20). Therefore a detailed study was elaborated in 2005 on the special options of the OAK Schwyz, still with focus on the compliance market during the first commitment period 2008-2012 of the KP. 2005 is the starting year of the project. Switzerland is applying Art. 3.4 of the KP. So the carbon stock changes of the forests are counted in the national carbon balance. But no legal basis has been introduced to let the forest owners participate with that value. So the OAK Schwyz decided to conduct a climate protection project for the voluntary market. Double counting in the national balance "is avoided" by following specific procedures confirmed by the Swiss Federal Office for the Environment (Ref. 25). But this does not comply with the CCBA policy.

The project can be characterised as "Improved Forest Management IFM" following the terminology of the Voluntary Carbon Standard VCS (Ref. 13 – 15). But it is not developed as a VCS project. IFM means increasing the carbon stock of a forest by extending the rotation period in plantation forests. The forests of the OAK Schwyz are mainly not planted but they originate from natural regeneration and they are mainly uneven aged. Harvest happens on single tree basis or on small areas. To increase the carbon stock means to harvest below the yield for some time.

To calculate ex ante the net anthropogenic GHG removals by sinks the formulae of the CDM small scale method AR-AMS0001 are used (Ref. 12). That method is designed for afforestation projects, but there are variables included for already existing carbon stocks. So we can take those formulae also for the IFM project type.

I. Basic Data:

1) The title of the CCB Standards project activity:
Oberallmig Climate Protection Project

2) The version number of the document:
Version 06

3) The date of the document:
06 September 2010

Project participant:

Oberallmeindkorporation Schwyz

Brüöl 2,
Postfach 449
CH-6431 Schwyz
Switzerland
Tel.: +41 (0) 41 818 50 60
Fax: +41 (0) 41 818 50 61

Person in charge of the project:

Felix Lüscher, Head of forestry department
Tel. direct +41 (0) 41 818 50 65

mailto:felix.luescher@oak-schwyz.ch
http://www.oak-schwyz.ch

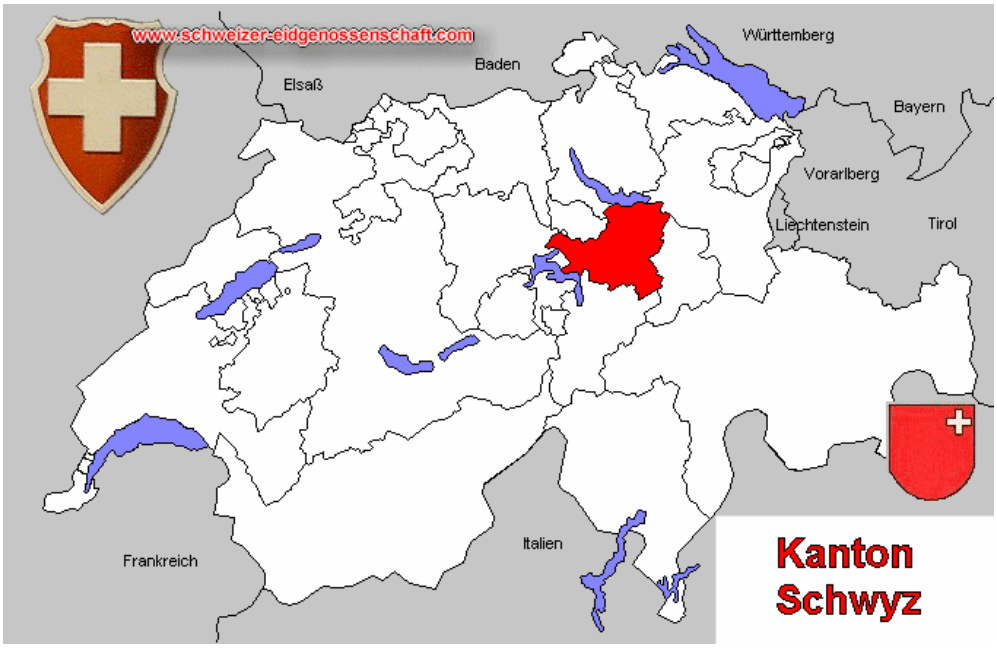
II. General Section:

G1 Original Conditions in the Project Area

General Information

G.1.1 The Location of the Project and Basic Physical Parameters

The project area is located in the Canton Schwyz in central Switzerland.



Geography

The OAK owns a total of about 9000 ha of plan - managed forest in addition to an inexact amount of areas of unproductive forests including forest line and tree line areas as well as separate stands in the Alps. The lowest elevation is found at 435 meters ASL on the bank of the Lake of Lucerne in the community of Ingenbohl-Brunnen. The highest closed forests are located at about 1700 meters and isolated stands reach to about 1900 meters in Chlingenstock and Sisiger Spitz in the community of Riemenstalden. Most of the forests grow at elevations from 800 to 1600 meters ASL on steep to very steep slopes with all exposures.

Geology

The sub alpine molasses forms the geological underground in the north in Wildspitz-Rothenthurm. This is followed by flysch areas in Schwyz-Alpthal-Ybrig. The southern part is located in the area of the Helvetic nappe, which is mostly chalk formations. Very differing soils have developed due to these undergrounds, the elevation and the topography. Above molasses and flysch, heavy, low skeletal content, moist to wet soils predominate. Above chalk, soils developed, which are primarily porous and rich in calcium content.

Climate

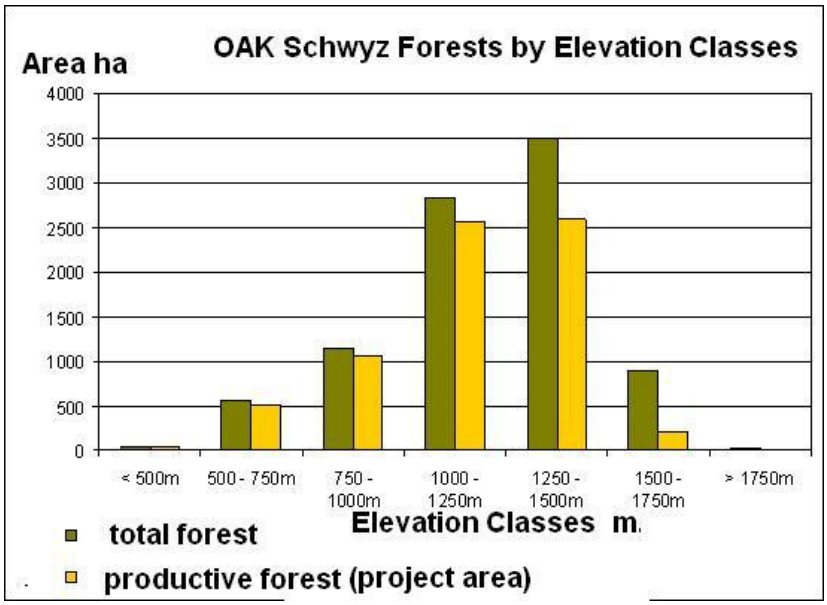
The climate has an oceanic character. The annual precipitation increases from the lowest to the highest forests from about 1200 mm to approximately 2500 mm. The seasonal distribution of the precipitation amounts to about 20 percent in the winter from December to February, 25 percent in the spring from March to May, 35 percent in the summer from June to August, and 20 percent in the fall from September to November. The annual average temperature decreases from around 9°C in the lowest elevations to about 2°C in the highest forests. The average monthly temperature in January varies with the elevation from 0°C to –6°C and in July from 18°C to 10°C.

Soils

On a regional or forestry district level respectively, assessments of soil and natural forest types have been conducted in recent years. Guidelines for target forest species composition have been derived from these evaluations, which build an important basis for the species selection in the silvicultural planning. The soil types are connected with the phyto sociological vegetation types according to the Swiss method to survey forest vegetation and soil types (Ref. 71). See section G.1.2 below.

G.1.2 Types and condition of vegetation within the project area

In the Alps the main ecological differentiation is influenced by elevation witch goes up to the forest line. Due to the site conditions, the following natural forest communities have developed: from the lowest elevations to the sub-montane level, which is up to around 900 meters ASL, this is mixed hardwood and beech forests; in the upper montane level, which is 800 to 1400 meters ASL, this is fir-beech forests; at the high montane level, which is 1000 to 1600 meters ASL, this is fir-spruce forests; and at the sub alpine level, which is from 1400 meters ASL up to the forest line, spruce forests. The graphic below shows the Distribution of the forests by elevation classes. The borders between the levels on undergrounds such as molasses and flysch, which promote softwoods, and undergrounds such a chalk, which promote hardwoods, are often displaced by several 100 meters in elevation. Pine, maple, alder or lime forests develop on special sites as very dry, very wet or changing wet-dry conditions or debris cones.

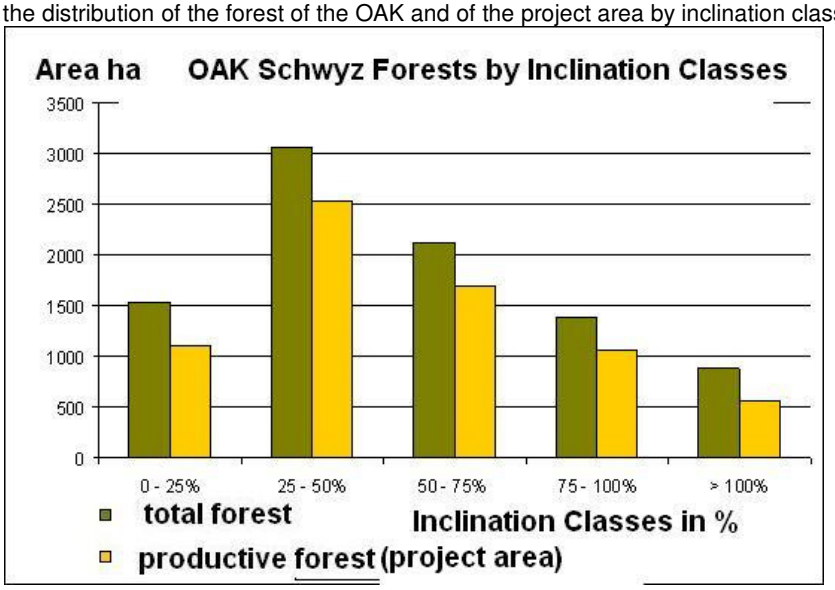


There is not a complete map of the forest types. The publication is on the forest types that occur in the Canton Schwyz and how they can be identified in the field by the local foresters

(key, Ref. 53). The forest types are categorized according to phyto sociological criteria. They indicate also climate and soil conditions. (Ref. 71). The Forest types are mainly determined by elevation and inclination. The two graphics of this section show the distribution of the forest to these main criteria.

The Beech Forests (Luzulo Fagion) consists of 18 sub forest types (all Fagetum)
Forests dominated by Beech with other tree species mixed in. The other tree species vary depending on precipitation and temperature. And this is depending from elevation, exposition, geomorphology and soil conditions.
The Beech-Fir-Forests (Abieti Fagion) consist of 12 sub forest types.
In higher elevation Silver Fir takes a certain portion in beech forests on calcium carbonate soils.
The Maple-Ash-Forests (Alno Fraxinion) consist of 8 sub forest communities
Wet and periodically flooded soils are typical for this forest types. Mostly accumulation of fertile soils downhill and in dells.
The Maple/Linden-Forests (Lunario-Acerion/Tilion) consist of 9 sub forest communities
Mountainous and high mountainous elevation with special geomorphologic conditions like gorges, gullies, cool small areas of high humidity lot of shadow. Here other broadleaf trees are dominating over beech.
The sub alpine Spruce Forests / mountain Fir-Spruce-Forests (Vaccinio Piceion / Abieti-Piceion) consist of 20 sub forest communities
Conifer forests of high elevation up to the tree line on good soil conditions. Those are widespread typical mountain forests.
Ordinary Pine / Mountain Pine / Oak – forests (Erico-Pinion / Dicrano-Pinion / Parts of Vaccinio-Pinion) consist of 11 sub forest communities. Forests of low productivity on thin soils, often dry.
All the forest types occur in the project area.
The forests of the OAK Schwyz are managed using close to nature practices. No clear cuts are carried out. This silvicultural practice of selective logging lead to good normal conditions of the OAK forests.

Protection forests
Due to the structure of the settled areas and the traffic routes, important parts of the forests are primarily protection forests. A large part of the forests grows on productive areas even though these are often on very steep areas. Special forest management of areas with power lines and water pressure lines is required, e.g. reduced tree size or stability of the stands (Ref. 58). Slope is the main physical criterion for protection forests. Additional criteria are damage potential and probability (i.e. avalanches). The graphic blow shows the distribution of the forest of the OAK and of the project area by inclination classes.



G.1.3 Boundaries of the project area and the project zone

Project Zone

The majority of the forests are located in the canton of Schwyz in the communities of Arth, Lauerz, Ingenbohl-Brunnen, Morschach, Riemenstalden, Muotathal, Illgau, Schwyz, Oberberg and Unteriberg, Alpthal, Rothenthurm, Sattel, Steinen and Steinerberg and smaller areas are found in the canton of Zug in the communities of Zug, Unterägeri and Oberägeri. Those communes form the county Schwyz and the project zone. The county Schwyz containing the communes mentioned above is identical with the project zone. See also map in G.1.5. Schwyz (the grey marked ones in the map below). The county Schwyz is the “Old Land Schwyz”, the northern lands of Einsiedeln (white coloured communes) joined the canton later. All together is the Canton Schwyz of today.

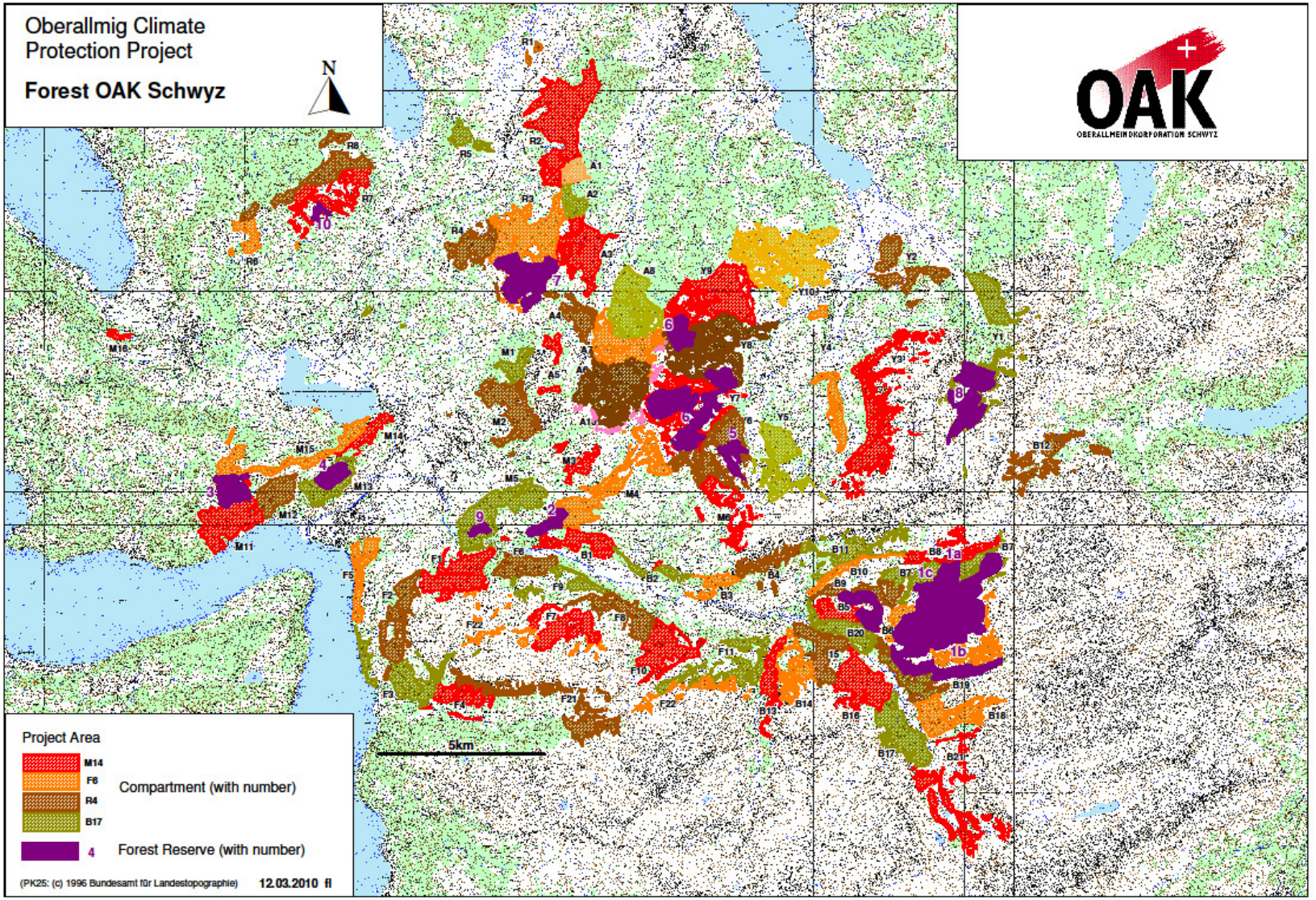
Project area

The OAK Schwyz owns 9036 ha of forests. From this total area 1656.9 ha were excluded from the project area. Those excluded areas were already existing forest nature reserves (NWR) without any future harvest and Special forest reserves (SWR) with some measures to improve biodiversity. The project area is defined with 7379.1 ha. This is very conservative because the establishment of the nature reserves is part of the overall forest management strategy. This includes FSC certification which requires a certain proportion of forest nature reserves. To avoid questions on the additionality those already established forest nature reserves were excluded from the project area. Also excluded were not productive forests were no or marginal harvest is conducted.

The map on the following page shows the project area. The colours only indicate different compartments without any further meaning. The numbers of the compartments are indicated, also the forest reserves. The forest reserves are not project area. Management maps of 1:5000 scale are available.

See Table of forest nature reserves in Section G.1.8.3 (Table in digital form Ref. 30).

See table in Annex 1


Oberallmig Climate
Protection Project
Forest OAK Schwyz
N
OAK
OBERALLMEIN KORPORATION SCHWYZ
Project Area
M14
F6
R4
B17
Compartment (with number)
4
Forest Reserve (with number)
5km
(PK25: (c) 1996 Bundesamt f0r Landestopographie)
12.03.2010 fl

Project area is 7'379 ha: The total forest area of the OAK Schwyz is 9'036 ha. Forest nature reserves and non productive forests are associated with the project but excluded from the project area.
Forest functions in column B: HP = Wood production, NWR = Nature forest reserve, SWR = Special forest reserve, BSF = Special protection function, NWW = Non productive forest

	B	C	D	E	AP	AX	AY	AZ	BA
1	**OAK Schwyz Climate Protection Project**								
2									
3									
4	Compartment	Forest function	Community	Management plan	Project area (allowable area) ha	Forest nature reserves ha	Special forest reserves ha	Non productive forest ha	OAK total forest area
5	ABT	FUNKTION	GEMEINDE	BETRIEBSPLAN	WFA_HA	NWR_HA	SWR_HA	NWW_ha	WFNEU_HA
6					= BA7-AX7-AY7-AZ7				
7	A3	NWR	Rothenthurm	Alpthal R3	5.02	125.98			131.00
8	A1	HP	Alpthal	Alpthal R4	43.00				43.00
9	A2	HP	Alpthal	Alpthal R4	44.00				44.00
10	A3	BSF	Alpthal	Alpthal R4	169.00				169.00
11	A4	BSF	Alpthal	Alpthal R4	64.00				64.00
12	A5	HP	Alpthal	Alpthal R4	27.00				27.00
13	A6	BSF	Alpthal	Alpthal R4	220.00				220.00
14	A7	SWR	Alpthal	Alpthal R4	153.00				153.00
15	A8	BSF	Alpthal	Alpthal R4	188.00				188.00
16	A10	NWW	Alpthal	Alpthal R4	0.00			14.00	14.00
17	B12	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	84.00				84.00
18	B1	BSF	Muotathal	Muotathal_Bisisthal_Pragel R1	87.00				87.00
19	B3	BSF	Muotathal	Muotathal_Bisisthal_Pragel R1	38.00				38.00
20	B5	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	61.06	33.71	5.23		100.00
21	B7	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	112.67	33.78	44.55		191.00
22	B15	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	111.00				111.00
23	B16	BSF	Muotathal	Muotathal_Bisisthal_Pragel R1	164.00				164.00
24	B18	NWW	Muotathal	Muotathal_Bisisthal_Pragel R1	0.00			126.00	126.00
25	B20	BSF	Muotathal	Muotathal_Bisisthal_Pragel R1	92.00				92.00
26	B11	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	92.00				92.00
27	B8	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	53.00				53.00
28	B22	NWR	Muotathal	Muotathal_Bisisthal_Pragel R1	0.00	61.00			61.00
29	B10	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	32.00				32.00
30	B9	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	63.68	14.24	16.08		94.00
31	B13	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	64.00				64.00
32	B19	NWR	Muotathal	Muotathal_Bisisthal_Pragel R1	98.15	47.78	18.07		164.00
33	B17	BSF	Muotathal	Muotathal_Bisisthal_Pragel R1	160.00				160.00
34	B14	NWW	Muotathal	Muotathal_Bisisthal_Pragel R1	0.00			69.00	69.00
35	B2	HP	Muotathal	Muotathal_Bisisthal_Pragel R1	28.00				28.00
36	B4	NWW	Muotathal	Muotathal_Bisisthal_Pragel R1	0.00			50.00	50.00
37	B21	NWW	Muotathal	Muotathal_Bisisthal_Pragel R1	0.00			112.00	112.00
38	B6	NWR	Muotathal	Muotathal_Bisisthal_Pragel R1	45.32	211.06	55.62		312.00
39	F3	BSF	Morschach	Muotathal_Fronalpstock R2	140.00				140.00
40	F2	BSF	Morschach	Muotathal_Fronalpstock R2	128.00				128.00
41	F9	HP	Morschach	Muotathal_Fronalpstock R2	2.00				2.00
42	F22	NWW	Morschach	Muotathal_Fronalpstock R2	27.00				27.00
43	F4	BSF	Riemenstalden	Muotathal_Fronalpstock R2	99.00				99.00
44	F21	NW	Riemenstalden	Muotathal_Fronalpstock R2	0.00			94.00	94.00
45	F6	SF_NW	Muotathal	Muotathal_Fronalpstock R2	90.00				90.00
46	F9	BSF	Muotathal	Muotathal_Fronalpstock R2	50.00				50.00
47	F10	HP	Muotathal	Muotathal_Fronalpstock R2	145.00				145.00
48	F22	NWW	Muotathal	Muotathal_Fronalpstock R2	41.00				41.00
49	F8	HP	Muotathal	Muotathal_Fronalpstock R2	106.00				106.00
50	F11	HP	Muotathal	Muotathal_Fronalpstock R2	120.00				120.00
51	F1	HP	Morschach u. Schwyz	Muotathal_Fronalpstock R2	166.00				166.00
52	F7	HP	Morschach	Muotathal_Fronalpstock R2	129.00				129.00
53	F5	HP	Morschach	Muotathal_Fronalpstock R2	74.00				74.00
54	M6	NW	Illgau	Mythen_Urmiberg R1	0.00			31.00	31.00
55	M12	BSF	Ingenbohl	Mythen_Urmiberg R2	92.00				92.00
56	M11	BSF	Ingenbhohl	Mythen_Urmiberg R2	164.48	21.52			186.00
57	M13	BSF	Ingenbohl	Mythen_Urmiberg R2	56.26	44.74			101.00
58	M14	BSF	Schwyz / Ingenbohl	Mythen_Urmiberg R2	52.00				52.00
59	M13	HP	Ingenbohl	Mythen_Urmiberg R2	18.00				18.00
60	M15	HP	Lauerz	Mythen_Urmiberg R5	93.33	16.67			110.00
61	M1	HP	Schwyz	Mythen_Urmiberg R5	45.00				45.00
62	M2	HP	Schwyz	Mythen_Urmiberg R5	147.00				147.00
63	M3	BSF	Schwyz	Mythen_Urmiberg R5	38.00				38.00
64	M15	BSF	Schwyz	Mythen_Urmiberg R5	38.00				38.00
65	M4	HP	Schwyz	Mythen_Urmiberg R5	170.63	35.37			206.00
66	M5	HP	Schwyz	Mythen_Urmiberg R5	208.19	12.81			221.00
67	M16	HP	Arth	Mythen_Urmiberg R6	7.00				7.00
68	R1	HP	Rothenthurm	Rotenthurm_Rossberg R4	8.00				8.00
69	R2	HP	Rothenthurm	Rotenthurm_Rossberg R4	324.00				324.00
70	R5	BSF	Rothenthurm	Rotenthurm_Rossberg R4	37.00				37.00
71	R3	BSF	Rothenthurm	Rotenthurm_Rossberg R4	232.00				232.00
72	R4	HP	Sattel	Rotenthurm_Rossberg R5	97.00				97.00
73	R7	BSF	Sattel	Rotenthurm_Rossberg R5	108.69	10.31			119.00
74	R6	HP	Steinerberg	Rotenthurm_Rossberg R5	46.00				46.00
75	R5	HP	Steinen	Rotenthurm_Rossberg R5	4.00				4.00
76	R8	BSF	Oberaegeri	Rotenthurm_Rossberg ZG	134.00				134.00
77	Y1	NWR	Unteriberg	Ybrig R3	145.50	127.50			273.00
78	Y2	HP	Unteriberg	Ybrig R3	113.00				113.00
79	Y10	BSF	Unteriberg	Ybrig R3	289.00				289.00
80	Y9	SWR	Oberiberg	Ybrig R3	237.00				237.00
81	Y8	SWR	Oberiberg	Ybrig R3	173.40	58.60			232.00
82	Y5	BSF	Oberiberg	Ybrig R3	136.00				136.00
83	Y4	BSF	Unteriberg u. Oberiberg	Ybrig R3	76.00				76.00
84	Y3	HP	Unteriberg u. Oberiberg	Ybrig R3	221.00				221.00
85	Y6	HP	Oberiberg	Ybrig R3	173.21	30.79			204.00
86	Y7	SWR	Oberiberg	Ybrig R3	78.49	135.51			214.00
87					7379.08	1021.37	139.55	496.00	9036.00
88					Project area				OAK forest

Ref. 30: Excel file "30 Abteilungen_OAK_Tabellev7engl.xls"

Climate Information

G.1.4 Current carbon stocks at the project site(s), using methodologies from the Intergovernmental Panel on Climate Change's IPCC 2006 GL for AFOLU or a more robust and detailed methodology.

