

6. Monitoring

6.a	Key indicators for measuring state of conservation	>	583
6.b	Administrative arrangements for monitoring property	>	587
6.c	Results of previous reporting exercises	>	589



Bernina line > Clearing snow on the
Bernina Pass.
P. Donatsch / Rhaetian Railway

6.a Key indicators for measuring state of conservation

The condition of the railway and the cultural landscape (cf. 4.a), together with the various influencing factors (cf. 4.b), form the basis for selecting the key indicators to assess the condition of the nominated asset. The influencing factors are particularly important for the cultural landscape.

Indicators for assessing the condition of the railway

The key indicators for appraising the condition of the railway infrastructure are based on the inventories and appraisals, completed or in progress, and their findings (cf. 4.a). The measures are determined according to the findings and set out in a several-year plan; the Business

and Investment Plans are adapted appropriately. The condition analyses are regularly updated. Beyond this, developments on the Albula and Bernina lines are followed up as an integral element of the monitoring process; the development log is based on surveys of passenger transport frequency and records of the freight volumes transported.

Table of indicators

Theme/Target Value	Indicator	Source	Periodicity
Protection and conservation of engineering structures	Up-to-date rehabilitation of the - Bridges - Tunnels - Protective structures - Revetment walls	Rhaetian Railway condition reports	Every 10 years
Protection and conservation of buildings	Up-to-date rehabilitation of the - Stations	Rhaetian Railway condition reports	Every 10 years
Protection and conservation of railtrack infrastructure	Up-to-date rehabilitation of the - Track - Electro-technical installations - Catenaries	Rhaetian Railway condition reports	Every 10 years
Passenger frequencies	Number of passengers transported on the Albula and Bernina lines	Rhaetian Railway frequency surveys	Annually
Freight carried	Freight transported on the Albula and Bernina lines in tonnes	Rhaetian Railway freight statistics	Annually

Indicators for assessing the condition of the cultural landscape

Natural features and topographic criteria, rather than territorial aspects, are decisive for the demarcation of the World Heritage perimeter. Most

of the cultural landscape indicators listed below cannot therefore be unequivocally restricted to the nominated asset, as the assessment is conducted at community and, in Switzerland, sometimes at cantonal level. This is best illustrated by

a few examples: the farmed area of a single agricultural unit may cover both part of the World Heritage area and land beyond it. Ecological networking concepts are determined by the community and consequently apply to the community land as a whole, which may comprise areas that are not part of the World Heritage area. Further, it is to be expected that certain communities will

merge in the next few years; the size of the areas covered by community-level surveys may therefore change as such mergers also abolish the old territorial borders. In these cases, the indicators for the entire community territory are adopted and qualitative considerations on their concrete significance for the effective World Heritage property added.

Table of indicators

Theme/Target Value	Indicator	Source	Periodicity
Spatial development			
Population in the World Heritage area	Number of inhabitants per community (core and buffer zones)	- Federal Office of Statistics, Population Census ESPOP - Centro per l'impiego di Tirano	Annually
Number employed in the 2nd and 3rd sectors within the World Heritage area	Number employed per community	- Federal Office of Statistics, Business Census - Centro per l'impiego di Tirano	Every 4 years
Commuter situation	Incoming commuter communities Outgoing commuter communities Number of incoming/outgoing commuters as a % of the workforce	- Population Census - Centro per l'impiego di Tirano	Every 10 years
Ratio of residents, jobs and tourism per community	Inhabitant reference value (inhabitants + employed + $\frac{1}{2}$ hotel beds + $\frac{2}{3}$ beds in self-catering)	- Federal Office of Statistics, Business Census - Ufficio informazioni turistiche di Tirano	Every 4 years
Settlements			
Size of building zone	Changes in size of building zones according to categories and communities	- Office for Spatial Development - Comune di Tirano	As required
Number of homes	New builds/homes	- Federal Office of Statistics, Building statistics - Comune di Tirano	Annually
Ratio 1st homes / 2nd homes	Proportion of second homes by community	- Federal Office of Statistics, Homes statistics - Comune di Tirano	Every 10 years
Building activity			
Investments in building	Investments in buildings and public works by community	-Federal Office of Statistics, Building statistics - Comune di Tirano	Annually
Building inside the building zone	Number of building permits issued by community	- Federal Office of Statistics, Communities - Comune di Tirano	Annually
Building outside the building zone	Number of building permits issued by community	- Office for Spatial Development - Comune di Tirano	As required

Theme/Target Value	Indicator	Source	Periodicity
Tourism			
Beds and overnight stays	Number of beds and overnight stays in hotels and self-catering units by communities	- Federal Office for Statistics, Office for Economy and Tourism - Ufficio informazioni turistiche di Tirano	Annually
Employed in tourism	Percentage proportion of those in tourism to total number employed (2nd and 3rd sectors)	- Federal Office of Statistics, Business Census - Ufficio informazioni turistiche di Tirano	Every 4 years
Agriculture			
Area under agriculture	Agricultural area as a % of total area (without Alpine meadows)	- Federal Office of Statistics, Area Statistics - Provincia di Sondrio	Every 12 years
Management of cultural landscape	Number of farm units Number employed in agriculture	- Federal Office of Statistics, Agricultural unit Census - Provincia di Sondrio	Every 4 years
Melioration projects, structural improvement measures	Total expenditure	- Office for Agriculture and Geo-information - Provincia di Sondrio	As required
Creating favourable conditions	Number of relocations Sum of contributions to building animal sheds	- Office for Agriculture and Geo-information - Provincia di Sondrio	As required
Ecological aspects of the cultural landscape	Communities with ecological networking concepts	- Office for Nature and the Environment/ Office for Agriculture and Geo-information - Provincia di Sondrio	As required
Forestry			
Forested area	Forested area as a % of total area	- Federal Office of Statistics, Area Statistics