Standing timber volume

A detailed study on the potential of the forests of the OAK Schwyz to bind carbon was conducted. This included a determination of the current carbon stocks (2005) and yield based on inventory data (Ref. 21). The data represent the carbon stocks at the beginning of year 2005. Project start 01.12.2004 is only a technical difference for the agricultural year 2005 starts with 01.12.2004. Because in winter times no trees grow and harvest is very limited the carbon stock is the same in 1st December 2004 as in 1st January 2005. See also Section G.2.2.

For each of the 80 compounds of the forest area of the OAK Schwyz the data situation was evaluated. The inventory data were taken and in the few cases there were no measured data were there, an expert assumption was made (low productive areas). This was made in collaboration of the forestry engineer of the OAK Schwyz Dr. Felix Lüscher, the responsible officer for forest planning of the canton forest service Mr. Bernhard Roth and Dr. Hubertus Schmidtke SILVACONSULT AG. For most of the 80 compartments data from two subsequent standing timber volume inventories were available. The inventory data were evaluated separately for conifers and broadleaf trees.

The standing timber volume of the project area was 281 m3/ha in 2005 (82% Conifers, 18%Broadleaf trees).

The carbon stock at project start was 641'844 tC (See Table "Baseline Carbon Stock in Section 2.3). The carbon stock per each forest compartment is indicated in Table Annex 2 columns Y and Z for conifers and broadleaf trees (unit tCO2).

Forest inventory in Switzerland: In Switzerland forest inventories were introduced in the 19th century as full measurements. In the 1960ties and 1970ties sample inventories were developed by the Swiss Federal Office for Forest Snow and Landscape. There were instructions developed to conduct such sample inventories (Ref. 29). The forests of the OAK Schwyz were measured in the 1970ties for the first time using sample inventory methods. The data had been measured according the official instructions and the results were calculated by the Swiss Federal Office for Forest Snow and Landscape. Depending on the compartments the first inventories took place in the years 1971 to 1974 and in 1979. During this first terrestrial forest inventory of the OAK Schwyz forests 2'934 sample plots were measured. This means a level of precision of +- 1.3 % at 95% confidence level.

The subsequent inventories were conducted 1998 to 2003. See the inventory years per compartment in columns H and J in the main calculation table in the annex2. In this inventory over 2'400 sample plots were re-measured. The level of precision then was +- 1.4% at 95% confidence level. So there is very high quality data available. Regarding the IPCC GL 2006 for AFOLU the requirements for tier 3 are fulfilled (2006 IPCC Guidelines for National Greenhouse Gas Inventories p. 1.11). The quality of the data is even better.

Parameters used

Species

Species or group of species	Species ID	Wood Density	Carbon fraction	Biomass Expansion Factor		Conversion factors		Conversion factors	
Species can be grouped if they have similar growth behavior and if the parameters on the right are similar for each species included in the group.	ID_j	D_j	CF_j	BEF_j-1 (Method 1)	R_j, Root to shoot ratio	Living tree biomass aboveground		Living tree biomass aboveground and belowground	
dimensionless	1,2,3, ...	t d.m. m^{-3}	t C (t d.m.)$^{-1}$	dimensionless		tCO2/m3	tC/m3	tCO2/m3	tC/m3
Conifers	1	0.384	0.500	1.21	0.37	0.852	0.232	1.167	0.318
Broadleaf trees	2	0.556	0.500	1.20	0.24	1.223	0.334	1.517	0.414

Sources of Parameters see following table:

For aboveground biomass BEF, Root to shoot ratio, and total Biomass expansion factors were taken from publications on the Swiss National Forest Inventory Ref. 55. The variables are published for conifers and broadleaf trees only not for species. Additional specifications are elevation classes and eco-regions. To use them is appropriate because the forests of the OAK represent quite well the species combination of those classes. Main conifer species is spruce. Main deciduous tree is beech. Both with more than 80%. This is typical for Switzerland (Ref. 55) as well as for the close to nature forests of the OAK Schwyz. For BEF the average of Pre-Alps and Alps and elevation classes 601-1200 m and >1200 m were taken. The distribution of the forests of the OAK is around half/half Pre-Alps and Alps and around half/half of the indicated elevation classes. The Parameters have changed against the previous PDD version because of the new publication Ref. 55.

Carbon fraction CF	0.500		
Wood density Conifers D_1	0.384	t d.m. m^{-3}	**D_1** Ref. 24
Wood density Broadeaftrees D_2	0.556	t d.m. m^{-3}	**D_2** Ref. 24

Aboveground biomass BEFo					
		Prealps	**Alps**		
Conifers	**>1200**	1.24	1.20	1.21	**BEF_1-1** Ref. 55, p111
	601-1200	1.20	1.18		
Broadl- Trees	**>1200**	1.21	1.20	1.20	**BEF_2-1** Ref. 55, p111
	601-1200	1.19	1.20		

Aboveground conversion factor m3/tCO2, = BEF*CF*Dj*44/12				
		Prealps	**Alps**	
Conifers	**>1200**	0.87	0.84	0.85
	601-1200	0.84	0.83	
Broadl- Trees	**>1200**	1.23	1.22	1.22
	601-1200	1.21	1.22	

Root to shoot ratio					
		Prealps	**Alps**		
Conifers	**>1200**	0.38	0.40	0.37	**R_1** Ref. 55, p111
	601-1200	0.33	0.35		
Broadl- Trees	**>1200**	0.24	0.28	0.24	**R_2** Ref. 55, p111
	601-1200	0.19	0.23		

BEFtotal					
		Prealps	**Alps**		
Conifers	**>1200**	1.71	1.68	1.65	Ref. 55, p112
	601-1200	1.59	1.60		
Broadl- Trees	**>1200**	1.50	1.53	1.48	Ref. 55, p112
	601-1200	1.42	1.48		

living Biomass conversion factor m3/tCO2, =BEFtotal*Dj*CF*44/12				
		Prealps	**Alps**	
Conifers	**>1200**	1.20	1.18	1.16
	601-1200	1.12	1.13	
Broadl- Trees	**>1200**	1.53	1.56	1.51
	601-1200	1.45	1.51	

Considering IPCC GL 2006 for AFOLU the forest of the OAK Schwyz is of the type forest remains forest. The whole forest is managed according to the national definition of "forest management" KP Art. 3.4. (Ref. 20).

Growth and Harvest

Knowing the standing timber volumes of from subsequent inventories and the harvested timber volume also the yield could be determined very precisely. The yield was determined with 5.15 m3/ha/year (out of this 82 % conifers 18 % broadleaf trees) or 5.63 tCO2/ha/year.

Annual growth

Total	Conifers	Broadleaves	
100	82	18	%
5.31	4.36	0.96	m3/year/ha
	1.16	1.51	tCO2/m3 Conversion factor see Section III Climate, Subsection C
6.53	5.09	1.45	tCO2/ha/year

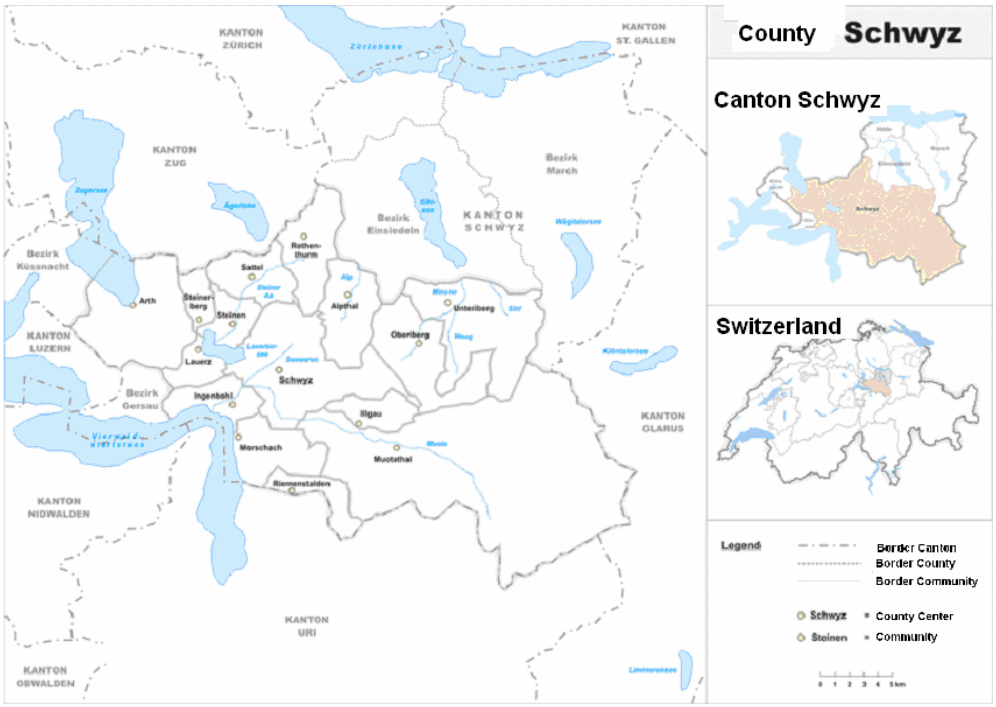
For conversion factors see Section CL.1.1

Community Information

G.1.5 Description of communities located in the project zone, including basic socioeconomic information.

The majority of the forests are located in the canton of Schwyz in the communities of Arth, Lauerz, Ingenbohl-Brunnen, Morschach, Riemenstalden, Muotathal, Illgau, Schwyz, Oberberg and Unteriberg, Alpthal, Rothenthurm, Sattel, Steinen and Steinerberg and smaller areas are found in the canton of Zug in the communities of Zug, Unterägeri and Oberägeri. These communes form the county Schwyz, which is identical with the project zone.

Canton, County and Communes Schwyz



In the communes affected by the project area are approximately 51’000 inhabitants living. The total area is 50’670 ha.

The figures below on the population and proportion of foreigners are official ones, taken from the website of the County Schwyz (Ref 54).

Population of the project zone

	Population 2008[1]	Foreigners as part of the population	Proportion of Foreigners 2008 in %	Population 2007[1]
County Schwyz	50'808	7'641	15.0	50'254
Schwyz	14'180	2'215	15.6	14'186
Arth	10'476	2'473	23.6	10'227
Ingenbohl	8'301	1'612	19.4	8'209
Muotathal	3'569	186	5.2	3'556
Steinen	3'082	234	7.6	3'041
Sattel	1'665	142	8.5	1'618
Rothenthurm	2'145	288	13.4	2'081
Oberiberg	787	56	7.1	793
Unteriberg	2'321	125	5.4	2'325
Lauerz	1'031	69	6.7	1'000
Steinerberg	862	54	6.3	875
Morschach	999	147	14.7	938
Alpthal	514	25	4.9	529
Illgau	793	13	1.6	792
Riemenstalden	83	2	2.4	84

Proportion of the foreign nationalities living in the County Schwyz

Germany	21.6 %
Serbia	20.3 %
Italy	12.3 %
Bosnia-Herzegovina	5 %
Croatia	4.9 %
Portugal	4.5 %
Macedonia	4.1 %
Others	27.4 %

From the 50'000 inhabitants of the project zone 7'641 or 15 % were not Swiss citizens. Out of them the Germans are the biggest group (21.6 %).

Employees by sector and commune in the project zone County Schwyz (Ref. 54):

	Workplaces 2005	Employees Total 2005	Employees I. Sektor	Employees II. Sektor	Employees III. Sektor
County Schwyz	3'223	21'029	2'369	5'874	12'786
Schwyz	1'065	9'742	510	2'838	6'394
Arth	519	3'007	329	810	1'868
Ingenbohl	372	2'688	109	452	2'127
Muotathal	252	1'229	303	512	414
Steinen	172	899	177	326	396
Sattel	121	431	183	51	197
Rothenthurm	140	742	121	409	212
Oberiberg	101	273	98	41	134
Unteriberg	170	646	133	229	284
Lauerz	58	211	73	55	83
Steinerberg	72	296	122	59	115
Morschach	80	519	70	15	434
Alpthal	38	108	48	14	46
Illgau	50	204	70	63	71
Riemenstalden	13	34	23	0	11

Unemployment in 2008: 1.3 %

The employment structure shows still a large part in the first sector, which is typical for rural areas in Switzerland. The second sector consists of small and middle sized industries of good status. The third sector with more than 50 % is still increasing. There is only very low unemployment. The overall view shows a good economic structure of the project zone and very good employment figures. The forest enterprise of the OAK Schwyz is employing directly 26 people (Ref 14). In addition to them a minor number of people is employed indirectly working in the forests for private companies. Compared with the total number of employees in the project zone of more than 20'000 and 2'369 in the first sector this is a small number.

The OAK Schwyz is a community of a historic type and it one of the oldest communities in Switzerland mentioned for the first time in the 12th century. The members of the OAK are around 17'000 people who are citizens of the county Schwyz and living in the Canton. **So the OAK citizens represent somehow an indigenous part of the population.** It does not cover the whole population because the membership was restricted to certain old families (97 family names) and only to men. Since 1993 also women can be members and since 2006 the membership can pass to the children independently from the family name. This will cause a big increase of the number of the members in future. There is a very close relationship between the community and the organisation of the OAK. Every year there is a general assembly. Other indigenous people are not living in the project zone.

G.1.6 A description of current land use and land tenure in the project zone.

History

The OAK Schwyz is an old-law family corporation according to the cantonal public law with its meeting place and headquarters located in Schwyz. In addition to the areas of the Alps and construction, the forest area has a high degree of importance. The OAK Schwyz is the largest forest owner in Switzerland with a total productive forest area of about 9000 ha. From prehistoric time until the “old Swiss federation” in 1798 owing to the French revolution, the history of the OAK Schwyz followed the history of the “old county of Schwyz” (today district of Schwyz).

The earliest document in the name of the OAK-corporation is a rule of imperator Henry IV from 1114 between the convent of Einsiedeln and the district of Schwyz concerning an argument about borders, where common possession of land in a cooperative agreement was already mentioned. Therefore, the OAK is older then the Swiss federation, which was founded in 1291.

On 8th of February 1350 the final peace treaty after 250 years of argument about borders was laid down and the borders between the “old county of Schwyz” and the OAK were fixed until today. October 15.th 1882, the oberallmeind-rural communes voted in favour of the separation, which was the birthday of the OAK corporation. The united parish municipalities got the lower lands up to “middle mountain” where as the alps and upper lands were possessions of the OAK. Yet, the forests were not separated then. After some years however, some separations were necessary: In the separation project of 1882 forests were given to the OAK in compensation of wood rights. After this, the separation process was finished until today.

2001: start of the employment of an own forest manager.

2006: inauguration of a co-operative enterprise, the OAK Energy Company on 1. of July.

2006: Change of civil law allows that women (!) also may pass their corporation rights to their heirs.

Land use and land tenure

Land use in the project zone

Following table shows the main land use categories for the project zone (County Schwyz) and for the communes. Out of 50'670 ha of the project zone there are 3.8 % settlement areas, 40.4 % agricultural areas (mainly pasture), 33.1 % forests and 22.7 % unproductive areas (mostly high mountain elevations). Figures are from the year 2009 (Ref. 54).

Communes	Total area in ha	Settlement area in %	Agriculture area in %	Forest area in %	Unproductive area in %
Project zone County Schwyz	50'670	3.8	40.4	33.1	22.7
Schwyz	5'319	8.7	46.4	39.1	5.8
Arth	4'851	7.4	35.4	40.1	17.1
Ingenbohl	1'667	13.0	24.9	39.6	22.5
Muotathal	17'212	1.0	32.8	22.0	44.2
Steinen	1'185	10.5	52.7	22.1	14.6
Sattel	1'739	6.2	55.7	37.2	0.9
Rothenthurm	2'275	4.2	44.1	48.6	3.1
Oberiberg	3'299	1.9	50.2	39.1	8.8
Unteriberg	4'657	2.9	44.4	44.1	17.6
Lauerz	919	4.1	44.7	35.7	15.5
Steinerberg	692	5.2	62.7	31.8	0.3
Morschach	2'349	2.6	46.4	32.1	19.0
Alpthal	2'288	1.6	32.4	62.8	3.2
Illgau	1'096	2.9	62.0	31.1	4.0
Riemenstalden	1'122	0.2	49.3	25.5	25.0

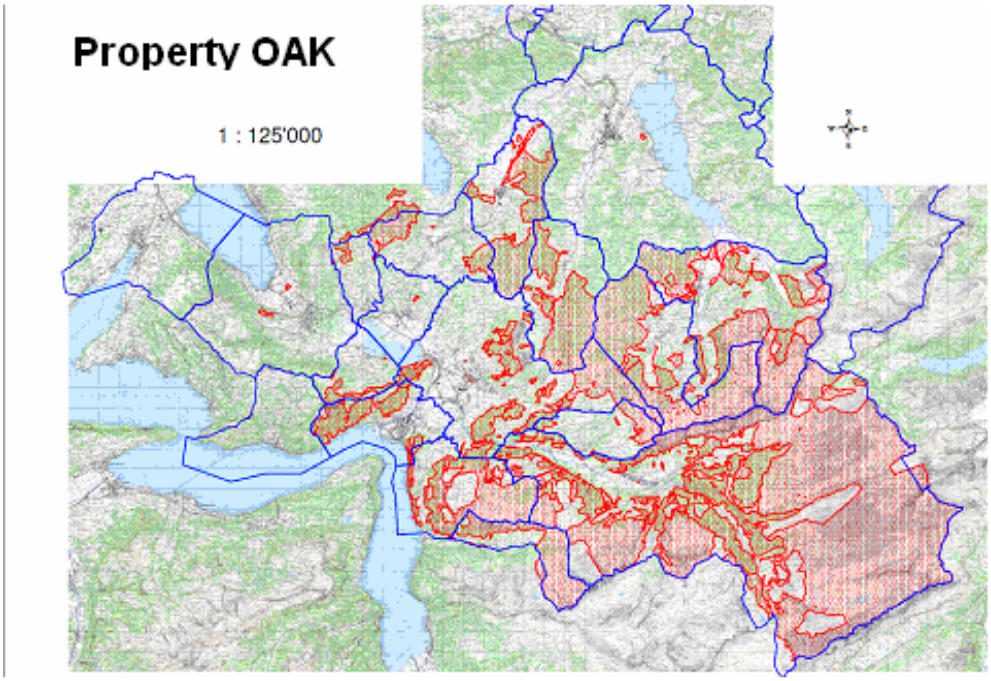
According to old community rights the OAK land was not private but community property of the OAK. The OAK also owns large areas of alps and it is leasing the rights for summer pasture. The OAK owns 9'036 ha of forests and 8'000 ha of alp pastures Ref 73) in the project zone. The project area consists of already existing forests which have been forests since ever or which were changed from pasture. Today the forest area is protected by law.

Land use categories are legally defined and very constant in the project zone. There are no general land use conflicts in the project zone (Ref 72).

Property rights in the project zone are defined through the land registry according to Swiss legislation.

There are no ongoing or unsolved conflicts on land tenure and property rights. A minor case of conflict on a border to private land in 2009 (4'600 m2) was settled by the court in favour of the OAK (Ref. 56, 57). No other conflicts occurred in the last ten years.

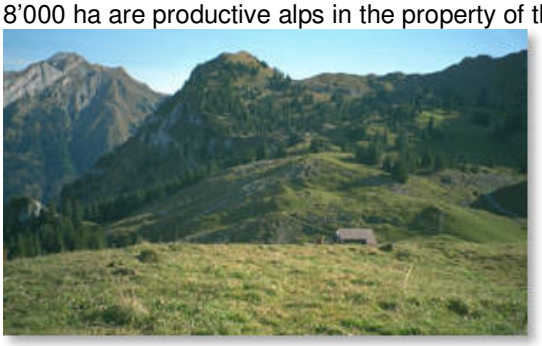
The map below shows the property of the OAK Schwyz and the project zone (project zone in this map are the communities (blue lines) that content property of the OAK (red areas). The light green colour in the red areas indicates the forest of the OAK Schwyz.



Land Use and Tenure in the Project Zone				
	%	Project zone	OAK Schwyz	others mostly private
		ha	ha	ha
Settlement area	3.8	1'925	10	1'915
Agricultural area	40.4	20'471	8'000	12'471
Forest area	33.1	16'772	9'036	7'736
Unproductive area	22.7	11'502		
	100.0	**50'670**		

Unproductive areas consist of rocks and stones mostly in highest elevations and of permanent ice and snow areas. The OAK Schwyz is the largest land owner in the project zone owning 44% of the usable area (unproductive areas excluded). The forests and the pastures of the OAK Schwyz are located more in the higher parts of the project zone. Other land owners are much smaller and mostly private. Their areas are located more in the lower and more productive areas of the project zone.

8’000 ha are productive alps in the property of the OAK



Those are rented with priority OAK to community people.

9’036 ha of the OAK property are forests

The forests of the OAK Schwyz are managed by the own OAK forestry enterprise.

G.1.7 Description of current biodiversity within the project zone and threats to that biodiversity, using appropriate methodologies substantiated with reference (evidence) where possible.

The project zone is subject to standard land use assessments and land us planning procedures according to Swiss legislation (Ref. 5, 6, 7, and 44). One consequence on the biodiversity issue is the establishment of forest nature reserves. Areas of importance to biodiversity are excluded from timber harvest (forest nature reserves) or they are subjects to special measures to improve biodiversity (special forest reserves). There is a concept on nature reserves of the canton (Ref. 44) as well as of the OAK Schwyz (Ref. 11). For each of these sites an assessment was made and a special report on the biodiversity is available. The contractual lifetime of each reserve is 50 years. Because they are financed partly with subsidies they are also subject to supervision by the forest services (federal and canton). No reserve will expire during the carbon project lifetime. Therefore no monitoring of the forest reserve area is foreseen.

Formally established Forest Nature reserves (NWR) and Special Forest Reserves (SWR):

Compartment	NWR (ha)	SWR (ha)
7	125.98	---
20	33.71	5.23
21	33.78	44.55
28	69.30	---
30	14.24	16.08
32	47.78	18.07
38	211.06	55.62
56	21.52	---
57	44.74	---
60	16.67	---
65	35.37	---
66	12.81	---
73	10.31	---
77	127.50	---
81	58.60	---
85	30.79	---
86	135.51	---
Total	1‘029.67 ha	139.55 ha (total 1‘169.22ha)

Regarding the project zone and project area in this case it is the same because the OAK Schwyz owns nearly all the forest reserves of the project zone communities.

The silvicultural concept of the OAK is close to nature. This means no large area clear cuts and selective harvest. This concept will not be affected by the project. Slight higher standing timber volume will cause a little more darkness and slightly less light loving vegetation. On the other hand destruent species will have little better conditions. Because the overall increment of the standing timber volume is very moderate those effects are not measurable. In terms of species no changes are expected because of the forest nature reserves and the special forest reserves.

In accordance with the Nature Protection Concept Canton Schwyz (Ref. 44), the Concept on Forest Reserves of the Canton Schwyz (Ref. 11) the OAK Schwyz has developed an own concept on nature protection (Overview Nature Protection Ref. 45).

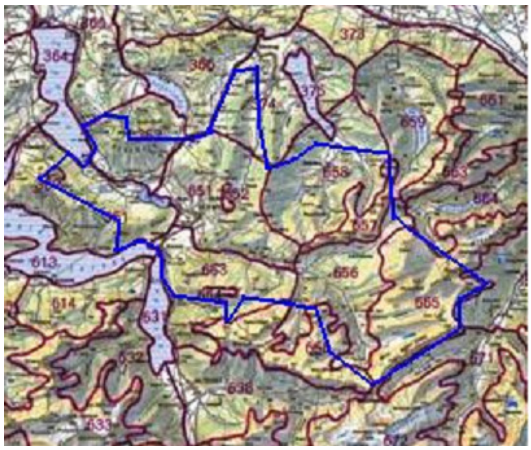
The forests of the project zone were assessed regarding rare forest types (phyto-sociological survey Ref 53). Thread can be that those areas are qualitatively damaged (in terms of biodiversity) through timber harvest operations. A target

was formulated in terms of areas of rare forest types to be protected. Method: The areas to be protected were evaluated by full assessment of the forest vegetation types (phyto-sociology) Ref. 69. This included also soil types. The reserves were reassessed by a monitoring project. This followed the monitoring concepts of the Canton Schwyz for forest nature reserves and special forest reserves (Ref. 67, 68).

Rare and very rare Forest Phyto-Sociological Types were assessed according to the Forest Reserve Control Report of the Canton Schwyz (Phyto-sociological Forest Types of Switzerland Ref. 71) and the referring area of Forest Nature Reserves and Special Forest Reserves.

The Swiss Web Flora of the Swiss Federal Institute for Forest, Snow and Landscape Research WSL has published a flora of Switzerland. The country is covered by 593 mapping areas. **It represents a full assessment of the species.** The following information on each mapping areas is available at http://www.wsl.ch/land/products/webflora/welcome-en.ehtml

The mapping areas follow mostly natural borders and not political ones. So the mapping areas do not cover exactly the project zone. All mapping areas that are affecting the project zone are listed below. A species list can be presented for each mapping area. Mapping area 361 for example contents 980 species. A complete list of species for this mapping area is included in Annex 5.



The table shows the mapping areas (red lines) with numbers and the project zone. Following mapping areas are affecting the project zone:

Flora mapping areas of the project zone:

361	Rigi
362	Rigi Kulm
363	Rossberg
651	Schwyz
652	Mythen
653	Brunnen
654	Fronalpstock
655	Kaiserstock
656	Bisigtal
658	Iberg
665	Braunwald

As an example the data of the mapping area 361 Rigi are printed out in Annex 5.

361: Rigi

Lowland area, 413 - 1700 m, 101.3 km2

species numbers

59 species known from literature
19 species known from herbarium specimens
82 rare species
787 abundant or frequent species
33 species reported since 1982

873 species 1982 (rare + abundant)
902 species 2000 (rare + abundant + new)

A complete list of species is printed in Annex 5.

This list contains information on notation, frequency, red list category, species name

Notation:
0=species known from literature
1=species known from herbarium specimens
2=rare
3=abundant or frequent
4=species reported until 1984 (Weltern & Sutter 1984) Ref. 83
5=species reported until 1994 (Wagner 1995) Ref. 84
6=species reported until 1998 (Floristic Notes Bot. Helv. until 1998) Ref 85
7=species reported until 2000 (Floristic Notes Bot. Helv. until 2000) Ref. 85

Frequency:
Frequency of species occurrence referring to all mapping areas (n=593), in percent

Red List category, nationwide:
following the Red List of Landolt (1991); for a detailed legend see 'Distribution of species'
U=not endangered
A=attractive
R=rare
V=vulnerable, endangered
E=critically endangered
Ex=extinct
?=no indications

Species-name:
Nomenklature after Welten and Sutter (1982), Ref 82, completed by species names after the Flora Helvetica (Lauber and Wagner 1996) Ref. 86.

G.1.8 High Conservation Values inside the project zone

The forestry sector of the OAK Schwyz is FSC-certified. The FSC standard also refers to the IUCN Protected Area Management Categories. In the national FSC Standard High Conservation Value Forests (ref.28, p.43) only protection forests are indicated as HCV categories (IUCN HCV 4). And in the national FSC-Standard it is confirmed that this category is covered by the protection forests identified in the official forest development plan.

The forest development plan covers all forests of the project zone. The area of the protection forest in the project zone is 3'575.2 ha according to Information provided by the forest service of the canton (Ref. 80). Out of this 3'346 belong to the OAK Schwyz.

Following table shows the total forest area of the OAK Schwyz and the categories according to FSC. "High conservation value forests" according to FSC includes also protection forests, which are managed intensively (Ref. 18, 19).

Composition of the FSC-certified Forest(s)

	Area (ha)
Area of forest protected from commercial harvesting of timber and managed primarily for conservation objectives /	**1269**
Area of forest protected from commercial harvesting of timber and managed primarily for production of NTFPs or services /	**500**
Area of forest classified as "high conservation value forest" /	**3346**
Total area of production forest (i.e. forest from which timber may be harvested) /	**7267**
Area of production forest classified as "plantation" /	**0**
Area of production forest regenerated primarily by replanting /	**0**
Area of production forest regenerate primarily by natural regeneration /	**9036**

1.8.1. Globally, regionally of nationally significant concentration of biodiversity values, including protected areas, threatened species, endemic species and areas that support significant concentrations of a species during any time in their life cycle (i.g. migrations, feeding grounds, breeding areas)

There are several inventories of nature conservation categories of national importance that are covering parts of the project zone (see Section below). They are parts of that national inventories but not significant concentrations of that. The project zone is part of the eco-regions Pre-Alps and Alps. The only HCV category according to IUCN criteria are the protection forests. This complies with national FSC-Standard which relies on IUCN criteria.

One rare species is the Wood Grouse (Tetrao Urugallus) Ref. 51. The IUCN category is EN endangered. It is also not a national significant concentration in the project zone but it is distributed to the whole Pre-Alp and Alp eco-regions. In the Nature Conservation Concept of the canton as well as in the Nature Conservation Concept of the OAK Schwyz this species is especially mentioned and silvicultural measures (habitat improvement) to support it are foreseen (Ref. 11, 38, 44).

Annex 5 shows the method of the floristic inventory of the project zone. For each species the red list category is indicated. The red list categories are not identical with the IUCN categories but they are Swiss national standard and they are equivalent to IUCN.

1.8.2 Nationally large landscape level areas

No areas of this HCV category are present in the project zone. This complies with national FSC-Standard which relies on IUCN criteria.

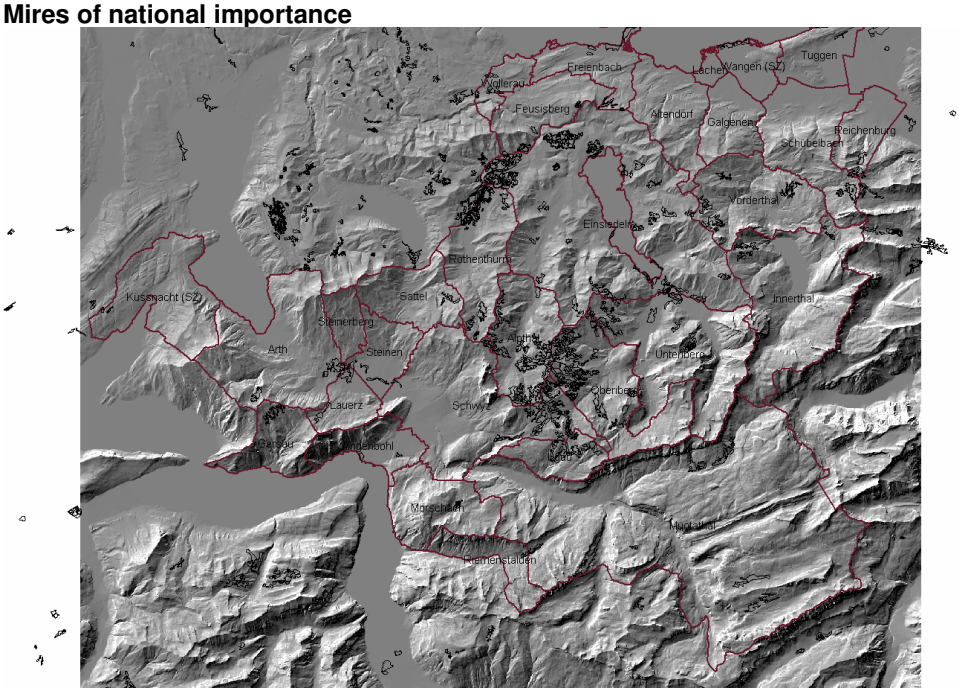
No complete HCV assessment according IUCN criteria was conducted in the project zone. Equivalent categories are used in several nature conservation inventories of national importance. HCV in the project zone in this context was used in addition to the IUCN criteria if the area is in an inventory of national importance. According to Swiss legislation this includes mires, and amphibian spawn areas.

Protected areas

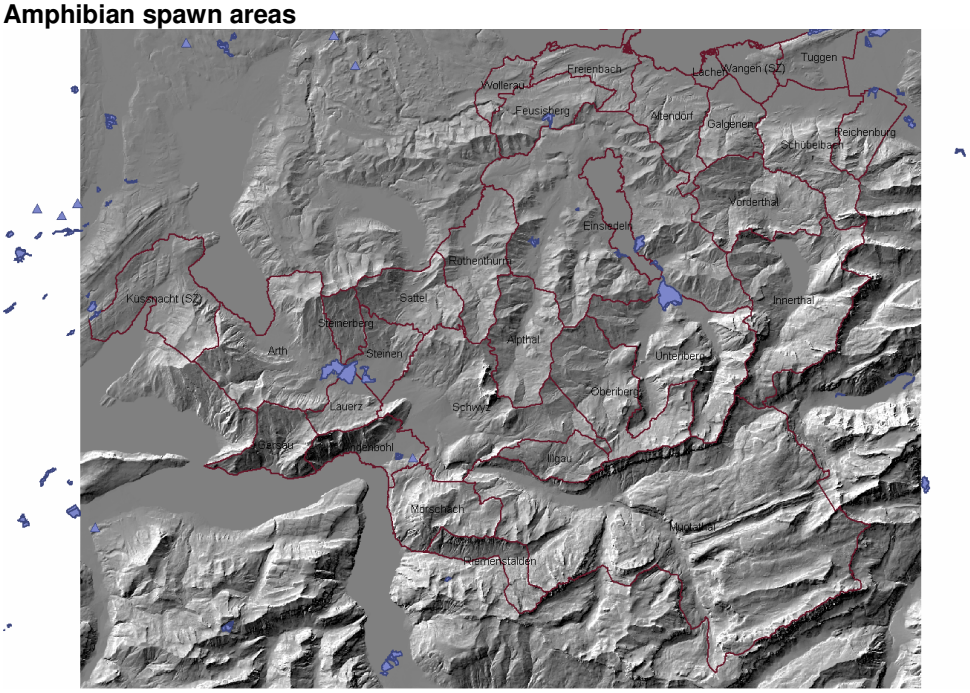
In the project zone there are several nature conservation objects of national importance. They are all legally binding and considered in the regional forest development plans and in the forest management plans. The forest management plans are approved by the authorities. Those areas of high conservation values are not touched by the project activities by law.

In addition to that there are the forest nature reserves indicated in Section G.1.7.All categories of protected areas indicated above are subject to scientific evaluation, which cover all aspects mentioned in the CCBA Standards G.1.8.1 (threatened species endemic species, areas of significant concentrations of a species during any time in their lifecycle).

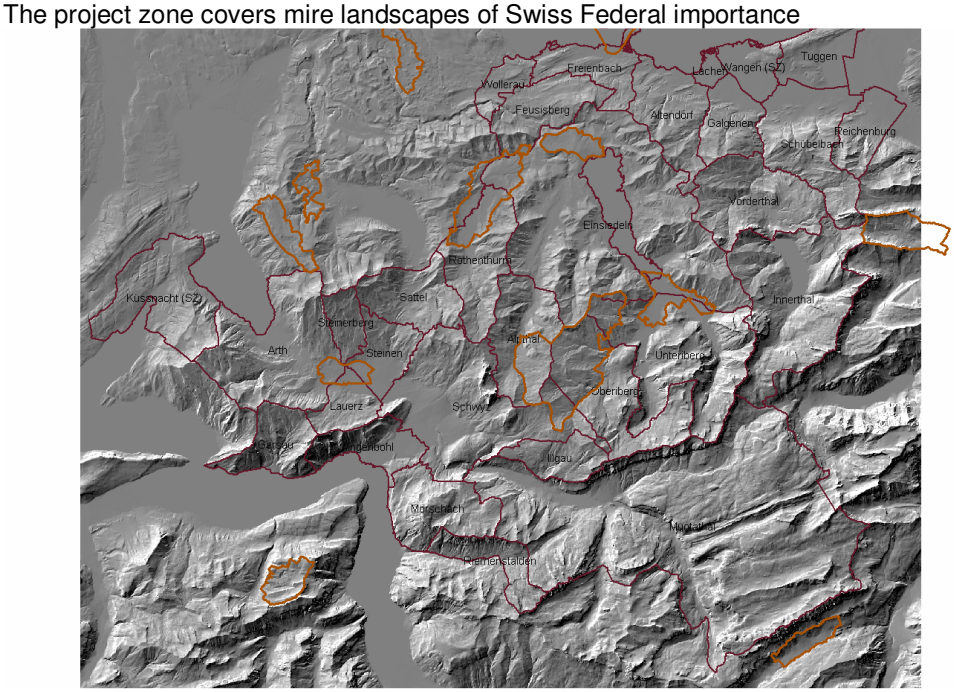
Mires of national importance



Amphibian spawn areas



The project zone covers mire landscapes of Swiss Federal importance



1.8.3 Threatened or rare ecosystems

No areas of this HCV category are present in the project zone. This complies with national FSC-Standard which relies on IUCN criteria related with forests. This category also is covered by the national nature conservation inventories indicated in Section 1.8.3 above.

In this context as the nature reserves can be mentioned. Many of those are lying in the forest. The forest reserves do not contain threatened or rare ecosystems in terms of the IUCN categories but they represent areas of a close to nature status and that are protected from timber harvest. They represent rare ecosystems equivalent to IUCN as well as typical ecosystems of the region.

The OKA Schwyz has established 10 forest reserves with a size of 1'169.22 ha where harvest is completely stopped or where a special management to improve biodiversity actively is foreseen. Another four reserves of total 660.40 ha are planned (Ref. 37). The reserves are contracted with the canton for 50 years. The reserves are all complying with the conditions Nature Conservation Concept of the Canton Schwyz (Ref 38). Therefore they are financed with subsidies, but partly only (Ref 37). The carbon money will contribute to the financing of the forest reserves. The forest reserves will contribute to the biodiversity. The already established reserves sequester a lot of carbon. They were excluded from the project area for reasons of additionality.

Name (commune)		**Type**	**Area /**	**Contract date /**
	Legally binding reserves			
1a	Bödmeren (Muotathal)	NWR	69.30 ha1)	25. Juli 1984
1b	Erweiterung Bödmeren (Muotathal)	NWR	340.57 ha	27. Mai 2009
1c		SWR	139.55 ha	
2	Chlingentobel (Schwyz)	NWR	35.37 ha	11. Aug. 2003
3	Rigi Hochflue (Ingenbohl, Lauerz)	NWR	38.19 ha	11. Aug. 2003
4	Urmiberg (Ingenbohl)	NWR	44.74 ha	11. Aug. 2003
5	Mördergruebi (Oberiberg, Schwyz)	NWR	30.79 ha	17. Sept. 2004
6	Hobacher/Salzbrunnen (Oberiberg, Schwyz)	NWR	194.11 ha	17. Sept. 2004
7	Hundschotten (Rothenthurm)	NWR	125.98 ha	16. Nov. 2005
8	Sihltal (Unteriberg)	NWR	127.50 ha	16. Nov. 2005
9	Unter Gibel (Schwyz)	NWR	12.81 ha	14. Nov. 2006
10	Gwandelen (Sattel)	NWR	10.31 ha	14. Nov. 2006
Total legally binding			**1169.22 ha**	

NWR = Forest nature reserve, SWR = Special forest reserve
For each forest reserve a detailed description is available.

1) 61 ha forest out of 69.30 ha total area.

1.8.4 Areas that provide critical ecosystem services.

Large areas of the project zone are in the mountains with steep slopes. There are settlements and traffic lines (roads, railways) that are in permanent danger of stone fall, erosion, and flood. Especially the forest has an important protection function. Those ecosystem services are subject to forest legislation. They are identified and delineated in the forest development plans and are legally binding

for all forests. The management plans of the OAK Schwyz are approved by the authorities and are covering all legal conditions (Ref. 42).

According to the national FSC Standard this category is identical to the protection forest category of the forest development plans which cover all forests of the canton and so also the whole project zone. The IUCN Category HCV 4 takes 3346 ha of the OAK forests.

1.8.5 Areas that are fundamental for meeting the basic needs of local communities.

The farmers of the project zone depend fundamentally from the pastures and the forests. In the project zone 11% of the employees are still working in the first sector. This is significant to all rural areas. The forests are not so important for employment but for the function of protection against natural hazards like snow avalanches, landslides, rock fall, flood. This is partly fundamental. I addition the forests are important to preserve natural biotopes and biodiversity.

The table in Section G.1.3 indicates the main function of the compartments.

1.8.6 Areas that are critical for the traditional cultural identity of communities.

The whole project zone is home of the population since more than thousand years. The identity also inside Switzerland is highly determined through the landscape (the landscape as the whole with land use pattern, mountains, and valleys). People are highly joint with this. (Also the dialect spoken is typical for the area). It is the landscape in general that is generic to the cultural identity not specific spots or areas. No specific areas can be identified that are critical for the traditional cultural identity of communities.

G2 Baseline Projections

G.2.1 Description of the most likely land-use scenario in the absence of the project following IPCC 2006 GL for AFOLU or a more robust and detailed methodology.

In Switzerland the forest area is determined officially and it is protected by law very strictly. (Ref. 1, 2, 3, 4). Any changes from forest to other land use are subject to a legal procedure that is controlled by the Swiss Federal Office for the Environment (Forest law Art. 5.1: “Forest clearing is prohibited”.) Exceptions are indicated in Art. 5.2. and they are handled very restrictively. First target of the canton forest service is that the forest remains with its area and spatial distribution (“Der Kantonale Forstdienst sorgt dafür, dass der Wald in seiner Fläche und räumlichen Verteilung erhalten bleibt).” Ref. 4. Any permission for forest clearing is subject to public stakeholder consultation.

The project area is the already existing forest that belongs to the OAK Schwyz. Goal of the project is to increase the biomass content by increasing the standing timber volume through improved forest management. The present land use is forest and the land use in the absence of the carbon binding project is also forest.

According to IPCC 2006 GL for AFOLU Chapter 1 the land use category is Forest land remaining Forest land FF.

The calculations of the Baseline Study Ref. 21 were adopted by excluding the existing forest nature reserves from the project area. The estimated growth (baseline and project scenario) is 5.31 m3/ha/yr (cell AF91 in table annex 3), the baseline harvest is 5.75 m3/ha /yr.

Baseline according to the adopted Baseline Study Ref 21 is following:

Annual yield (baseline and project scenario)

Total	Conifers	Broadleaves	
5.31	4.36	0.96	m3/year/ha
	1.167	1.517	tCO2/m3 Conversion factor see Section III Climate, Subsection C
6.34	5.09	1.45	tCO2/ha/year

Annual baseline harvest

Total	Conifers	Broadleaves	
5.75	4.80	0.96	m3/year/ha
	1.167	1.517	tCO2/m3 Conversion factor see Section III Climate, Subsection C
7.05	5.60	1.45	tCO2/ha/year

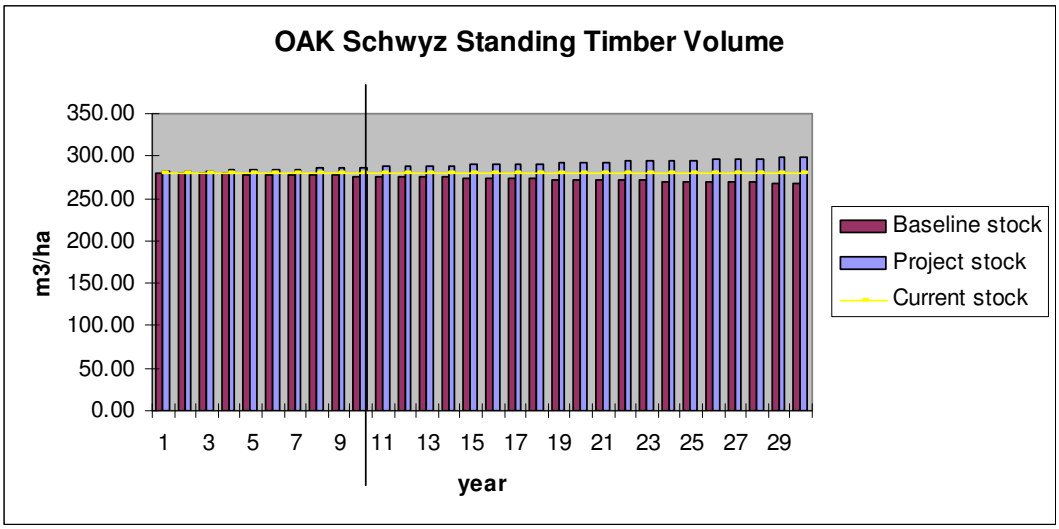
Annual baseline net removals

Total	Conifers	Broadleaves	
-0.44	-0.44	0.00	m3/year/ha
	1.167	1.517	tCO2/m3 Conversion factor see Section III Climate, Subsection C
-0.51	0.51	0.00	tCO2/ha/year

For conversion factors see Section CL.1.1

The detailed calculations on the baseline per year (yield, harvest, removals, carbon stock) are included in the Climate Section CL.1.1.6c.

The baseline is a slight decreasing of the carbon stock with 0.44 m3/ha/yr or 0.51 tCO2/ha/yr. This will cause a decrease of the average stock from 281 m3/ha to 268 m3/ha during 30 years from 2005 on. The vertical line in the graph below shows the status after ten years. After ten years the baseline carbon stock will be 277 m3/ha.



In the baseline study the baseline scenario was elaborated as the allowable harvest volume under consideration of all forest functions. In this sense the baseline is conservative. This study was conducted together with the representative of the forest administration. The actual timber harvest volume depends also from timber prices, because the costs of harvest in mountain forests vary a lot. With increasing timber prices the harvested volumes increase immediately. Reserves can be taken. So historic data with different timber prices and different costs (the technology to harvest timber in mountains has been developed fast) are not suitable to be used as baseline. We refer to the general demand from the Swiss forest owners association to reduce the standing timber volume in the mountain forests.

Baseline methodology: Confirmed planning scenario approach.

The "Confirmed planning scenario approach" is based on two criteria.

- The planning scenario is realistic according to silvicultural and legal requirements.
- The planning scenario is highly probably

Both criteria must be sustained with evidence.

In the case of the OAK Schwyz there is a written confirmation by the authorities, that the baseline scenario is realistic and legal (Ref 74). This statement issued by the head of the Canton Forest service is stating:

- that the forest enterprise of the OAK Schwyz is obliged to have an approved management plan, which is the case. This management plan guarantees the forest functions according to the Swiss and Canton legislation.
- All trees to be harvested are marked by the forest service and measured. All harvest is controlled by the forest service.
- The amount of timber harvested of the baseline study of 42'000 m3 timber per year is confirmed. They are confirmed not only as possible but as realistic. Realistic because the amout of timber harvested is sensitive to the timber price. Timber harvest in the mouinains can be very expensive. In this context the rising timber prices in 2007 and 2008 are indicated.

Realistic in this context means highly probable.

The probability is further sustained with demands by the forest owners association for future decreasing of the standing timber volume in Switzerland (Ref 47). This is a political position paper of the forest owners' association.

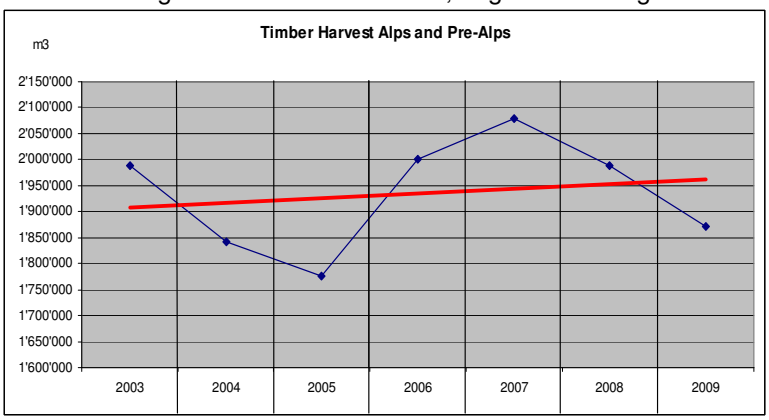
- Position one is stating that the mountain forests are of high timber volume and that harvest must be intensified.
- Position four is stating that improvement of the productivity as well as growing demand for timber will improve the economic situation of the mountain forest enterprises.

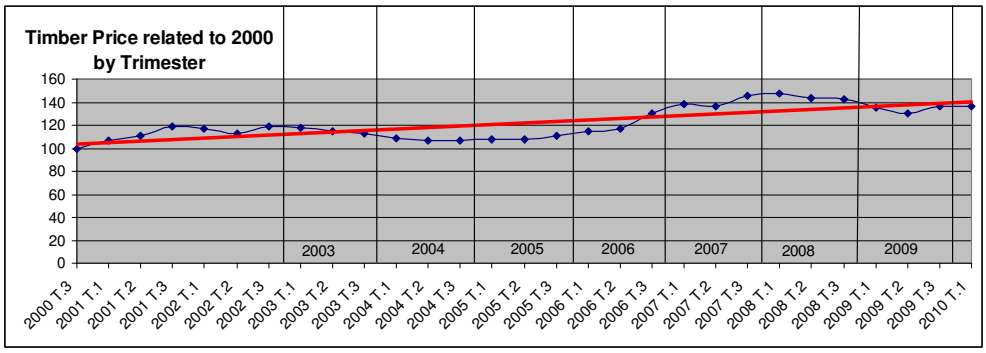
Main driver of the baseline scenario is the price of timber. In the mountain forests the cost for harvest can be very high depending on the geography, infrastructure etc. If the costs are not covered by the revenues from wood sales, harvest operations are postponed. On the other hand if the timber prices increase, more volume can be harvested with profit. The harvest volume in the mountains is sensitive to the timber price. This can be disturbed by damages (mostly storm damages). In such situations more timber is harvested at lower prices, partly compensated with subsidies. But the general rule is that the increasing prices cause higher harvest volume. The actual discussion is a point that leads to demands to decrease the standing timber stocks in Switzerland! Ref. 47.! This is strong evidence that the baseline scenario is even more than realistic but to be expected with high probability.

Because the baseline was defined as maximum timber harvest volume under consideration of all other forest functions, it is conservative. Even if the price goes higher, no more timber can be harvested

Such expert statements can be sustained with following figures. First graph below shows the timber harvest volume in the Alps and Pre-Alps in Switzerland (blue line) with increasing tendency (red line) by year .

The second graph shows the timber price (blue line) also with increasing tendency (red line) by trimester. Source: Swiss Federal Statistical Office http://www.bfs.admin.ch/bfs/portal/de/index/themen/05/04/blank/key/spez_ppi/ppi_spez.print.html. Not only the general tendency is parallel but also the temporal variation. Before 2003 the storm damages were disturbing the market. From 2003 on we see decreasing timber prices and decreasing harvest volume in 2004 and 2005. In 2006 prices and harvest volume went up. In 2008 and 2009 there is a decreasing during the economic crises. But the timber price statistics show increasing tendencies end of 2009, begin of 2010 again.





The two graphs show the high sensitivity of the harvest volume to the price for timber. Those are clear evidents on the baseline assumptions. The economic dynamics of this development cannot be predicted exactly but the likelihood is very high.

Because of different cost structures and sizes of Swiss forestry enterprises any benchmark is also not applicable to proof the baseline considerations. With more than 9'000 ha the OAK Schwyz is the largest not state owned forest enterprise in Switzerland. The one realistic baseline methodology is the "confirmed planning scenario approach" of the baseline study: allowable timber harvest volume under the current legal conditions, confirmed by the authorities. This is added with evidence that the actual tendency is to harvest more. There are demands from the forest owners association to decrease the standing timber stocks in Switzerland! Ref. 47.! The "realistic" baseline harvest scenario becomes highly probably.

In the baseline study also a scenario of minimum harvest volume was elaborated also considering all forest functions. This allows to proof that the project scenario

which is in between the baseline and that the maximum allowable harvest scenario is sustainable against all forest functions.

The baseline assumptions were elaborated together with the responsible person from the forest service of the Canton Schwyz and confirmed (Ref. 74).

The baseline shall be revised after ten years. The same procedure shall be applied as in the baseline study. A maximum allowable timber harvest volume will be determined for each compartment considering the actual status of the forests all forest functions. This shall be confirmed by the forest service of the Canton Schwyz.

If the carbon stock at the end of the first baseline period in year 10 is below the baseline figure the difference must be transferred to the subsequent baseline period as loss. This loss must be filled up by growth before new credits can be issued in the subsequent baseline period.

Because the gain/loss method is applied no new inventory data are required at baseline revision. Only if new inventories are conducted for other reasons any new data on growth shall be considered at the time of the baseline revision.

Non continuation of the project is not likely. This would mean that the standing timber volume will be decreased during the project duration or after that. The OAK Schwyz will issue carbon credits to customers which implicates a legal obligation to continue with the project. Any non continuation would be defraud to the buyers of the credits and potentially subject to legal accusation. The OAK Schwyz as an old family law corporation with 17'000 citizens with annual public reporting and annual general assembly and close relations to the future customers (mainly small and middle sized enterprises) is under permanent public observation. The absolute positive reputation of the OAK Schwyz is one reason for customers to buy carbon credits from this project. Non continuation would be a complete deviation from the habit and the tradition of the OAK Schwyz.

Permanence of the carbon sequestered is on the one hand guaranteed by the forest legislation. Forest clearing is extremely restricted in Switzerland. The forest area of the OAK Schwyz has been the same since hundreds of years. The carbon content of the managed forests with around 300 m3/ha against 270 m3/ha in the baseline scenario at the end of the project lifetime will be stabilising or increasing the yield. (Ref. 57). So this advantage of higher standing stock the OAK Schwyz will not neglect. But the precondition for higher more productive average timber volume is the abdication to potential harvest in the meantime, which is the main project measure.

Risk: The only serious risks for the forests of the OAK Schwyz are storm damages. Fires are not a danger in the north of the alpine main mountains. The most severe storm damage in the history of the OAK was caused by "Lothar" 26. December 1999. This storm caused harvest of much more than the yield in the following three years. This was compensated by reduced harvest after that. Even this most severe storm damage did not cause a source of carbon in a 5 years average. I case damages may make harvest volumes necessary that are above the yield and cause a decreasing of the standing timber volume in subsequent years the harvest volume will be reduced and the sale of carbon credits will be stopped until the lost carbon is compensated by yield. See Section G.3.5. A complete stop of harvest operations until the extraordinary cuts are compensated is not possible because other forest functions may make harvest necessary (i.e. measures in protection forests).

G.2.2 Documentation that project benefits would have not occurred in the absence of the project.

The project benefits against the baseline can be seen in the figure in Section G.2.1. above.

The historical average harvest from the last 30 years is given below. The average from 2005 on is significantly lower.

A historical baseline comparing just timber harvest in the past and harvest volume in the future is not appropriate in the project area for following reasons: The cost for harvest can be very high in the mountainous regions and not being covered by the revenues from timber sale. So the amount of harvested timber depends also from the timber market and the wood prices. It is expected, that the prices for timber and wood will increase in the future dramatically, when the oil price will go up. The rising of the wood prices before the economic crisis showed clearly the increase of the timber harvest volume in Switzerland and also in the OAK Schwyz. Considering that the oil peak is already passed it is expected, that timber prices will increase again dramatically. Then the timber harvest will be economically successful in much more steep mountain forests. The actual timber harvest will then reach the maximum possible number. There were arguments in Switzerland even to reduce the standing timber volume if the wood price is high enough (Ref.47). And in fact the baseline shows a slight decrease of the standing timber volume.

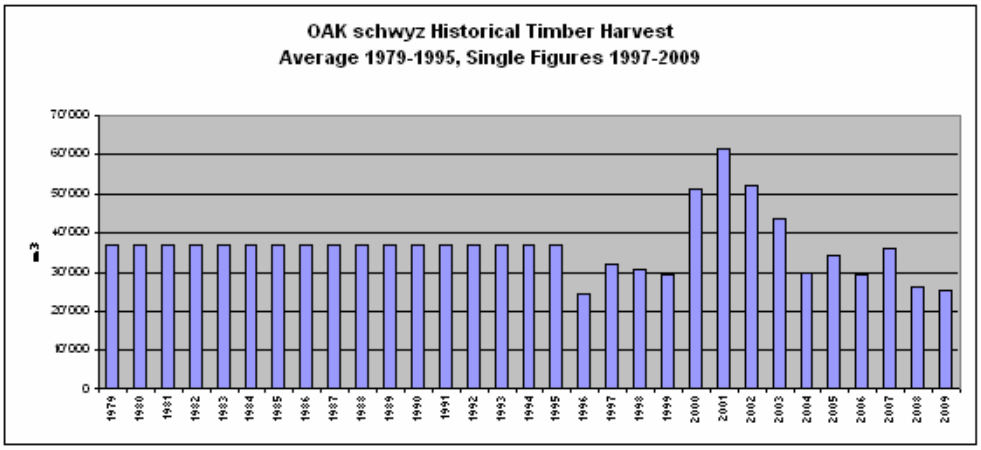
A baseline study was produced in 2006 (Ref. 21). In this study the harvest optimised harvest timber volume was evaluated under the current legal conditions. In this study the responsible person of the canton forest service was involved and the study as such confirmed. For the project the already existing forest nature reserves and not productive forests were excluded from the project area.

Land use change from forest to other land use is extremely restricted by law in Switzerland and in the Canton Schwyz (Ref. 1-4). Any deforestation would not occur also in the absence of the project.

Taking all legal requirements and silvicultural conditions in the forests of the OAK Schwyz into consideration the harvest inside the forest can take some more than the yield during the project lifetime, a certain decrease of the carbon stock is there in the absence of the project. In the baseline study the carbon stock change in the absence of the project was calculated. See Section G.2.3

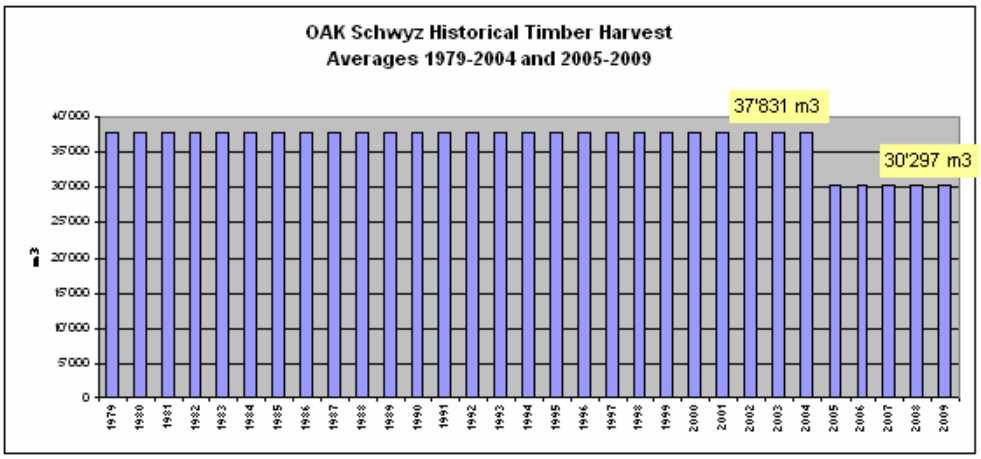
The additionality of the project is based on the self compliance of the OAK Schwyz not to increase the timber harvest to the legally and silviculturally possible maximum even in times of higher wood prices but to increase the standing timber volume and hold it. High wood prices are a significant financial barrier for a carbon sequestration projects. Without money from carbon credits the OAK Schwyz will follow just the business as usual practice and harvest more.

The historical approach of the figure below shows the change in harvest regime in 2005. From 1979 to 1995 total harvest timber volumes were available for the whole management plan periods of the former separate management units. From 1996 on the detailed figures are available (Ref.58). The years 2000 to 2003 were characterized by the storm damages caused by Storm “Lothar” 26th December 1999. From 2005 on carbon sequestration was the reason for the reduced timber harvest. Early considerations go back to 2003 when the OAK Schwyz took part in an evaluation on the opportunities to count for carbon sequestration under KP Art. 3.4 conducted by the Swiss Federal Office for the Environment (Ref. 20), which was followed by a detailed Baseline and Project Scenario Study on the OAK Schwyz (Ref. 21) with starting year 2005.



Methodological approach: The historical harvest data show a high volatility caused by damages in the forests. The biggest damage in history was storm “Lothar” in 1999. But in a 5 year average even this storm did not cause a source of GHG.

Starting date is 1. December 2004. This is the starting date of the 2005 agricultural year in Switzerland. The baseline study finished in 2006 clearly states the start of the project in 2005. All calculations are based on the start year. Also inventory data from the baseline study are related to begin of 2005. 1. December was chosen because this date is the beginning of the “Agricultural year” in Switzerland. During winter season there is no growth and the harvest activities are nearly stopped due to snow. Winter months (December-March) are the times of the lowest carbon flow (near to zero). In terms of carbon any date within this period would result in nearly the same carbon status figure. By choosing 1. December 2004 the project simply fits to the bookkeeping period 2005. The long term average harvest timber volume from 1979 to 2004 was 37’831 m3/yr. Since 2005 this is 30’297 m3/yr.



G.2.3 Estimation of the "without project" reference scenario (baseline scenario)

According to the IPCC land use classes the project area is forest remaining forest also in the baseline scenario.

Target of the project is to increase the standing timber volume within 30 years by harvesting below the baseline figures for that period and by holding the carbon stock from then on.

There is only one land use change class "forest remaining forest". The carbon pools considered are aboveground and belowground biomass of the living trees (living tree biomass). Dead wood, litter and soil carbon are not taken into account in the baseline calculations. In the baseline scenario there is a slight decrease of the standing timber volume. In the project scenario the standing timber volume will be increased and together with that also the other carbon pools. Therefore the exclusion of the other carbon pools in the baseline (as well as in the project scenario) is conservative.

Timeframe of the baseline estimations is 30 years, which is project lifetime as well as crediting period.

A revalidation of the baseline is foreseen after 10 years. At the end of year 10 the baseline carbon stock will be 631'599 tC.

The table below shows the baseline carbon stock during the expected project lifetime.

Baseline Carbon Stock

		Baseline		
		BL C-Stock at the end of the year		
		Bti1	Bti2	eq.1 Bt
		Conif	BLeaf	total
	Year	tC/year	tC/year	tC/year
	0	497'446	144'398	641'844
2005	1	496'418	144'401	640'820
2006	2	495'390	144'405	639'795
2007	3	494'362	144'408	638'771
2008	4	493'335	144'412	637'746
2009	5	492'307	144'415	636'722
2010	6	491'279	144'418	635'697
2011	7	490'251	144'422	634'673
2012	8	489'223	144'425	633'648
2013	9	488'195	144'428	632'624
2014	10	487'167	144'432	631'599
2015	11	486'139	144'435	630'575
2016	12	485'112	144'439	629'550
2017	13	484'084	144'442	628'526
2018	14	483'056	144'445	627'501
2019	15	482'028	144'449	626'477
2020	16	481'000	144'452	625'452
2021	17	479'972	144'456	624'428
2022	18	478'944	144'459	623'403
2023	19	477'916	144'462	622'379
2024	20	476'888	144'466	621'354
2025	21	475'861	144'469	620'330
2026	22	474'833	144'473	619'305
2027	23	473'805	144'476	618'281
2028	24	472'777	144'479	617'256
2029	25	471'749	144'483	616'232
2030	26	470'721	144'486	615'207
2031	27	469'693	144'489	614'183
2032	28	468'665	144'493	613'158
2033	29	467'638	144'496	612'134
2034	30	466'610	144'500	611'109

The parameters used are indicated in Section G.1.4

Non-CO_2 greenhouse gas (GHG) emissions such as CH_4 or N_2O

The project is being conducted in already existing forests. The silvicultural practice is small scale and single tree harvest. In most cases the stands are naturally regenerated without any plantations. No site preparations like ploughing occur. There is no difference in the general silvicultural practice between baseline and project scenario. The difference is the intensity of the harvest operations. No fertilizer or nitrogen fixing trees that may cause N_20 emissions are used.

G.2.4 Description of how the "without-project" scenario would affect communities in the project zone.

The project means a moderate change in the harvest strategy only. No land use change occurs. The baseline scenario as well as the project scenario is not really different in affecting the communities in the project area significantly in terms of water, soil and other ecosystem services. Also the without project land use is embedded in the legal framework and a sustainable forest management is assured also in terms of preserving water and soil resources.

Important for the communities is the protection function of the forest (mainly protection against rock fall and erosion). Such protection forests are normally located in between rocks and housing areas or infrastructures like railways and roads on steep slopes. In such protection forests old and heavy trees might become a danger to the lower lying infrastructures. In protection forests the average standing timber volume in tendency must be kept lower than in normal productive forests. This was taken into consideration in the baseline harvest estimation in the baseline study. Columns AH and AI in the table Annex 3 show the lower figures in protection forests in terms of potential increased harvest volume in the baseline.

G.2.5 Description of how the "without-project" land-use scenario would affect biodiversity in the project zone.

The forest management plan of the OAK Schwyz is embedded in the legal framework of the federal forest law and the canton forest law (see section G.6). In addition the forest enterprise is FCS-certified. Also the without project scenario the OAK Schwyz fulfils the requirements of the FSC standard. This includes the establishment of a certain percentage of forest reserves to strengthen the biodiversity status of the project area. The carbon binding project causes an additional incentive to establish forest nature reserves. Without project in tendency there is more intensive harvest and less standing timber volume with the consequence that there is less dead wood and less biodiversity. Higher standing stock is closer to natural conditions.

On the other hand less dense forests enable species that like more light find better conditions. The Special Forest Reserves are mainly established for that purpose. Because the difference in average standing timber volume from baseline and project scenario is moderate there are only slight tendencies in changes in biodiversity to be expected.

G3 Project Design & Goals (Required)

G.3.1 Scope of the project and major climate, community and biodiversity goals.

The scope of the project is to increase the carbon pool of the living tree biomass of the existing managed forests of the OAK by reducing the harvest below the yield. Most stands of the OAK forests are uneven aged. Clear cuts are not conducted. The increase of the average standing timber volume is analogue to an "extension of the rotation period" in even aged forest plantations. The standing timber volume will be increased by 30 m3/ha within 30 years against the baseline. This is a moderate measure within the silvicultural tolerance.

Major climate goal

The mentioned figures on sequestration result in a total of 245'000 tonnes of CO2 to be sequestered. This is the overall contribution of the project to the climate goal. See Climate Section.

Community goal

The OAK Schwyz is an old law family corporation with 17'000 members out of around 51'000 inhabitants in the communities of the county Schwyz. So the members are not identical with the political communes and their citizens but they represent a large part of them. They represent a sort of indigenous portion of the population. The goal of the OAK Schwyz is not only to earn as much money as possible and distribute this to the members, but to support public, charitable or beneficial intents (Ref.39, 40). Cash payments to the members are marginal. By owning most of the forest in the project zone the success of the OAK also affects the communes in general. The act on forestry (Wald- und Forstwirtschaftsverordnung) of the OAK says in Art. 1, that the forests are to be managed and used in the framework of the official management plans (Ref. 41). The management and the use of the forest then are embedded into the framework of the federal and canton forest legislation (Ref. 1 – 7). This contents the forest development plans which are sectorial parts of the official land use planning. Forest development plans undergo a public participatory process. Result is the geographical determination of forest functions in forest development plans. The management plans must be approved by the authorities. Beside timber harvest there are protection against natural dangers, improvement of biodiversity, and provision of tourist infrastructures of great importance. The forest functions defined in the development plans will be achieved without project as well as with project. The sequestration of carbon is one new additional goal of the OAK embedded in an overall management concept. The OAK Schwyz is not a rich organisation, and one goal is to manage the alps and forests in an economical manner. The income from the carbon credits will help to reach the other goals. In addition to this the OAK offers periodically services to the community members: Free use of the OAK aerial cable way to mountain peaks during the whole summer season, free use of ski lifts in winter, free guided tours to the forest nature reserves etc. This are well accepted services that can be provided by the OAK Schwyz more easily with income from carbon credits.

Biodiversity goal

Biodiversity is an important part of the regional forest development plans. Biodiversity goals are also very important in the context of FSC certification. The silvicultural practice will not be changed in principal by conducting the climate protection project. Some cuts may be less intensive and will cause fewer disturbances. In

addition to the legal requirements the forestry enterprise of the OAK is certified according to FSC. Several forest reserves have been established. To increase the standing timber volume means to have older and thicker trees and in tendency more deadwood. Both contribute to biodiversity. Higher average standing timber volume brings the forests closer to natural conditions.

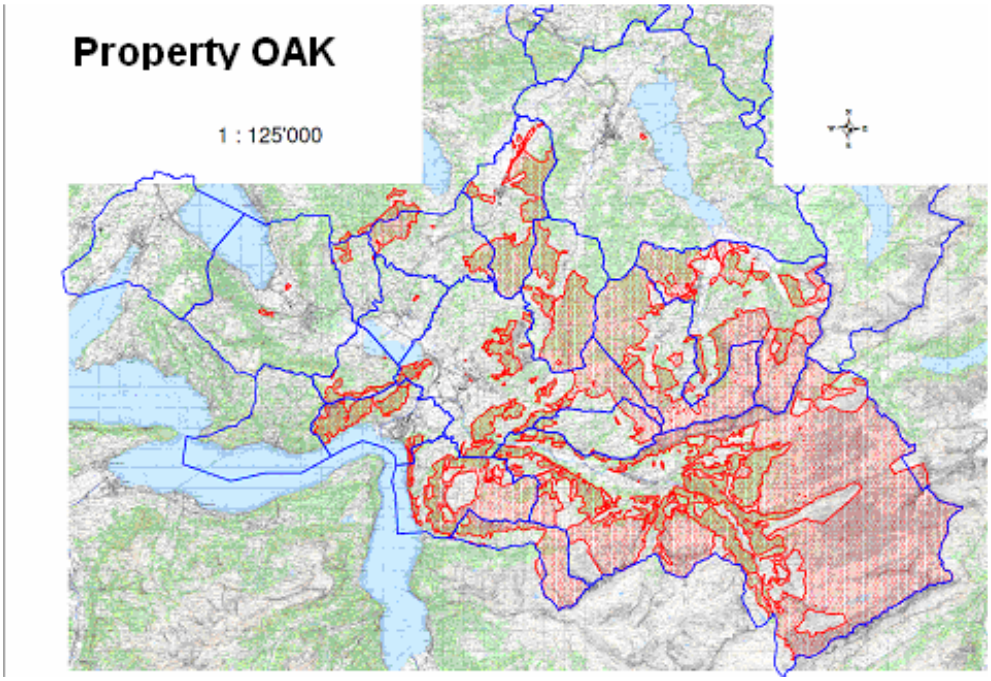
G.3.2 Major project activity (if more than one) and its relevance to achieving the project's goals.

The major project "activity" is to harvest in average less timber than it could be according to the baseline study. This will result in the climate, community and biodiversity goals described above. The activity is to refrain from more intensive harvest. One other project activity is the establishment of forest nature reserves. No other "activities" are planned.

G.3.3 Provide a map identifying the project location and boundaries, where the project activities will occur, of the project zone and surrounding areas.

The map below shows the property of the OAK Schwyz (red coloured areas) embedded in the Communes (blue borders) which represent the project zone.

The whole surface of the communes containing OAK forests are forming the project zone. The background shows the topographical map indicating forest as green areas.



The forest area of 9'036 ha refers to all forests owned by the OAK Schwyz. They are all plan-managed.

Forest stand maps of the forest of the OAK Schwyz are available in scale 1:5'000 also in digital form. They are parts of the management plans.

Project area = Forest property OAK – Forest nature reserves – Non productive forests.

G.3.4 Define project lifetime and GHG accounting period.

The time frame of the project is 30 years from 2005 to 2034. It is conducted in the already existing forests and those will remain as forests after the project is finished. The increment of the standing timber volume by around 30 m3/ha in 30 years against the baseline scenario with a target standing timber volume of around 300 m3/ha. This is a moderate and realistic scenario in the middle of the silvicultural range of 250 to 350 m3/ha.

From 2002 on the OAK took part as case study of the Swiss Federal Office for the Environment on the "Opportunities to Apply Article 3.4 in Switzerland" (Ref. 20). Target of that study was to evaluate how forest owners can participate from RMU's. For the OAK Schwyz a detailed study was elaborated "Potential of Carbon Sinks. Example of a Large Area Forest Enterprise" in 2006 (Ref. 21). In this study the baseline and project scenario calculations were conducted with starting year 2005, which was determined by the OAK Schwyz. Because the state is not prepared to transfer any RMU's to the forest owners (a general revision of the forest law including a respective article were not considered by the parliament), the OAK Schwyz decided in 2008 to conduct a project for the voluntary market. Project start remained 2005. During that study it was evaluated what amount of carbon sequestration and which project lifetime and crediting period shall be applied. The 30 years life time and crediting period with an increment of the standing timber volume from 280 to 320 m3/ha was considered a moderate project scenario. These figures changed with the exclusion of the forest nature reserves and the non productive forests from the project area.

The compliance to reduce harvest compared to the baseline was considered adequate and the expected prices for carbon credits seemed to compensate the risk of loosing money compared to the baseline harvest figures with increasing timber prices.

The projects could be implemented immediately.

Milestones

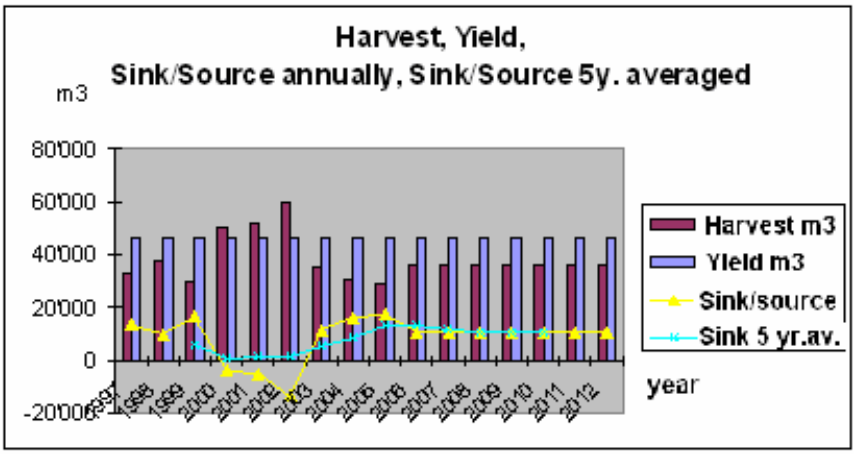
2002-2005	Initial study for option to account for carbon credits.
2005	Baseline and project scenario study, project implementation
2009	Project development PDD
2010	Validation, Verification on period 2005-2009
2011 - 2014	Annual verification
2014	Baseline revision
2015-2024	Annual verification
2024	Baseline revision
2025-2034	Annual verification

G.3.5 Identify likely natural and human-induced risks to the expected climate, community and biodiversity benefits during the project lifetime and outline measures adopted to mitigate the risks.

Risks to climate benefits

The only risk to the climate goals of the project is the loss of carbon stock due to natural hazards. In the mountainous regions 20 to 30% of the harvested volume is caused by damages mainly storm damages. Forest fires are not a risk in the northern Alps. The largest damages in history of the OAK happened in 1999 caused by storm "Lothar" together with heavy rainfalls. Most of the timber felled by "Lothar" was harvested and extracted. This was three times higher volume than in average years (yellow line in graphic below). But even in a five year

average the carbon stock was not reduced (blue line in the graphic below), Ref. 21. The measures to mitigate this risk are the common silvicultural practices and are not project specific. Anyway the silvicultural practice will be adopted to some extend to preserve the stability of the stands. With the sequestration target the harvest measures will be less intensive and the disturbance of the forests will be less. This will strengthen the silvicultural goal to make the forest stands more stabile against storms and to reduce the risk of storm damages by applying close to nature silvicultural concepts.



Risks to community benefits

The community benefits from the OAK forest are not depending significantly from the project because of the embedding of the forest management in the legal framework of the state and the canton. No risks to the community benefits can be identified.

Risks to biodiversity benefits

Because the project is within the frame of the common silvicultural practice including FSC-certification, not project specific risks to the biodiversity can be identified. Storm damages can disturb the higher stock regime and the mentioned higher dead wood portion. Such damages occur only on parts of the project area, so the overall biodiversity is not affected. In terms of biodiversity storm damages can also be positive (more pioneer species).

G.3.6 Specific measures to ensure maintenance or enhancement of the high conservation value attributes identified in G1

The high conservation attributes identified in G1 are either parts of conservation areas of Swiss national importance. Or, in addition to that, there are the nature reserves established in the forest of the OAK SCHWYZ. Those areas are not project areas but they are associated. All those objects are having written descriptions with specific restrictions in land use and they under supervision of the authorities by law. The nature reserves are contracted for minimum 50 years. Protection forests which are also “Forests of High Conservation Value” according to FSC are permanently under observation for safety reasons. They are managed according to specific guidelines issued by the Swiss Federal Office fore the Environment (Ref. 58).

G.3.7 Specific measures to ensure maintenance or enhancement of the climate, community and biodiversity benefits beyond the project lifetime.

Climate benefits

The climate benefits consist of a higher carbon content of the forest which means around 30 m3/ha more than under baseline conditions. . 300 m3/ha are still in a good range of silvicultural practice which is in between 250 and 350 (400) m3/ha. So 300 m3/ha are not critical and there is no reason to put that down. In addition to that a standing timber volume of around 300 m3/ha is considered as the volume of a higher yield. This is a strong argument to remain with that after the project lifetime. Higher yield caused by higher standing stock can allow higher harvest volumes after project lifetime. Considering the potential of that additional harvest volume there are two climate benefits after the project lifetime: the carbon stock remains, there is no incentive to reduce it again, and on the other hand the higher harvest volume can substitute fossil energy. The climate benefits of the project will continue and there will be more, caused by the project.

Community benefits

The community benefits consist mainly in the income from carbon credits. So this will just end with the project lifetime.

Biodiversity benefits

The conservation areas of Swiss national importance are established independently from the project. The nature reserves are contracted for minimum 50 year, far beyond the project lifetime.

The OAK Schwyz as an old institution of a very high reputation. The credibility of the OAK Schwyz on long term decisions is guaranteed by the articles of the OAK constitution as well as through the practice of public participation.

G.3.8 Definition of local stakeholders

The stakeholders beside the owners are the forest service, environmental NGO’s and tourism organisations.

There is a public participation of stakeholders during the forest development plan establishment conducted by the canton forest authorities based on the forest laws (Ref. 1-7). During the FSC certification process an additional public

stakeholder participation was conducted in 2007. Stakeholders were invited to take part in a public event as well as to contribute with written statements.

For the annual FSC-audit the **stakeholder list is updated annually**. During the annual audit a sample of the stakeholders is interviewed. This guarantees a continuous feedback from stakeholders. The 2009 list (Ref. 43) contents 19 stakeholders (people and organisations).

Stakeholder groups:
- several canton authorities
- forestry and wood industry
- union
- environmental organisations NGO
- tourism organisations
- sport organisations

In addition to the regular stakeholder consultation a letter was sent to them explaining the climate protection project and the CCBA requirements of stakeholder consultation and asking for any comments to be sent to CCBA, TUEV SUED or to the OAK Schwyz (Ref. 59). No responses were received from this stakeholder consultation.

G.3.9 Steps and communication methods to publicize the CCBA public comment period

A media conference was held 16 June 2009 and a brochure on the project was produced (Ref 52). Several newspapers reported about the project (Ref. 60, 61, 62)

In addition to the public announcement a letter was sent to the stakeholders with information about the project and the request for comments on 28. April 2010 (Ref.59) together with the brochure on the project (Ref. 52). No comments on the project were received from any stakeholder.

G.3.10 Process for handling unresolved conflicts and grievances that arise during project planning and implementation

There is already an institutionalised procedure of annual stakeholder consultation in place in the context of the annual FSC audit. This includes procedures for solving conflicts and handle grievances. Complaints can be stated any time during the standard business procedures. Any rejected complaints can be stated once again. After that there is still the possibility to follow formal judicial procedures.

These procedures are also valid for all aspects of the climate protection project.
- Basically complaints can be raised any time to the OAK directly.
- Complaints can be raised formally during the annual FSC stakeholder consultation to the FSC certifier.
- Complaints can be raised during the annual general assembly of the OAK by OAK members (this may lead up to a rejection of the annual report).
- If there is no satisfying response from the OAK Schwyz regarding legal requirements there is the possibility to go to court.
- As a mostly public organisation (17'000 OAK citizens) any serious complaints that are not solved would become a public affair. So any complaints are taken very seriously and handled immediately.

The CCBA project aspects will be covered explicitly during the FSC stakeholder consultation process. This is also included into the Monitoring Plan.

G.3.11 Financial mechanisms adopted to achieve the project benefits

The project is embedded into the overall operations of the OAK Schwyz. This ensures that the rules for bookkeeping and the normal annual financial audit according to the constitution of the OAK Schwyz cover all financial activities related to the project. The flow of funds from carbon credits goes directly to the OAK Schwyz itself. The minimum price the OAK is expecting is 20 CHF per tonne CO2. This will in average generate 164'000 CHF per year and will contribute to the climate, community and biodiversity goals of the project.

G4 Management Capacity

G.4.1 Proponent and developer

The project is developed by the OAK Schwyz as owner of the project area.

The responsible Person is

Dr. Felix Lüscher, Head of the Forest Division
Oberallmeindkorporation Schwyz
Brüöl 2, Postfach 449
6431 Schwyz, Switzerland
T. +41 (0)41 818 50 65, felix.luescher@oak-schwyz.ch

External consultant for project development is:

Hubertus Schmidtke
SILVACONSULT AG
Neustadtgasse 9, Postfach 113
CH-8402 Winterthur, Switzerland
T. +41 (0)52 214 02 65
hubertus.schmidtke@silvaconsult.ch www.silvaconsult.ch

G.4.2 Technical skills and management team's experience in implementing land management projects

The OAK Schwyz with more than 9'000 ha of forests is one of Switzerland's larges forestry enterprises. Before the year 2'000 the OAK Schwyz forestry enterprise consisted of several more or less independent part companies under the lead of the regional cantonal forest service. In the year 2'001 the different regions were united to one forestry enterprise under a new management with one academic forestry engineer as director (Dr. Felix Lüscher).

The internal report on 2008 (Ref. 17) shows the staff by education and year:

Year / Categories	1980	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Permanent staff	24	41	28	26	24	25	22	23	23	21	22
Forestry Engineer (head)	0	0	0	1	1	1	1	1	1	1	1
Forester	0	0	0	0	0	2	2	2	2	2	2
Sales manager	1	1	1	1	1	1	1	1	1	1	1
Foremen	1	1	9	9	7	6	6	6	6	5	6
Skilled forest worker	5	15	12	10	10	10	9	9	9	8	10
Forest worker	17	24	6	5	5	5	3	4	4	4	2
Part time employees	24.6	15.3	6.7	6.6	4.8	4.1	3.8	2.0	1.2	1.2	0.9
Employees forestry total	48.6	56.3	34.7	32.6	28.8	29.1	25.8	25.0	24.2	22.2	22.9
Learner	7	4	6	4	5	6	5	5	4	3	3

The management team (green cells in the table above) consists of one ETH Zurich (Swiss Federal Institute of Technology Zurich) forestry engineer Dr. Felix Lüscher as managing director. Two foresters of bachelor level are operational managers: Mr. Paul Betschart and Mr. Christian Rüsch. Sales manager is Mr. Kaspar Schelbert. The management structure is adequate to the size of the enterprise.

All of them are well experienced through education and professional practice.

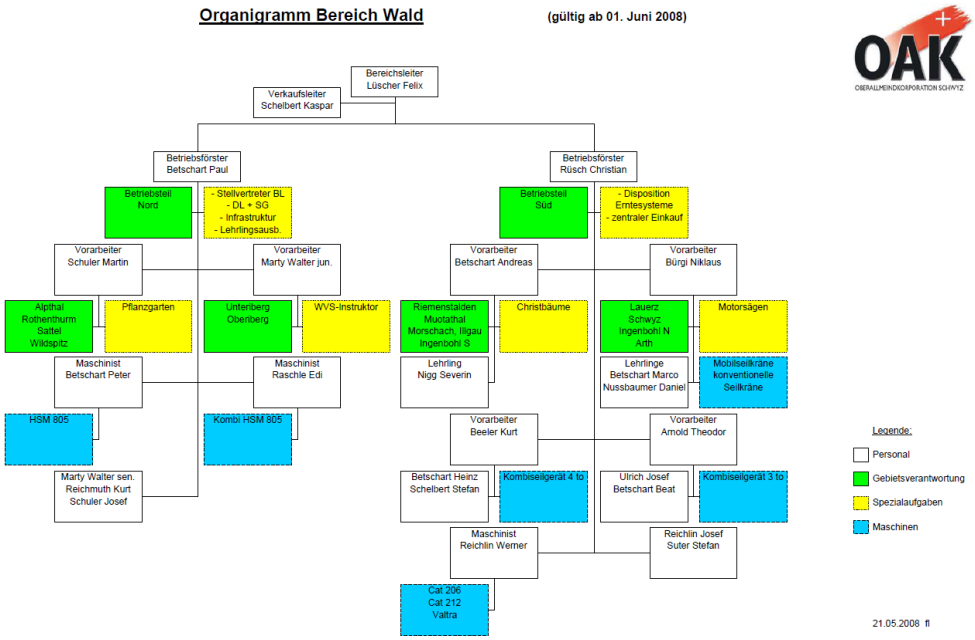
The other project employees are also mostly long term employed by the OAK Schwyz.

The implementation of the project will not change the procedures of the operation in general. Only the intensity of the harvest measures will be reduced. So the current staff is highly qualified to work in the project area.

The FSC procedures also show clearly that the staff is able to handle any community and biodiversity issues. According to the monitoring plan the monitoring of the carbon fluxes is based on the measurement of the timber harvest volume. This will be conducted and controlled by the canton forest service.

As described in section G.4.1. the management capacity consists of four high educated and well experienced professionals. This team has been working since several years with the OAK Schwyz. Since 2008 the OAK has implemented an integrated management system.

The picture below shows the overall organigram of the forestry sector of the OAK Schwyz.



The OAK staff is able to manage and conduct the project and adequate to the size of the project.

G.4.3 Orientation and training for the project's employees and relevant people

The project is conducted by the OAK Schwyz itself with its own well educated staff. Project implementation is embedded in the OAK operations that are qualitatively not different with project or without project. According to FSC obligations training of staff is compulsory as well according to Swiss regulations on work safety.

No extra training is foreseen and necessary.

The OAK Schwyz is permanently employing young people for apprenticeship as skilled workers. They pass a three years professional education. In Switzerland skilled lumberjacks are educated during three years of practical work in a company combined with vocational school visits with an exam at the end. This education follows an official curriculum (Ref.75) and it contents a specific education plan (Ref 76).

The education plan contains following targets:

- Professional competences
- Method competences
- Social competences
- Self competences
- Performance targets: to know, to understand, to apply, analysis, synthesis, judgement

People not directly employed with the OAK Schwyz are informed through periodical public relation activities.

G.4.4 Employment of people from the communities

All staff of OAK Schwyz is living in the project zone. Nearly all of them are citizens of the project zone since birth. Gender related issues are covered by the Swiss legislation and fully respected by the OAK Schwyz.

G.4.5 Laws and regulations covering worker's rights

Labour law in Switzerland is fully developed. It is based on international law (International Labour Organisation ILO), the Swiss constitution and several sectoral laws. A list is provided in Ref. 48 p.1-5.

Legislation and regulation / Gesetze und Verordnungen Notes / Bemerkungen

- Schweizerisches Zivilgesetzbuch (ZGB) Rechte der Bürger / Swiss Civil Laws, Rights of the Citizens
- Obligationenrecht (OR) Vertragsrecht / Contract legislation
- Arbeitsgesetz vom 8.Mai 1963 - / Labor law
- EKAS Spezial-Richtlinie Nr. 6508 (Dez. 1996) und Richtlinie 2134 (Arbeitssicherheit) / Guidelines for Labour Safety

The old-age pension schemes, unemployed insurance and working safety are compulsory according to Swiss working legislation. The state insurance for working safety (SUVA) provides a guideline for working protection (EKAS guideline No. 2134 "forestry works"). This is compulsory for all forest enterprises (branch solution FORST of the Swiss forest owner association Ref 19). This is also the the requirement of FSC criterion 13 (Ref. 18, 19).

G.4.6 Risks to worker safety

No project specific risks to worker safety can be identified. Nevertheless harvest of timber is one of the most dangerous works in Switzerland. The OAK Schwyz mitigates this risk by following strictly the guidelines of the state insurance for work safety SUVA. SUVA undertakes risk assessments on branch permanently and produces binding rules for worker safety. This includes education and permanent information of the staff. Each work order contains information on emergency measures and each work unit is finished with a meeting also covering safety aspects (Ref. 64).
The Swiss Federal Institute for Accident Insurance (Schweizerische Unfall Versicherungs Anstalt SUVA) periodically publishes work safety rules for the forestry sector.

There are "checklists for assessment of risks and planning of counter measures" for all types of forest work provided by SUVA that are used. (check list example for use of chain saws Ref . 79)

Each year a detailed list of work accidents is produced by the OAK Schwyz indicating all details. This list is provided to the Swiss Accident Insurance Institute, a national institution (Ref.63). A significant decrease in number of work accidents lead to reduction of the insurance premium.

G.4.7 Document the financial health of the implementing organization(s).

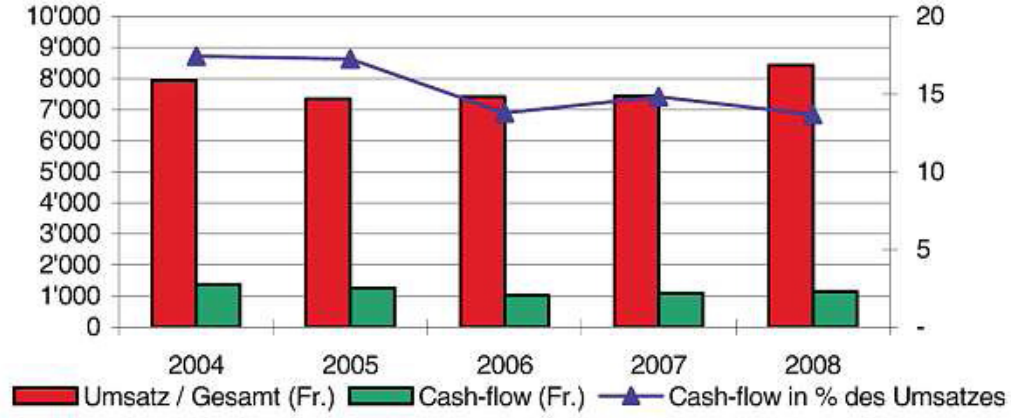
The OAK Schwyz as implementing organisation has been existing at least since the 12th century. As an old family law corporation the book keeping is conducted according common standards and checked every year by a commission elected by the corporate's general assembly.

The yearly reports show the financial results of the OAK (Ref. 16).

The table below shows the results before depreciations (in thousands CHF).

	2004	**2005**	**2006**	**2007**	**2008**
Forest	641	142	-64	534	158
Alp	376	355	310	303	164
Property	1'461	1'494	1'542	1'315	1'791
Roads	-436	-258	-213	-455	-386
Administration	-640	-655	-699	-705	-790
Result before interests, taxes, depreciation, extraordinaries	**1'402**	**1'078**	**876**	**992**	**937**
Finance	178	249	232	229	133
Taxes/Steuern	-202	-74	-218	-219	-201
Result before depreciation	**1'378**	**1'253**	**890**	**1'002**	**869**

The diagram below shows the development of the financial situation of the OAK (in Thousands CHF and %.



Umsatz = Turnover

The table and the diagram above from the year 2008 business report of the OAK Schwyz show the good overall financial situation. The forestry sector shows very varying figures over the years. This comes from a very volatile timber market. Another reason is the varying proportion of harvest in the protection forest. This is quite expensive compared with harvest in the normal forest.

The cash flow over the years is very stabile and shows the solid financial situation of the OAK Schwyz.

G5 Legal Status and Property Rights

G.5.1 Relevant national and local laws and regulations in the host country and compliancy of the project.

Following Article gives a comprehensive overview on forestry policy, legislation and actors in Switzerland (Ref. 46).

Forest policy and forest policy actors in Switzerland[1]

Legislation: The Swiss Federal government has a comprehensive set of constitutional powers with regard to the conservation of natural resources and environmental protection. Some were established in the 2nd Federal Constitution of 1874, in particular with regard to the protection a reestablishment of forests as protection against floods (Art 24 of the old Federal Constitution (OFC)). Others were introduced by constitutional amendments after World War II. The latter refer to the protection of nature and landscape (Art. 24sexies FC, by popular vote in 1962 and 1987), land-use planning (Art. 22quater FC, popular vote 1969), environmental protection (Art. 24septies FC, popular vote 1971)16 and to economic welfare (Art. 31bis FC). There are further federal powers that are important for forest protection and forestry development policies. These include training and education, scientific research, regulating commerce, entrepreneurial activities and employment. It also includes policies affecting water protection and management, agriculture and energy.

The 1993 Federal Forest Law (FFL): Starting in 1985, forest law has totally been revised. The new Federal Forest Law was adopted by the two Chambers of the Federal Parliament in 1991 and is in force since 1993. The Law reflects important changes in the role of forests in society and focuses on two central issues. First, it aims to balance the interests of forest owners, and the increasing and diversified interests of public user groups. Second, it tries to establish equilibrium between public demands and public commitments in order to protect forest lands and to maintain a wide range of socially desirable non-timber services. The Forest Law of 1993 retains the principle of forest protection and conservation, which has so far been successful. Its purpose is to preserve forests as a close to nature habitat and to ensure that the forests are able to fulfil their important functions, in particular to provide protection from natural hazards, recreation, education and timber production. Further, it aims to support and develop forestry and forest-related industries (Art. 1 FFL). The protection of nature and landscapes has become a fundamental requirement to be addressed in planning and management regulations. Timber production may be reduced in certain areas if this is compatible with the general objectives of the law. In addition, specific parts of forests may be protected by the cantons in order to conserve and promote biodiversity (Art. 20 FFL). With regard to forestry development, the law introduces the principle of compensating forest owners if they are required to carry out work or provide services of public interest at costs which cannot be covered otherwise (Art. 36-38 FFL). Furthermore, the law regulates the federal support of education and training as well as of monitoring activities (Art. 29, 33 FFL). It also allows for the possibility of transferring specific tasks to non-governmental organisations, and contains a new article which stipulates that the authorities and the population must be informed regularly (Art. 32, 34 FFL).

Revision of cantonal forest legislation: As a consequence of the new federal forest legislations, the cantons have had to revise their forest legislation. By January 1st 2002, all the cantons had

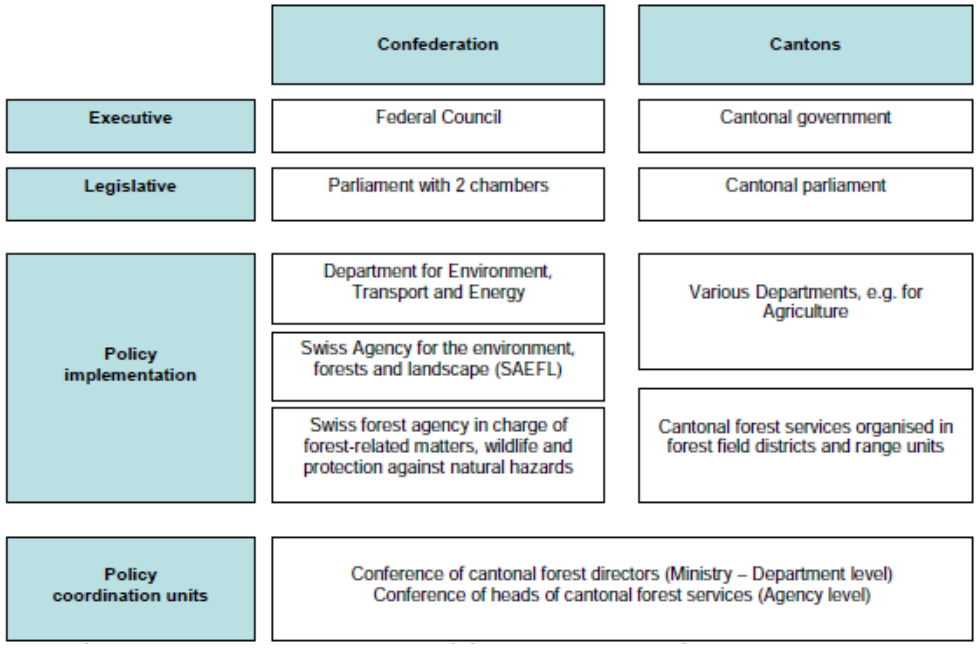
[1] Ref 46: Ueli Baruffol, Priska Baur, Roger Dürrenmatt,
Alfred Kammerhofer, Willi Zimmermann and Franz Schmithüsen 2004: Evaluating Financing of Forestry in Europe. Country Report Switzerland. Chair of Forest Policy and Forest Economy, ETH Zürich, Economics Section of the Swiss Federal Institute for Forest,

completed this task. Major issues which require cantonal regulation and which have been the subject of debate during the legal process are the definition of minimum criteria for forest areas, compensation in kind for land for which a clearing permit has been issued, the regulation of access for large-scale events in the forests, forest management planning, public financial transfers to forest owners, and the organisation of cantonal forest services.

Institutional forest policy actors: At the federal level the two chambers of Parliament, the Federal Council and the Federal Administration (especially the Swiss Forest Agency) are the principal actors involved in deciding on federal public policy in forestry (*Figure 3*). They are responsible for programme formulation and annual decisions on public funding. Since 1998, policy implementation has been the task of the Federal Department for the Environment, Transport, Energy and Communication. Within the department, the Swiss Agency for the Environment, Forests and Landscape (SAEFL) is in charge of forest-related matters as well as of game protection and protection against natural hazards.

At the cantonal level, the cantonal parliament and government play an important role in the formulation of new cantonal forest policies. Forest-related matters may be implemented by various departments, such as the departments of agriculture, for public infrastructure and the environment. There is a public forest service with headquarters, field districts and range units in all cantons. The conference of the cantonal forest directors and of the heads of the cantonal forest services act as liaison units between the cantons and the federal administration.

Figure 3: Institutional forest policy actors at federal and cantonal level



Source: (Schmithüsen and Zimmermann 1999: 32) (translated and modified).

In recent years, new actors have participated in the formation of forest policy. Citizens and the mass media have become more interested in the impacts of policies on nature conservation. Various political parties, environmental parliamentary groups and commissions, and non-governmental organisations try to influence forest policy. The Swiss Forestry Association and the Swiss Forest Owner's Association are the principal representatives in the forestry sector, and a wide range of non-governmental organisations, are engaged in the promotion of nature protection."

The article above shows the legal framework the project is embedded: the forest law of Switzerland and of the Canton Schwyz. Other relevant laws are: Law on Nature Conservation, Law on Land use Planning.

Main legal issues related with the project are:

- A management plan is compulsory for owners who own more than 50 ha.
- The management plan must be approved by the Canton Forest Service.
- Yearly wood harvest is formally approved and controlled by the authorities.

G.5.2. Document that the project has approval from the appropriate authorities and communities.

The project works within the legal framework and within the management plans that are approved by the authorities including public participation. The baseline and project scenario study was elaborated together with the responsible officer of the forest service of the canton Schwyz Mr. Bernhard Roth (Ref. 21). For each forest compartment the baseline harvest volume was determined, under consideration of all forest function especially the critical protection function. The participation of the forest service representative ensured full compliance with the legal requirements.

The OAK Schwyz itself is a community that took the decision to conduct the project autonomously within the legal framework.

G.5.3 Demonstrate that the project will not encroach uninvited on private property, community property, or government property.

The project will be conducted on the property of the OAK Schwyz only, which is holding the land titles since the 12th century.

G.5.4 Demonstrate that the project does not require the relocation of people or any relocation of activities important for the livelihood of the people.

The project is being conducted in the already existing forest of the OAK. The legal land use status of the project area is forest according to the land use planning of the Canton Schwyz. No people are settling inside the project area. No relocation occurs. There are no land tenure problems in the area.

G.5.5 Illegal activities in the project zone that affect the project's climate, community and biodiversity impacts.

No illegal activities can be indicated that could affect the project's climate, community or biodiversity goals can be identified inside the project zone.

G.5.6 Rights on carbon

In the context of the Swiss legislation the right on the carbon belongs to the forest owner according to Prof. Dr. Willi Zimmermann, Professor for environmental law at the ETH Zurich (Ref. 31.)

Main content: „…. Because this output (carbon sequestration) is primarily generated through natural processes of the forest product „trees" it can be legally considered as component of the tree and therefore component of the forest. According to the property concept of the Swiss constitution the owner of the

forest is free to process the sequestered CO2. As long as the carbon is not separated from the tree it is simply part of it and follows its legal fate. ……..".

On the other hand Switzerland is applying Kyoto Protocol Art. 3.4. This means that carbon stock changes in the managed forest of Switzerland count for the national greenhouse gas balance including those of the OAK Schwyz. The OAK Schwyz asked the Swiss Federal Office for the Environment to clarify the issue of double counting.

A letter issued by the Swiss Federal Office for the Environment BAFU also confirms the right of the OAK Schwyz to generate carbon credits. The credits shall not be allowed to be used in the compliance market to avoid double counting in the national green house gas balance. If the credits are not usable in the compliance market it is not seen as double counting (Ref. 25).

Translation of Ref. 25:

"Dear Mr. Lüscher

Thank you for your letter informing us on the intentions to account for forest carbon sinks in the voluntary market and asking us about our opinion on that. We apologize for the long time we worked on this. The clarifications considering the complexity of the issue took very much time.

Basically it must be taken into consideration that carbon sinks in difference to emission reductions can be made reversible. When trees die or are harvested the carbon sequestered will be released earlier or later. Special measures for carbon sinks are needed for the case CO2 is released again into the atmosphere. If sinks are brought to market the permanence must be assured and loss of sinks must be compensated.

Voluntary measures contribute to the target that less reductions must be achieved via CO2-tax or the climate penny. In this sense voluntary measures contribute to achieve the reduction target. The Swiss federation does not act as buyer because to fulfil the Kyoto Protocol only certificates according to the Kyoto standard can be taken into account. ***There is a certain danger of double counting. To avoid this the credits merchandised in the voluntary market shall be identified as such, to exclude them from any Kyoto relevant accounting.*** *In addition it shall be clarified how sinks are compensated, if they were made reversible through releasing of the bound carbon. International regulations for example foresee a time limited validity of certificates resp. a limited project duration."*

So the Swiss Federal Office for the Environment BAFU is of the opinion that there is no double counting (…is avoided…), if it is guaranteed that the credits remain in the voluntary market. The OAK Schwyz therefore will explicitly print this on all certificates issued. The certificates will be retired immediately and not further tradable (Ref. 65).

The CCBA was requested on this issue and the answer was a general policy statement that in such cases it is expected that AAU's or RMU's are cancelled or that the project is additionally compensated by external GHG credits (any CER for example). Both will not happen.

The CCBA Policy Announcement says " a letter from the program operator or designated national authority that emissions allowances (or other GHG credits used in the program) equivalent to the reductions or removals generated by the project have been cancelled from the program; or national cap as applicable "

According to the letter of the Swiss Federal Office for the Environment it is not considered as double counting under the conditions mentioned above and therefore no AAU's resp. RMU's are to be cancelled.

"Purchase and cancellation of GHG allowances equivalent to the GHG emissions reductions or removals generated by the project related to the program or national cap" is the other option to "avoid" double counting according to the CCBA Policy Announcement. This is a theoretical option that would not comply with the transparent communication of the OAK Schwyz. In the voluntary market in Switzerland it is not comprehensible to the customers to pay for two credits for the same amount of carbon.

We can join the opinion of the Swiss Federal Office for the Environment, that in the case of the OAK Climate Protection Project double counting is avoided by the measures mentioned above (immediate retirement after issue, not tradable, explicitly not usable in the compliance market).

The non compliance with the CCBA policy statement Ref. 65 remains.

III. Climate Section

CL1 Net Positive Climate Impacts

CL1.1 Estimate the net change in carbon stocks due to the project activities using the methods of calculation, formulae and default values of the IPCC 2006 GL AFOLU or using more robust and detailed methodology. The net change is equal to carbon stock changes with the project minus carbon stock changes without the project (G2).

CL1.1.1 Estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period:

The net anthropogenic GHG removals by the sinks of the proposed project activity are anticipated to be 245'758 tonnes of CO2 equivalent during the crediting period (from 2005 to 2034). The details are given below (Table Annex 4 Column AL. **For the period of 10 years (baseline revision) it is 81'920 tCO2.**

Years	Annual net anthrop. GHG removals by sinks in t CO_2 e	Sum of net anthrop. GHG removals by sinks in t CO2 e
Year 1	8'192	8'192
Year 2	8'192	16'384
Year 3	8'192	24'576
Year 4	8'192	32'768
Year 5	8'192	40'960
Year 6	8'192	49'152
Year 7	8'192	57'344
Year 8	8'192	65'536
Year 9	8'192	73'728
Year 10	8'192	**81'920**
Year 11	8'192	
Year 12	8'192	
Year 13	8'192	
Year 14	8'192	
Year 15	8'192	
Year 16	8'192	
Year 17	8'192	
Year 18	8'192	
Year 19	8'192	
Year 20	8'192	
Year 21	8'192	
Year 22	8'192	
Year 23	8'192	
Year 24	8'192	
Year 25	8'192	
Year 26	8'192	
Year 27	8'192	
Year 28	8'192	
Year 29	8'192	
Year 30	8'192	
Total estimated net anthropogenic GHG removals by sinks (tonnes of CO_2 e)	245'758	
Total number of crediting years	30	
Annual average over the crediting period	8'192	

of estimated net anthropogenic GHG removals by sinks (tonnes of CO_2e)		

CL1.1.2 Specification of the greenhouse gases (GHG) whose emissions will be part of the proposed CCBA project:

No GHG emissions can be identified as consequence of the project. The variable GHGproj was used to take the timber harvest into account.

CL1.1.3 Carbon pools selected:

Carbon pools	Selected (answer with yes or no)
Above ground	Yes
Below ground	Yes
Dead wood	No
Litter	No
Soil organic carbon	No

The living biomass of the trees will be considered only. This is a very conservative approach because with increasing the standing timber volume dead wood, litter and soil carbons will be increased as well. The reasons not to consider the other carbon pools are the high costs of their monitoring.

Above and below ground biomass will not be differentiated. In Switzerland there are expansion factors available that calculate the whole living biomass of trees out of the stem volume measured as standing timber volume in common timber volume inventories (Ref. 55).

The carbon pools selected were considered for baseline and project scenario.

CL1.1.4 Description of strata applied for ex ante estimations:

The whole project area is considered as one stratum, because most forests are of uneven age. Also the control of the harvest is done considering the whole area and not parts.

For conifers and broadleaf trees separate yield and density figures were taken, but conifers and broadleaf trees normally are mixed and do not separately exist in separate geographical strata. They are calculated as strata in volume and yield calculation.

CL1.1.5 Description of how the actual net GHG removals by sinks are increased above those that would have occurred in the absence of the project

A detailed baseline study shows that there is a certain range of possible average harvest volume. This is determined by the yield and the legal obligations (mainly to manage protection forests). An average maximum harvest timber volume was determined for each compartment still ensuring the forest functions according to the law. This study was elaborated together with the forest officer of the canton forest service who is responsible for forest planning (See table annex 3, columns AH and AJ).

This harvest optimised regime was taken as baseline. A baseline based on historical data only is not applicable. The actual timber harvest varies a lot and has been influenced by natural hazards, costs for harvest and prices for timber. In the mountainous forests the costs for harvest can be more than the revenues. So the price and the costs determine the actual harvest inside a silvicultural range described.

The separate baseline study was finished in October 2006. Ref. 21
The baseline study was conducted by Dr. Hubertus Schmidtke SILVACONSULT AG, Winterthur Switzerland.

CL1.1.6 Estimation of ex ante net anthropogenic GHG removals by sinks:

CL1.1.6a Calculation of tree carbon content

Parameters of Wood density, Carbon fraction, Biomass expansion factors etc. are explained in Section G. 2.3.

This is very conservative. During harvest nearly 20 % of the aboveground biomass remains on the area, as well as the total belowground biomass, which is of factor 0.19 to 0.40 of the aboveground biomass (root to shoot ratio). This is considered as complete loss.

CL1.1.6b Formulae used

The equations of the methodology AR CDM method AR-AMS0001 are used as follows:
This method provides formulae that can be used for this project, even it is not an afforestation project. The formulae can be used because yield can be taken as GHG removals and harvest can be taken as GHG emissions. Yield and harvest figures are known from previous inventories and from the baseline and project scenario study (Ref21). The complete set of formulae of the AR CDM method AR-AMS0001 to calculate the ex ante net anthropogenic removals are used as follows. This provides the complete logic of the calculation according IPCC 2006, GL for AFOLU:

- Baseline carbon stocks: equation 1
- Baseline sinks: equation 10
- To convert the figures on the standing timber volume into living tree biomass national Swiss conversion factors are used. Therefore equations 2-9, 15 and 16 are not applied. The national BEF's used cover the whole tree biomass and not only aboveground biomass. Also the variable root to shoot ratio therefore is not applied.
- For ex ante actual net removals by sinks equations 11-14. 17 and 18 are used.
- For leakage is not zero Equation 19 is not applicable. Ex ante calculation of leakage is using equation 20. This has been adapted because leakage is calculated as a 10% discount from the actual net removal.
- The anthropogenic net removal by sinks is calculated according equation 21.
- The certificates issued will not be time limited. Equations 22 and 23 are not applied.
- For ex post calculations equations 24, 29, 35 and 36 will be applied. The other equations are not relevant because of the use of the Swiss conversion factors.

CL1.1.6c Estimated baseline net GHG removals by sinks: Baseline Stock

Equation 1 determines the baseline carbon stock for above-ground and below-ground biomass per stratum and year B(t). In Switzerland the common forest inventories measure the standing stem volume of the trees. To calculate total living tree biomass (stem, branches, twigs, leafs/needles, roots) expansion factors were developed by the Swiss Federal Institute for Forest Snow and Landscape (Ref. 23, 24).

Baseline GHG Removals

Equation 10 was applied to determine the baseline net GHG removals by sinks (tCO2e) in each year. **After 10 years the BL net removals are -10'240 t C**.

Equation 10: $\Delta C_{BSL,t} = (B_{(t)} - B_{(t-1)}) * (44/12)$

where

$\Delta C_{BSL,t}$ = Carbon stock change without project scenario at year t tonnes CO2
$B_{(t)}$ = Carbon stock without project scenario at year t tonnes C
$B_{(t-1)}$ = Carbon stock without project scenario at year t-1 tonnes C
44/12 = CO2/C

		yield				Baseline									
		Project GHG removals				BL net removals							BL C-Stock at the end of the year		
					$\Delta C_{PROJ,t}$							eq.10	Bti1	Bti2	eq.1 Bt
				N_t	eq. 17	max. Harvest			i1	i2	$\Delta C_{BSL,t}$		Conif	BLeaf	total
	Year	Conif	BLeaf	tC	CO2/yea	Conif	BLeaf	total	Conif	BLeaf	total		tC/year	tC/year	tC/year
	0	tC/year	tC/year	6263932		tC/year	tC/year	tC/year	tC/year	tC/year	tC/year		5'426'832	837'100	6'263'932
2005	1	10'235	2'920	6'277'087	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'425'804	837'103	6'262'907
2006	2	10'235	2'920	6'290'242	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'424'776	837'107	6'261'883
2007	3	10'235	2'920	6'303'397	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'423'748	837'110	6'260'858
2008	4	10'235	2'920	6'316'553	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'422'720	837'113	6'259'834
2009	5	10'235	2'920	6'329'708	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'421'693	837'117	6'258'809
2010	6	10'235	2'920	6'342'863	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'420'665	837'120	6'257'785
2011	7	10'235	2'920	6'356'018	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'419'637	837'124	6'256'760
2012	8	10'235	2'920	6'369'173	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'418'609	837'127	6'255'736
2013	9	10'235	2'920	6'382'329	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'417'581	837'130	6'254'711
2014	10	10'235	2'920	6'395'484	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'416'553	837'134	6'253'687
2015	11	10'235	2'920	6'408'639	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'415'525	837'137	6'252'662
2016	12	10'235	2'920	6'421'794	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'414'497	837'141	6'251'638
2017	13	10'235	2'920	6'434'949	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'413'469	837'144	6'250'613
2018	14	10'235	2'920	6'448'104	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'412'442	837'147	6'249'589
2019	15	10'235	2'920	6'461'260	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'411'414	837'151	6'248'564
2020	16	10'235	2'920	6'474'415	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'410'386	837'154	6'247'540
2021	17	10'235	2'920	6'487'570	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'409'358	837'158	6'246'515
2022	18	10'235	2'920	6'500'725	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'408'330	837'161	6'245'491
2023	19	10'235	2'920	6'513'880	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'407'302	837'164	6'244'466
2024	20	10'235	2'920	6'527'036	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'406'274	837'168	6'243'442
2025	21	10'235	2'920	6'540'191	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'405'246	837'171	6'242'418
2026	22	10'235	2'920	6'553'346	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'404'219	837'174	6'241'393
2027	23	10'235	2'920	6'566'501	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'403'191	837'178	6'240'369
2028	24	10'235	2'920	6'579'656	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'402'163	837'181	6'239'344
2029	25	10'235	2'920	6'592'812	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'401'135	837'185	6'238'320
2030	26	10'235	2'920	6'605'967	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'400'107	837'188	6'237'295
2031	27	10'235	2'920	6'619'122	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'399'079	837'191	6'236'271
2032	28	10'235	2'920	6'632'277	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'398'051	837'195	6'235'246
2033	29	10'235	2'920	6'645'432	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'397'023	837'198	6'234'222
2034	30	10'235	2'920	6'658'588	48'236	11'263	2'917	14'180	-1'028	3	-1'024		5'395'996	837'202	6'233'197

Ref 26 Excel file "carbon calculations OAK Schwyz-8a.xls, table "meth"

CL1.1.6d Estimate of the actual net GHG removals by sinks:

The ex-ante actual net GHG removals by sinks in year t (ΔCACTUAL,t) was calculated applying following equation 18 of the methodology:

Equation 18: $\Delta C_{ACTUAL,t} = \Delta C_{PROJ,t} - GHG_{PROJ,t}$

Where

$\Delta C_{ACTUAL,t}$ = Ex-ante actual greenhouse gas removal by sinks in year t (t co2 e yr-1)
$\Delta C_{PROJ,t}$ = Project GHG removals by sinks in year t(t co2 yr-1)
$GHG_{PROJ,t}$ = Project emissions in year t (t co2 yr-1)

		yield				Harvest						stock at the end of the year		
		Project GHG removals				Project emission								
					$\Delta C_{PROJ,t}$	$GHG_{PROJ,t}$					$\Delta C_{ACTUAL,t}$ actual net GHG removals			eq.12 N(t)
				N_t	eq. 17	target Harvest		total	sequestration		eq.18	Conif	BLeaf	total
	Year	Conif	BLeaf	tC	CO2/yea	Conif	BLeaf	nn.harve	Conif	BLeaf	total	tC	tC	tC
	0	tC/year	tC/year	6263932		tC/year	tC/yeart	tC/year	tC/year	tC/year	tCO2/year	5426832	837100	6263932
2005	1	10'235	2'920	6'277'087	48'236	9'279	2'418	11'697	956	502	5'346	5'427'788	837'602	6'265'390
2006	2	10'235	2'920	6'290'242	48'236	9'279	2'418	11'697	956	502	5'346	5'428'744	838'104	6'266'848
2007	3	10'235	2'920	6'303'397	48'236	9'279	2'418	11'697	956	502	5'346	5'429'699	838'606	6'268'306
2008	4	10'235	2'920	6'316'553	48'236	9'279	2'418	11'697	956	502	5'346	5'430'655	839'108	6'269'764
2009	5	10'235	2'920	6'329'708	48'236	9'279	2'418	11'697	956	502	5'346	5'431'611	839'610	6'271'221
2010	6	10'235	2'920	6'342'863	48'236	9'279	2'418	11'697	956	502	5'346	5'432'567	840'112	6'272'679
2011	7	10'235	2'920	6'356'018	48'236	9'279	2'418	11'697	956	502	5'346	5'433'523	840'615	6'274'137
2012	8	10'235	2'920	6'369'173	48'236	9'279	2'418	11'697	956	502	5'346	5'434'479	841'117	6'275'595
2013	9	10'235	2'920	6'382'329	48'236	9'279	2'418	11'697	956	502	5'346	5'435'434	841'619	6'277'053
2014	10	10'235	2'920	6'395'484	48'236	9'279	2'418	11'697	956	502	5'346	5'436'390	842'121	6'278'511
2015	11	10'235	2'920	6'408'639	48'236	9'279	2'418	11'697	956	502	5'346	5'437'346	842'623	6'279'969
2016	12	10'235	2'920	6'421'794	48'236	9'279	2'418	11'697	956	502	5'346	5'438'302	843'125	6'281'427
2017	13	10'235	2'920	6'434'949	48'236	9'279	2'418	11'697	956	502	5'346	5'439'258	843'627	6'282'885
2018	14	10'235	2'920	6'448'104	48'236	9'279	2'418	11'697	956	502	5'346	5'440'214	844'129	6'284'343
2019	15	10'235	2'920	6'461'260	48'236	9'279	2'418	11'697	956	502	5'346	5'441'169	844'631	6'285'801
2020	16	10'235	2'920	6'474'415	48'236	9'279	2'418	11'697	956	502	5'346	5'442'125	845'133	6'287'259
2021	17	10'235	2'920	6'487'570	48'236	9'279	2'418	11'697	956	502	5'346	5'443'081	845'635	6'288'716
2022	18	10'235	2'920	6'500'725	48'236	9'279	2'418	11'697	956	502	5'346	5'444'037	846'137	6'290'174
2023	19	10'235	2'920	6'513'880	48'236	9'279	2'418	11'697	956	502	5'346	5'444'993	846'640	6'291'632
2024	20	10'235	2'920	6'527'036	48'236	9'279	2'418	11'697	956	502	5'346	5'445'949	847'142	6'293'090
2025	21	10'235	2'920	6'540'191	48'236	9'279	2'418	11'697	956	502	5'346	5'446'904	847'644	6'294'548
2026	22	10'235	2'920	6'553'346	48'236	9'279	2'418	11'697	956	502	5'346	5'447'860	848'146	6'296'006
2027	23	10'235	2'920	6'566'501	48'236	9'279	2'418	11'697	956	502	5'346	5'448'816	848'648	6'297'464
2028	24	10'235	2'920	6'579'656	48'236	9'279	2'418	11'697	956	502	5'346	5'449'772	849'150	6'298'922
2029	25	10'235	2'920	6'592'812	48'236	9'279	2'418	11'697	956	502	5'346	5'450'728	849'652	6'300'380
2030	26	10'235	2'920	6'605'967	48'236	9'279	2'418	11'697	956	502	5'346	5'451'683	850'154	6'301'838
2031	27	10'235	2'920	6'619'122	48'236	9'279	2'418	11'697	956	502	5'346	5'452'639	850'656	6'303'296
2032	28	10'235	2'920	6'632'277	48'236	9'279	2'418	11'697	956	502	5'346	5'453'595	851'158	6'304'754
2033	29	10'235	2'920	6'645'432	48'236	9'279	2'418	11'697	956	502	5'346	5'454'551	851'660	6'306'211
2034	30	10'235	2'920	6'658'588	48'236	9'279	2'418	11'697	956	502	5'346	5'455'507	852'163	6'307'669

Ref 26 Excel file "carbon calculations OAK Schwyz-8a.xls, table "meth"

The actual net GHG removals by sinks after 10 years are 53'460 tCO2.

CL1.1.6e Estimated leakage:

Market leakage is considered extremely low. The project will reduce the market volume in Switzerland by 7'440 m3 per year against the baseline, which is 0.14 % of the total timber harvest in Switzerland of 5.5 mio m3/year. According to Voluntary Carbon Standard as best practice a 10% leakage credit adjustment for low risk projects is discounted.

Equation 19 : Lt = 0
Is not applied

Therefore equation 20 is adapted and applied.

Equation 20: $Lt = 0.1 * \Delta C_{PROJ,t} - \Delta C_{BSL,t} - GHG_{PROJ,t}$ = 910 tCO2 per year

Where

Lt =	Leakage in year t (t CO2)
$\Delta C_{BSL,t}$ =	Carbon stock change without project scenario at year t (t CO2 yr-1)
$\Delta C_{PROJ,t}$ =	Project GHG removals by sinks in year t(t co2 yr-1)
$GHG_{PROJ,t}$ =	Project emissions in year t (t co2 yr-1)

Leakage

Total leakage after 10 years is 9'100 t CO2.

	Year	tCO2 Leakage, Lt, eq. 20	Sum Leakage
	0		
2005	1	910	910
2006	2	910	1'820
2007	3	910	2'730
2008	4	910	3'640
2009	5	910	4'550
2010	6	910	5'460
2011	7	910	6'370
2012	8	910	7'280
2013	9	910	8'190
2014	10	910	9'100
2015	11	910	
2016	12	910	
2017	13	910	
2018	14	910	
2019	15	910	
2020	16	910	
2021	17	910	
2022	18	910	
2023	19	910	
2024	20	910	
2025	21	910	
2026	22	910	
2027	23	910	
2028	24	910	
2029	25	910	
2030	26	910	
2031	27	910	
2032	28	910	
2033	29	910	
2034	30	910	

Ref 26 Excel file "carbon calculations OAK Schwyz-8a.xls, table "meth"

CL1.16f The sum of CL1.1d minus CL1.1.5c minus CL1.15e representing the net anthropogenic GHG removals by sinks of the proposed project:

Actual net greenhouse gas removals by sinks (ex ante)

Equation 11 says that the carbon stocks for the project scenario at the starting date of the project activity (t=0) shall be the same as the baseline stocks of carbon at the starting date the project (t=0)

Equation 11: $N_{(t=0)} = B_{(t=0)} =$ 6'263'932 **tC**

where
$N_{(t=0)}$ Carbon stocks at time t under the project scenario (tC/ha)
$B_{(t=0)}$ Carbon stocks at time t under the baseline scenario (tC/ha)

For all years the carbon stock ($N_{(t)}$) was calculated

Equation 12:

$$N_{(t)} = \sum_{i=1}^{I} (N_{A(t)i} + N_{B(t)i}) * A_i$$

where
$N_{(t)} =$ Carbon stocks at time t under the project scenario (tC)
$A_i =$ Area of stratum $_i$
$N_{(A)} =$ Aboveground carbon stock
$N_{(B)} =$ Belowground carbon stock

Instead of $N_{(A)}$ and $N_{(B)}$ aboveground and belowground carbon stocks the Swiss conversion factors were used. One stratum on the whole area was taken.

Equations 13 – 16 were not applied because of the use of the national Swiss BEF parameters. See CL1.1.5a.

Removal component of actual net GHG removals by sinks $\Delta C_{PROJ,t}$.

Equation 17: $\Delta C_{PROJ,t} = (N_t - N_{t-1}) * (44/12) / \Delta t$

where
$C_{PROJ,t}$ = Project net GHG removals by sinks (tonnes of CO_2/yr)
N(t) = Carbon stocks at time t under the project scenario (tC)

The net anthropogenic GHG removals by sinks for each year was calculated as:

Equation 21: $ER_t = \Delta C_{PROJ,t} - \Delta C_{BSL,t} - GHG_{PROJ,t} - L_t$

where
ER_t Net anthropogenic GHG removals by sinks (tonnes of CO_2/yr)
$C_{PROJ,t}$ Project net GHG removals by sinks (tonnes of CO_2/yr)
$C_{BSL,t}$ Baseline net GHG removals by sinks (tonnes of CO_2/yr)
$GHG_{PROJ,t}$ Project emissions (tonnes of CO_2/yr)
L_t Leakage (tonnes of CO_2/yr)

CL1.1.6g Table providing values obtained when applying the equations:

The result of the application of equations from approved methodology above is indicated using the following tabular format (see also table Annex 4):

Year	Estimation of baseline net GHG removals by sinks (tonnes of CO_2 e)	Estimation of actual net GHG removals by sinks (tonnes of CO_2 e)	Discount 10% Estimation of leakage (tonnes of CO_2 e)	90% Estimation of net anthropogenic GHG removals by sinks (tonnes of CO_2 e)
Year 1	-3'756	5'346	910	8'192
Year 2	-3'756	5'346	910	8'192
Year 3	-3'756	5'346	910	8'192
Year 4	-3'756	5'346	910	8'192
Year 5	-3'756	5'346	910	8'192
Year 6	-3'756	5'346	910	8'192
Year 7	-3'756	5'346	910	8'192
Year 8	-3'756	5'346	910	8'192
Year 9	-3'756	5'346	910	8'192
Year 10	-3'756	5'346	910	8'192
Sum Year 10	**37'560**	**53'460**	**9'100**	**81'920**
Year 11	-3'756	5'346	910	8'192
Year 12	-3'756	5'346	910	8'192
Year 13	-3'756	5'346	910	8'192
Year 14	-3'756	5'346	910	8'192
Year 15	-3'756	5'346	910	8'192
Year 16	-3'756	5'346	910	8'192
Year 17	-3'756	5'346	910	8'192
Year 18	-3'756	5'346	910	8'192
Year 19	-3'756	5'346	910	8'192
Year 20	-3'756	5'346	910	8'192
Year 21	-3'756	5'346	910	8'192
Year 22	-3'756	5'346	910	8'192
Year 23	-3'756	5'346	910	8'192
Year 24	-3'756	5'346	910	8'192
Year 25	-3'756	5'346	910	8'192
Year 26	-3'756	5'346	910	8'192
Year 27	-3'756	5'346	910	8'192
Year 28	-3'756	5'346	910	8'192
Year 29	-3'756	5'346	910	8'192
Year 30	-3'756	5'346	910	8'192
Total (tCO_2 e)	-112'694	160'371	27'306	245'758

For year 10 a sum line was insert, which is the end of the first confirmed baseline period.

CL.1.2 Estimation of the net change in the emissions of non-CO_2 gases such as CH_4 and N_2O to the net change calculations.

No non-CO_2 gases CH_4 and N_2O can be identified as project emissions.

CL.1.3 Other GHG emissions resulting from project activities.

Other emissions from biomass burning, site preparations, fossil fuel combustion, synthetic fertilizer and emissions from decomposition of N-fixing species cannot be identified as caused by the project.

CL.1.4 Net climate impact of the project.

The table in section CL1.15g shows the positive net climate impact of the project over the project lifetime. The total net climate impact is over the 30 years project lifetime 273'065 tCO2. From this 10% are discounted to cover any project related unmitigated negative offsite climate effect impacts (See CL2.3).

The net climate impact of the project is estimated ex ante 245'758 tCO2 (30 years).

For the first 10 years of the first baseline period the net climate impact of the project is estimated ex ante 81'920 tCO2

For ex post calculation of the net positive climate impact following formulae and variables are used:

$$\mathbf{ER_t = \Delta C_{PROJ,t} - \Delta C_{BSL,t} - GHG_{PROJ,t} - L_t}$$

where

ER_t	Net anthropogenic GHG removals by sinks (tonnes of CO_2/yr)
$\Delta C_{PROJ,t}$	Project net GHG removals by sinks (tonnes of CO_2/yr)
$\Delta C_{BSL,t}$	Baseline net GHG removals by sinks (tonnes of CO_2/yr)
$GHG_{PROJ,t}$	Project emissions (tonnes of CO_2/yr)
L_t	Leakage (tonnes of CO_2/yr)

$$\mathbf{\Delta C_{PROJ,t} = \Delta CG}$$

$$\mathbf{\Delta C_{BSL,t} = -3'756\ tCO2/year}$$

$$\mathbf{GHG_{PROJ,t} = -\Delta CL}$$

$$\mathbf{L_t = 0.1 * (\Delta C_{PROJ,t} - \Delta C_{BSL,t} - GHG_{PROJ,t})}$$

CL.1.5 Specification how double counting of GHG emissions reductions or removals will be avoided.

Switzerland is applying Art. 3.4 Kyoto Protocol. Up to 1.8 mio tonnes of CO2 from carbon sequestration can be accounted for each year. Switzerland will not reach this figure. So also the carbon sequestered in the OAK Schwyz is counted for in the national carbon balance and in the reporting to the UNFCC secretariat. To avoid double counting in the national balance all carbon benefits will be sold in the voluntary market only. The credits explicitly cannot be used in the regulated compliance market at all. According to the Swiss Federal Office for the Environment double counting is avoided by applying this procedure. Ref. 34. See also G.5.6. for further explanations.

CL.2 Offsite Climate Impacts ("Leakage")

CL.2.1 Determination of types of leakage and estimation of potential offsite decreases in carbon stocks (increases in emissions or decreases in sequestration) due to project activities.

Activity shifting or displacement:
No shifting or displacement of activities out of the project area is expected.

Market effects:
In Switzerland around 5.5 mio m3 of timber is harvested annually. The spare of the project is neglectable and does not cause any measurable external market effects.
Increased or decreased investment in the project zone is not expected. However market effects cannot be excluded completely.

CL.2.2 Document how any leakage will be mitigated and estimate the extent to which such impacts will be reduced and estimate the extent to which the negative offsite impacts will be reduced.

Only leakage that may occur is market leakage but it is so small that it cannot be quantified. Mitigation measures are not foreseen. Nevertheless possible negative market effects cannot be identified or quantified; a credit adjustment (discount) of 10% is applied.

This is best practice according to Voluntary Carbon Standard for extended rotation periods leading to a shift in harvests across time periods but minimal change in total harvest over time with "low" leakage risk. As mentioned above actually the market leakage is so small that it cannot be quantified. The 10% credit adjustment according VCS guidance is therefore very conservative.

CL.2.3 Subtract any likely project-related unmitigated negative offsite climate impacts from the climate benefits being claimed by the project and demonstrate that this has been included in the evaluation of net climate impact of the project (as calculated in CL1.4).

For market leakage a 10% discount was subtracted from the calculated net anthropogenic removals by sinks.

CL.2.4 Non-CO2 gases must be included if they are likely to account for more than a 5% increase or decrease (in terms of CO2-equivalent) of the net change calculations (above) of the project's overall off-site GHG emissions reductions or removals over each monitoring period.

No non CO2 gases related to the project activity can be identified.

CL.3 Climate Impact Monitoring

CL.3.1 Monitoring Plan

A monitoring plan has been developed (Ref. 50).

CL.3.2 Baseline Monitoring

The baseline is determined through the adopted figures of the baseline study. Main variable in the gain loss method is yield. Yield is known from previous subsequent inventories and is not needed to be monitored.

ΔC_G = annual increase of carbon stocks due to biomass growth t C/year
ΔCG_{Con} annual growth Conifers = 10'235 tC/year
ΔCG_{Bleaf} annual growth Broadleafs = 2'920 tC/year

$\Delta CG = \Delta CG_{Con} + \Delta CG_{Bleaf} =$ 13'155 tC/year

Figures from excel file "carbon calculations OAK Schwyz-08.xls/meth/C32 and D32" Ref. 26 deducted from baseline study Excel file: Abteilungen_OAK_Tabelle-2010-v7engl.xls, sheet "Abteilungen OAK" AF87, and AG87, Ref. 30.

This value shall be used until there is no new inventory. If there are new results from forest inventories, ΔCG shall be recalculated and the value adjusted for the subsequent monitoring reports.

Baseline harvest was determined in the baseline study (Ref. 21) and as a long term planning figure adopted with 14'180 tC/yr (confirmed by the authorities). See Ref. 26, excel file on carbon calculations table "meth" cells I32 – I61. No baseline monitoring is applied.

CL.3.3 Leakage Monitoring

No leakage was identified. Only possible market leakage is mentioned. Market leakage will be covered by a general 10% discount on the net removals. Leakage therefore will not be subject to monitoring activities.

CL.3.4 Emission reduction monitoring

CL.3.4.1 Potential carbon pools

The potential carbon pools are following:

- Above ground biomass
- Litter
- Dead wood
- Belowground biomass
- Wood products
- Soil carbon
- Peat

From the potential carbon pools only the biomass of the living trees (aboveground and belowground) is considered to be monitored (see section CL3.1.1). The other pools will not decrease as a result of the project. Litter, dead wood and soil carbon as well as peat will in tendency be increased as a result of the project. Less intensive interventions will cause less warmness on the ground and therefore lower decomposition rates. To exclude those pools is conservative.

No sources of GHG emission caused by the project were identified and are therefore monitored.

CL.3.4.2 Monitoring of the project boundary

Any changes in the project boundary are monitored and reported at each verification event.

CL.3.4.3 Monitoring method Gain/Loss

To calculate the sink effect of the project the gain/loss method is applied. Carbon stocks and yield are known from previous forest inventories. For the monitoring the extracted timber volume is measured in detail (full measurement) for conifer and broadleaf trees. The measurements are conducted and controlled by the forest service of the canton Schwyz.

Gain/Loss method

The IPCC GL for AFOLU indicates two methods to calculate changes in living biomass.

- gain/loss method (default method)
- stock change method

The default method is gain/loss method which recommended for situations of low increment, were the stock change method (which is based on subsequent inventories) is difficult to be precise enough in short inventory intervals. Small changes in large carbon pools are difficult to be measured with sampling methods with a good accuracy. The sampling error may be more than the growth. This is the case in the OAK project.

The gain loss method requires data on growth and on loss. Loss can be harvest, fuel wood collection and natural hazards. Fuel wood is not collected outside the regular harvest operations and also loss because of natural hazards (storm damages) is covered by regular harvest.

In the canton Schwyz all harvest is controlled by the canton forest service. All trees to be harvested are measured standing using the same tariffs as used in the normal forest inventory. So the loss is known without any sampling error.

What is also known is the increment from previous forest inventories which were conducted in the 1970ies and in the 1990ies (parts in the early 2000 years). This is adequate in the slow growing mountainous forests (Ref.21).

For the gain/loss method the basic equation is according to IPCC GL 2006 for AFOLU Equation 2.7

$$\Delta C_B = \Delta C_G - \Delta C_L$$

Where
ΔC_B = annual change in the living biomass (above + belowground biomass) tC/year
ΔC_G = annual increase of carbon stocks due to biomass growth t C/year
ΔC_L = annual decrease in carbon stocks due to biomass loss t C/year

Annual growth ΔCG (in tC/yr)

The annual growth was determined in the baseline study with 5.34 m3/ha/year.

ΔCG_{Con} annual growth Conifers = 10'235 tC/year
ΔCG_{Bleaf} annual growth Broadleafs = 2'920 tC/Year

$\Delta CG = \Delta CG_{Con} + \Delta CG_{Bleaf} =$ 13'155 tC/year

Figures from excel file "carbon calculations OAK Schwyz-08.xls/meth/C32 and D32" Ref. 26 deducted from baseline study Excel file: Abteilungen_OAK_Tabelle-2010-v7engl.xls, sheet "Abteilungen OAK" AF87, and AG87, Ref. 30.

This value shall be used until there is no new inventory. If there are new results from forest inventories, ΔCG shall be recalculated and the value adjusted for the subsequent monitoring reports.

Annual loss ΔCL (in tC/yr)

Carbon loss is defined as extracted timber volume.

ΔCL = $\Delta CL_{Con} + \Delta CL_{Bleaf}$

Where
ΔCL **annual carbon loss (in tC/yr)**
ΔCL_{Con} annual carbon loss from conifers (in tC/yr)
ΔCL_{Bleaf} annual carbon loss from broadleaf trees (in tC/yr)

Natural hazards: Storms can cause damages in the forests. Only if the damaged trees are harvested, they are counted as loss. If they remain on the area they are not lost. The decomposition is very slow and in the meantime the young regenerated trees grow up. The carbon content of the ecosystem does not change.

In case that harvested timber is not measured as standing trees but as round wood conservative conversion factors from round wood to standing timber volume shall be applied.

Remark on conservativeness: In most cases only the round wood is taken out of the forest. All other compartments of the trees remain as dead wood in the area

and are going to be decomposed during years and decades. More than one third of the living biomass is not really removed due to harvest.

Harvested timber volume for conifers and broadleaves

Harvest: measured as standing timber volume separately for conifers and broadleaves in m3.

According to CL1.1.5a following conversion factors from standing timber volume in m3 to tCO2 and tC are to be applied in the monitoring:

	tCO2/m3	tC/m3
Conifers:	1.16	0.32
Broadleaves	1.51	0.41

CL.3.4.4 Monitoring and verification frequency

Monitoring frequency can be from one up to five years.
Standard monitoring and verification period is one year. If a loss of carbon stock occurs, in example because of storm damages, the verification frequency can be prolonged up to five years. The reason for that is that it can be expected, that any losses are compensated by growth within a five year period. This is conservative. Losses that cause more than one annual yield are very seldom. The worst damages in the history of the OAK Schwyz were caused by the storm "Lothar" in 1999. In a five year average the forests were not source of carbon. New certificates only can be issued after the carbon stock has recovered above that amount, as it was at the time of the last issuance of certificates.

The baseline shall be revised every 10 years

Monitoring frequencies

Project boundary	1 (-5) years
Harvest	1 (-5) year
Baseline	10 years
Leakage	No monitoring, default 10% discount of actual net removal
Community impact	1 (-5) years
Biodiversity impact	1 (-5) years

First project year was 2005 (started with 1. December 2004).

First monitoring and verification event takes place in 2010 after validation covering the first 5 years.

CL.3.4.5 Field measurement methods

Field measurements for monitoring are the measurements of the standing trees to be harvested. Those measurements (Dbh) are controlled by the authorities and conducted according printed instructions Ref 29. Because the trees are measured standing before harvest full compliance is given with data from forest inventories. The same tariffs to calculate the tree volume are used. Harvest is usually measured completely according to the canton legislation. So no stratification or sampling error occurs. If exceptionally the timber is not measured fully (i.e. in case of damages), conservative estimations will be provided.

CL.3.4.6 Forest inventory method

In case of a new inventory is conducted by the OAK Schwyz the method of the canton forest service shall be applied which is based on the method of the Swiss Federal Institute for Forest Snow and Landscape Ref. 29 and the tariffs of Ref 35.

Monitoring entity

The harvest is measured as standing timber volume by the canton forest service. In case there is a change in the law and the measurements are not taken by the forest service any more the OAK Schwyz has to provide a credible measurement system.

CL.3.4.7 Data to be collected or used in order to monitor the verifiable changes in carbon stock in the carbon pools within the project boundary resulting from the proposed project activity, and how this data will be archived:

Data at validation

Data variable	**Source of data**	**Data unit**	**Measured (m), calculated (c) or estimated (e)**	**Proportion of data**	**How will the data be archived? (electronic / paper)**	**Comment**
Project area		*ha*	*c*	*100%*	*Paper, digital in GIS*	
BL Carbon Stock	*BL-Study*	*641'844 tC*	*c*			
Yield conifers tC/year	*BL-Study*	*10'235 ha/yr*	*m*	*100%*	*paper*	
Yield Broadleaf trees	*BL-Study*	*2'920 tC/year*	*m*	*100%*	*paper*	
Wood Density Conifers, D1	*Ref. 24*	*0.384 t d.m./m3*				
Wood Density Broadleaf trees D2	*Ref 24*	*0.556 t d.m./m3*				
Carbon Fraction	*default*	*0.5*				
BEF1 Conifers	*Ref 55, p111*	*1.21*				
BEF2 Broadleaf trees	*Ref 55, p111*	*1.20*				
Root to shoot ratio Conifers R1	*Ref 55, p111*	*0.37*				
Root to shoot ratio Broadleaf trees R1	*Ref 55, p111*	*0.24*	*c*			
Conversion factor Confers	*IPCC*	*0.852 tCO2/m3*	*c*			
Conversion Factor Broadleaf		*1.223 tCO2/m3*	*c*			

trees						
Conversion factor Confers		*0.232 tC2/m3*	*c*			
Conversion Factor Broadleaf trees		*0.334 tC2/m3*	*c*			

Baseline data

Data variable	**Source of data**	**Data unit**	**Measured (m), calculated (c) or estimated (e)**	**Recording frequency**	**Proportion of data to be monitored**	**How will the data be archived? (electronic / paper)**	**Comment**
Project area	*Monitor. Report. Sales and Purchases*	*7267 ha*	*m*	*10 years*	*100%*	*paper*	*Any sales of parts of the project area*
BL Carbon stock	*631'599*	*tC*	*c*	*10 years*	*100%*	*paper*	*Baseline C-stock at year 10*
Yield conifers	*Revised BL-Study*	*tC/yr*	*e*	*10 years*	*100%*	*paper*	*To be evaluate using the same approach as in the BL-Study*
Yield Broadleaf trees	*Revised BL-Study*	*tC/yr*	*e*	*10 years*	*100%*	*paper*	*To be evaluate using the same approach as in the BL-Study*
Wood Density Conifers, D1	*Ref. 24*	*0.384 t d.m. /m3*		*10 years*	*100%*	*paper*	*To be confirmed according literature.*
Wood Density Broadleaf trees D2	*Ref. 24*	*0.556 t d.m. /m3*		*10 years*	*100%*	*paper*	*To be confirmed according literature.*
Carbon Fraction	*IPCC*	*0.5*		*10 years*	*100%*	*paper*	*To be confirmed according literature.*
BEF1 Conifers	*Ref. 55*	*1.21*		*10 years*	*100%*	*paper*	*To be confirmed according literature.*
BEF2 Broadleaf trees	*Ref. 55*	*1.20*		*10 years*	*100%*	*paper*	*To be confirmed according literature.*
Root to shoot ratio Conifers R1	*Ref. 55*	*0.37*		*10 years*	*100%*	*paper*	*To be confirmed according literature.*
Root to shoot ratio	*Ref. 55*	*0.24*		*10 years*	*100%*	*paper*	

Broadleaf trees R1							
Conversion factor Confers	*Ref 55, p111*	*0.852 tCO2 /m3*	*c*	*10 years*	*100%*	*paper*	
Conversion factor Broadleaf trees	*Ref 55, p111*	*1.223 tCO2 /m3*	*c*	*10 years*	*100%*	*paper*	
Conversion facto Confers	*Ref. 55, p111*	*0.232 tC/m 3*	*c*	*10 years*	*100%*	*paper*	
Conversion Factor Broadleaf trees	*Ref. 55, p111*	*0.334 tC/m 3*	*c*	*10 years*	*100%*	*paper*	

Monitoring Parameter Project Implementation

Data variable	**Source of data**	**Data unit**	**Measured (m), calculated (c) or estimated (e)**	**Recording frequency**	**Proportion of data to be monitored**	**How will the data be archived? (electronic / paper)**	**Comment**
Monitoring period		*year*	*c*	*1 (-5) years*	*100%*	*paper*	*Regular monitoring and verification period 1 year*
Project area	*Mon. Report. Sales and Purchases*	*ha*	*m*	*1 (-5) years*	*100%*	*paper*	*Any sales of parts of the project area*
Harvested conifers	*Official harvest control*	*m3*	*m*	*1 (-5) years*	*100%*	*Paper/ electronic*	*Data will be collected according permission of the authority and harvested volumes.*
Harvested broadleaf trees	*Official harvest control*	*M3*	*m*	*1 (-5) years*	*100%*	*Paper/ electronic*	*see above*
Harvest volume that exceeds baseline level	*Official harvest control*	*M3*	*m*	*1 (-5) years*	*100%*	*Paper/ electronic*	*see above*
Not executed harvest volume	*Official harvest control*	*M3*	*m*	*1 (-5) years*	*100%*	*Paper/ electronic*	*see above*

due to due to unexpected harvesting beyond baseline level.							

annual growth Conifers ΔCGCon	*PDD baseline*	*m3/ ha/yr*	*c*	*5-10 years*		*electronically*	*New data will be considered if new inventory were conducted only.*
annual growth Broadleaf ΔCGBleaf	*PDD baseline*	*m3/ ha/yr*	*c*	*5-10 years*		*electronically*	*See above*
Yield conifers	*New inventory data*	*m3/ ha/yr*	*m*	*Not specified*	*100%*	*paper*	*See above*
Yield Broadleaf trees	*New inventory data*	*m3/ ha/yr*	*m*	*Not specified*	*100%*	*paper*	*See above*

In case new inventories are conducted, which is not compulsory to the monitoring because of use of the gain/loss method, data to be collected and procedures see Ref. 29.

Quality control (QC) and quality assurance (QA) procedures that will be applied to monitor actual GHG removals by sinks:

The amount of timber to be harvested will be measured every year as standing timber volume by the canton forest service itself respectively will be controlled by it according to the canton forest law. A full measurement is conducted.

Any new inventories will be conducted under the supervision of the authorities using standard methods.

In case this legal requirement changes, the OAK Schwyz is obliged to introduce an adequate QC/QA system.

Operational and management structure(s) that the project operator will implement in order to monitor actual GHG removals by sinks by the proposed project

There is no special operational management structure to conduct the monitoring implemented. The measurements of the standing timber volume will be conducted as already mentioned by the canton forest service as a matter of routine. Those are standard procedures according to the canton forest law.

IV. Community Section

CM1 Net Positive Community Impacts

CM.1.1a Describe the appropriate methodologies used (e.g. the livelihoods framework) to estimate the net benefits to communities resulting from planned project activities.

Project owner is the community of the 17'000 members of the OAK Schwyz. All benefits belong to them. First benefit is a commercial one. This will mainly be used for public benefits as stated in the constitution of the OAK Schwyz. It is foreseen to sell the credits at a minimum prize of 20 CHF per tonne CO2. So the annual benefit will be around 8'000 tCO2 x 20 CHF = 160'000 CHF per year. The transaction costs are not considered in these figures. The transactions costs can be kept very low because the monitoring is concentrated on the harvest control conducted by the canton forest service anyway.

The measurable parameter is the income generated by the project.

CM.1.1b Include a credible estimate of net benefits changes in community wellbeing given project activities. This estimate must be based on clearly defined and defendable assumptions about how project activities will alter social and economic wellbeing over the duration of the project.

The project will generate credits of 245'000 tCO2e. The minimum prize that is expected is 20 CHF (which is around 20 USD). According to the constitution of the OAK Schwyz the members can get cash from the benefits. This has been always only marginal amounts. Main goal of the OAK Schwyz beside to manage the lands economically is to support public, charitable or beneficial intents. So the benefits of the project will be dedicated to the public according to the constitution.

The "with project" scenario will generate revenues that will be spent mostly internally inside the OAK Schwyz. Because the target of the OAK is also highly common welfare oriented, this will contribute to that target. Following use of the revenues is foreseen:

Proportion of use of revenues for carbon credits:

- 23% Compensation harvest abandonment/Nutzungsverzicht
- 50% Improved forest management/angepasste Bewirtschaftung
- 11% Project (certification etc.)/Projekt (inkl. Zertifizierung)
- 1% Administration OAK/Verwaltung OAK
- 5% Compensation ClimatePartner/Vergütung ClimatePartner
- 10% Risk and profit/Risiko und Gewinn

The net benefit to the community is small. But there is also no negative consequence. The benefits of the communities from the OAK forests remain more or less the same without project and with project (i.e. protection function). But the project helps to guarantee the performance of the OAK to the communities in the future. The improved forest management will ensure all forest functions. Certain benefits are depending from the financial situation like the free use of infrastructure of the OAK through community members (G.3.1). This services to the community will be increased.

CM.1.1c Compare the "with project" scenario with the baseline scenario of social and economic wellbeing in the absence of the project. The difference (i.e., the net community benefit) must be positive.

The OAK is not a rich organisation. Considering a turnover of around 8 mio Sfr. and a cash flow of around 1 mio Sfr. the financial benefit from the project is substantial and will help to reach the targets and goals determined in the constitution. The comparison between "with project scenario" and "without project scenario" will result in a compensation of the harvest abandonment. The improved forest management will result in less intensive harvest operations. This means less disturbances of the ecosystem and improvement of the biodiversity of the forest. The project strengthens the economic wellbeing of the OAK community. The there is no community group that suffers from any negative consequences from the project.

As stated above the net benefit is small but it is positive.

CM1.2 Demonstrate that no High Conservation Values HCV identified in G1.8.4-8 will be negatively affected by the project.

Areas of HCV were identified in section G1.8.4-6

Areas that provide critical ecosystem services (e.g. hydrological services, erosion control) (G1.8.4)

Protection forests

Important HCV are the protection forests. In protection forests uphill of roads, railway lines, housing areas must be managed differently from the normal forest. Such forests must be kept on a lower level of standing timber volume. This has been considered in the baseline calculation as well as in the project scenario. For each compartment the potential to increase the standing timber volume was determined considering the protection function. This was done together with the representative of the forest service. So those HCV areas in the project area will be "protected" anyhow. The protection forests of the project zone will not be impacted by the project

Areas that are fundamental for meeting the basic needs of local communities (G1.8.5).

The farmers of the project zone depend fundamentally from the pastures. This is significant to all rural areas. The area of the forest will not be extended as consequence of the project.

Areas critical for the traditional cultural identity of communities (G1.8.6).

The whole project zone is home of the population since more than thousand years. The identity also inside Switzerland is highly determined through the landscape. The pattern of land use distribution which is mainly that of pasture and forest will not be altered through the project

CM2 Offsite Stakeholder Impacts

CM.2.1 Potential negative offsite stakeholder impacts that the project is likely to cause.

The stakeholders were identified in section G3.8. A sample of the stakeholders is interviewed annually during the FSC check. No potential negative offsite stakeholder impacts caused by the project can be identified. Stakeholder consultation did not bring any negative response.

CM.2.2 Mitigation of negative offsite social and economic impacts.

N/A

CM.2.3 Net negative impacts on the well-being of other stakeholder groups

The carbon project will contribute to the overall goals of the OAK Schwyz: To manage the lands economically and to contribute to public welfare. No other stakeholder groups can be identified whose well-being is negative affected by the project.

CM3 Community Impact Monitoring

CM.3.1 Initial plan for how to select community variables to be monitored, and the frequency of monitoring. Potential variables include income, health, roads, schools, food security, education and inequality. Include in the monitoring plan, community variables at risk of being negatively impacted by Project activities.

The whole forest operation activities especially the harvest operations are under supervision and control of the canton forest service. The project is embedded into the standard operation procedures of the OAK forest department. The OAK Schwyz itself is a community of 17'000 people. The OAK is managed according to the Swiss legislation. The political communities of the project zone are subject to official statistics. The project will affect the political communities not significantly, but indirectly. The OAK Schwyz will include the project into the standard annual reporting. One variable that will be monitored is the activity of the OAK in protection forests.

CM.3.2 Initial plan for how to assess the effectiveness of measures used to maintain or enhance High Conservation Values related to community well-being (G1.8.4-6) present in the project zone.

As described in section CM1.2 the important HCV is protection of human beings and infrastructure against erosion from rocks and steep slopes. Protection is a major function uphill of roads, railway lines, houses. This is not only a subject of the project but a major issue of alpine forestry. The forests are officially categorised with protection functions in the "forest development plan". Sensitive areas are subject to control and measures independently from the project. The project will not alter any of those determinations. No project specific plan therefore is foreseen. The OAK Schwyz is obliged to conduct all necessary measures to guarantee the protection function. As a proxy for the community well being the measures in protection forests are monitored.

The OAK Schwyz will report on its activities to maintain the protection forests by each monitoring event. Indicator is the area of protection forest treated. This indicator is significant because in general expenses for harvest are higher than revenues from the timber sold. As second monitoring parameter the number and type of benefit services provided to the communities will be monitored.

The CCBA project aspects will be covered explicitly during the FSC stakeholder consultation process. This is also included into the Monitoring Plan. A Monitoring Plan is already developed (see Section CM 3.3).

Data at validation
Protection forest classified as “high conservation value forest”: 3’346 ha

Baseline
N/A

Project implementation

Data variable	**Source of data**	**Data unit**	**Measured (m), calculated (c) or estimated (e)**	**Recording frequency**	**Proportion of data to be monitored**	**How will the data be archived? (electronic / paper)**	**Comment**
Amount of money spent for community purposes out of the project revenues	*Annual reports of OAK*	*CHF*	*c*	*1 (-5) years*	*100%*	*paper*	*Regular monitoring and verification period 1 year*
Ha of protection forest treated	*Annual reports of OAK*	*ha*	*e*	*1 (-5) years*	*100%*	*paper*	*Regular monitoring and verification period 1 year*
Benefit activity to community members	*Annual reports of OAK*	*No*		*1 (-5) years*	*100%*	*paper*	*Types and duration of community activities*

CM.3.3 Commitment to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the standards and dissemination of this plan to the public, to the communities and other stakeholders.

A monitoring plan is already developed with its final version. Beside that the OAK Schwyz will report about the project inside the regular annual report which is public and well spread and discussed in the canton.

V. Biodiversity Section

B1. Net Positive Biodiversity Impacts

B.1.1 Appropriate methodologies used to estimate changes in biodiversity as a result of the project. Base this estimate on clearly defined and defendable assumptions. Compare the "with project" scenario with the baseline "without project" biodiversity scenario completed in G2. The difference (i.e., the net biodiversity benefit) must be positive.

Also in biodiversity aspects the project is embedded in the federal and canton legislation.

There are several federal inventories that touch the land of the OAK Schwyz:

Swiss Federal Inventory on Flood Plains of national importance
Swiss Federal Inventory on Highmoors of national importance
Swiss Federal Inventory on Swamps of national importance
Swiss Federal Inventory on Moor Landscapes of national importance
Swiss Federal Inventory on Landscapes and Natural Monuments
Swiss Federal Inventory on Amphibian spawn waters of national importance

The project will not affect these areas negatively. They are taken into consideration in the nature protection concept (Ref. 11).

In the economically harvested forests the main project activity is to harvest less than the growth for some time and to increase the standing timber volume moderately. No land use change will occur.

There is a concept for forest reserves of the canton (Ref. 44) and a nature protection concept of the OAK Schwyz describing the activities (Ref. 45). The reserves are established on a contractual basis with the canton and are binding for 50 years.

Target of the forest nature reserves (WNR) is to enable all processes of natural forest stand development. They are excluded from any harvest measures. In forests under harvest regime trees are cut in a "young" age of 100-150 years for spruce in example. In natural forests those trees can become 200-300 years old but with loss of timber quality. Forest nature reserves allow trees to grow old and die and decay with all positive aspects of biodiversity. Especially decaying trees and groups of trees are forming biotopes of high biodiversity. Decaying trees are also promoting natural regeneration in high elevations. The natural processes of forest stands development start with regeneration and continue to the ripe stadium and to the decay stadium. In case of single tree and small area decay the more shadow tolerant tree species regenerate (fir, spruce, and beech). This is called the short generation cycle consisting mainly of the shadow tolerant trees. In case of more opening of the canopy less shadow tolerant trees species regenerate like larch, birch. In this case there is a sequence of phyto-sociological forest types of the succession. In cases of landslides the cycle includes also a soil development with pioneer tree species as first forest generation followed by the main species in a later phase after some decades. In the mountains temperature is the main limiting factor for tree growth. Therefore the forest types differ mainly with elevation up to the tree line. Locally this is interfered by exposition, slope and soil conditions. For example South expositions are of advantage in high elevation because they receive more insulation and are of higher temperatures. This is important regarding the short annual vegetation period. Precipitation normally is much in high elevations. In lower elevations temperature is not so critical, the vegetation

period is longer. There south exposition can cause lack of water in dry summers. So in low elevations north expositions are of advantage.

With this explanations we want to demonstrate the big variety of vegetation conditions and the processes going on. The biodiversity is not constant but it is changing by the time and by local conditions.

In some cases especially the regeneration of the non shadow tolerant forest types is the target. In this cases Special Forest Reserves (SWR) are established and measures are planned to open the canopy artificially. Even some trees are harvested, target of the measures are not commercial ones but ecological ones.

All nature conservation objects that touch the land of the OAK are listed in the OAK Nature Protection Concept (Ref. 11). This Concept also shows the proposals for new forest nature reserves (status 2003). Ref. 45 shows the status 2009. It shows also that the compensation is always less than the costs. The carbon sequestration will help to finance more reserves and motivate the OAK Schwyz to establish forest nature reserves. So the net biodiversity benefit will be enormous.

The area of the nature reserves will be taken as indicator for biodiversity. It is introduced as monitoring variable and will be indicated in each monitoring report. So not single species but protected areas will be monitored.

The silvicultural concept of the canton Schwyz, which covers project area as well as project zone is close to nature management practices. This means basically no clear cuts but selective logging and natural regeneration, only indigenous tree species and low impact logging (cable way systems). The FSC-certification is confirming these practices according the nearly one hundred criteria of the standard. To undertake FSC certification did not cause a real change in silvicultural practices. The biodiversity status of the forests therefore is very close to nature conditions. The special treatment of the protection forests is described in Section B.1.2 below. Because in the mountain forests the costs for harvest can be very high there are also areas that are harvested with very low frequency (decades). This contributes also to a very close to nature and high biodiversity status.

The carbon sequestration project is a certain reduction of the amount of timber harvested. Because of the close to nature silvicultural regime that is practiced anyway the changes in biodiversity are also moderate and regarding the slow dynamics in mountain forests difficult to measure. But following can be stated clearly:

The reduction of the timber harvested leads to more close to nature conditions and processes in the forests of the OAK Schwyz and the tendency is therefore is clearly to an improvement of biodiversity. The project activity results in a net biodiversity benefit.

B1.2 High Conservation Values HCV's affected by the project identified in G1.8.1-3

According the national FSC standard which is based on IUCN criteria only one type of HCV occurs in the OAK Schwyz forests. This is the protection forest. The area is not determined by the OAK but by the forest service according to legal criteria. What the OAK Schwyz is influencing is the treatment of the protection forests.

The following three Categories of HCV's from section G are in addition to IUCN criteria

G1.8.1 Globally, regionally of nationally significant concentration of biodiversity values, including protected areas, threatened species, endemic species and areas that support significant concentrations of a species during any time in their lifecycle (i.g. migrations, feeding grounds, breeding areas).

For the endangered species capercallie (Tetrao Urugallus) there is a special program to improve the habitat. This is independent from the carbon sequestration project. The program on habitat improvement of the capercailie is not impacted by the project. It is not limited to the project area (forest) but also for the project zone. It is also valid for areas outside the forest in the whole project zone. The results of that program will be included in the monitoring report.

G1.8.2 Nationally large landscape level areas

The inventories of national importance of nature conservation categories (Mires, Amphibian spawn waters of national importance) are not IUCN categories. They will not be affected by the project in the whole project zone.

G1.8.3 Threatened or rare ecosystems

The potential to sequester carbon was evaluated in all 80 compartments of the OAK forests considering all forest functions. The nature conservation function can lead to less or no harvest (in protected areas) or to more intensive harvest (special habitat improvement) or to certain harvest schemes. This was considered in the baseline and project scenario study for each compound together with the responsible person of the canton forest service. So it was guaranteed that the nature conservation values are not negatively affected by the project. In general the higher standing timber volume will lead to more deadwood and higher biodiversity in decay depending species (birds, insects, fungi). The nature conservation function will not be affected by the project.

B.1.3 Species to be used by the project

The OAK Schwyz is usually taking advantage of natural regeneration. The main types of forests are described in section G.1. Main species are depending on ecological site conditions: Spruce (Picae abies), Silverfir (Abies alba) and Beech (Fagus silvatica) in the average mountain forests. Sub alpine sites are dominated by Spruce (Pica abides), Ash trees (Fraxinus excelsior), Maples (Acer campest is) and other broadleaf tree species like Alder (Altus glutinous), Willow (Salix peck.) occur in gullies and along rivers. Pioneer tree species like Rowan Berry (Sorbs actuarial) occur on harvested sites. In the lower part there are Oaks (Quarks robber), Elms (Alums glare), Wild Cherry trees (Pronouns avian) and Linden (Tulia cordata).

All plantations are conducted with endemic species only. No invasive alien species are introduced by the project.

B.1.4 Use of invasive species

No invasive species are foreseen to be use in the project.

B.1.5 Guarantee that no genetically modified organisms will be used to generate carbon credits.

No non-native species or GMO are used in the forests of the OAK Schwyz. This is forbidden by law. Natural regeneration is the usual silvicultural technique.

B2 Offsite Biodiversity Impacts

B.2.1 Identification of potential negative offsite biodiversity impacts that the project is likely to cause.

Negative offsite biodiversity impacts cannot be identified.

B.2.2 Description how the project plans to mitigate these negative offsite biodiversity impacts.

N/A

B.2.3 Evaluation of likely unmitigated negative offsite biodiversity impacts against the biodiversity benefits of the project within the project boundaries. Justification and demonstration that the net effect of the project on biodiversity is positive.

Negative offsite Biodiversity impacts cannot be identified. Proof for the improvement of the biodiversity within the project boundaries is the establishment of forest nature reserves in the past and in the future. The official approval procedure is followed with an obligation of normally 50 years. In addition the increase of the standing timber volume will bring the forests closer to the natural development.

B3 Biodiversity Impact Monitoring

B3.1 Initial plan for selecting biodiversity variables to be monitored, frequency of monitoring and reporting

The area of the nature protection objects of national importance as well as the area of the local nature reserves is subject to FSC certification. The area of the protected objects will be reported with each monitoring report.

As indicated in Section G.1.8 HCV according to the IUCN criteria are the protection forests (3346 ha of the project area). Forest nature reserves are indicated as HCV in addition to the IUCN criteria.

The area of the forest nature reserves, the special forest reserves and the protection forests treated are subject to monitoring

B3.2 Initial plan for assessing the effectiveness of measures used to maintain of enhance High Conservation Values related to globally, regionally, nationally significant biodiversity (G1.8.1-3)

The variable “Area of protected forests treated” and “Area of forest nature reserves” was introduced as proxy for biodiversity in the monitoring plan. It will be reported on each monitoring event. The area shall not be reduced.

Data at validation

Data variable	**Source of data**	**Data unit**	**Measured (m), calculated (c) or estimated (e)**	**Proportion of data to be monitored**	**How will the data be archived? (electronic / paper)**	**Comment**
Area of forest nature reserves		*1’029.67 ha*	*m*	*100%*	*paper*	*Regular monitoring and verification period 1 year*
Area of special forest reserves		*139.55 ha*	*m*	*100%*	*paper*	*Regular monitoring and verification period 1 year*
Area of protection forest		*3346 ha*	*m*	*100%*	*paper*	*Regular monitoring and verification period 1 year*

Baseline
N/A

Project implementation

Data variable	**Source of data**	**Data unit**	**Measured (m), calculated (c) or estimated (e)**	**Recording frequency**	**Proportion of data to be monitored**	**How will the data be archived? (electronic / paper)**	**Comment**
Areas of protection forests treated	*Annual management report*	*ha*	*e*	*1(-5) years*	*100%*	*paper*	
Areas of forest nature	*Annual management*	*ha*	*m*	*1(-5) years*	*100%*	*paper*	

reserves NWR	*report*						
Area of forest special reserves SWR	*Annual management report*	*ha*	*m*	*1(-5) years*	*100%*	*paper*	

B.3.3 Commitment to develop a full monitoring plan

A monitoring plan is already developed.

GOLD LEVEL SECTION

The project proponents don not apply for gold level status.
The content of this section is only indicative and not subject to further validation.

GL1. Climate Change Adaptation Benefits Optional

GL.1.1 Identification of likely regional climate change and climate variability scenarios and impacts, using available studies.

The forests of the OAK Schwyz are located in the upper mountainous and sub alpine elevations. In this high elevations temperature is the main minimum factor for the growth of plants. Precipitation is high and not a minimum factor. In tendency warming will improve the growth conditions in these regions. The annual vegetation period is going to be longer. The tree line is moving up hill.

Negative impacts of the anticipated climate change are more extreme weather events mainly storms that may cause damages in the forests. The overall effect is estimated to be still positive. For the next 50 to 100 years the alpine forests are expected to be carbon sinks depending on the management. Ref. 32, 33. Even if the growth conditions may be improved by increasing temperatures it is stated in Ref. 33 that in the alps it is needed to reduce the harvest to have sinks in future. So in the absence of the project this sink will not take place.

GL.1.2 Identification of risks to the projects climate, community and biodiversity benefits resulting from likely climate change and climate variability impacts and explain how these risks will be mitigated.

More extreme weather events are the main risks to the project's climate, community and biodiversity benefits. Storms can damage the forests, heavy rainfalls can cause floods, mud flows, land slides. To mitigate those risks large clear cuts are not conducted in the forests of the OAK. The silvicultural strategy is to establish mixed stands consisting of several species. So the ecological amplitude of each species will contribute to strengthen the flexibility of the forest ecosystems to react to and to stand the mentioned likely more extreme weather events.

One mayor risk is that the permafrost is melting and makes the mountains more instable against erosion.

GL.1.3 Impact of the current or anticipated climate change on the well being of communities and/or the conservation status of biodiversity in the project zone and surrounding regions.

The forests themselves are expected to adapt to the changing climate. Biodiversity will not be affected too much. For the communities the more likely heavy rain falls and the melting of the permafrost are risks and can affect the well-being of the communities in the whole alpine region dramatically.

GL.1.4 Assistance of the project activities to communities and/or biodiversity to adapt the probable impacts of climate change.

The silvicultural strategy in the project area with no large area clear cuts, natural regeneration with native species and the establishment of mixed forest stands improves the ability of the forests to adapt to changing climate conditions and to

fulfil the forest functions. For the community the protection function is of special importance.

With the strategy the adaptation of the forests to the changing climate is assisted. The biodiversity can adapt to the changes

GL2. Exceptional Community Benefits

The Canton Schwyz does not have a significant portion of the population living below the national poverty line. In 2006 1.8 % of the people were on welfare.
No exceptional community benefits according the CCBA Standards can be indicated.

GL3. Exceptional Biodiversity Benefits

There are no sites of global significance for biodiversity conservation in the project area. No species that are Critically Endangered (CR) and Endangered (EN) are at the site as well as no vulnerable species (VU) according to the IUCN Red List categories.

No irreplaceable species are at the project site.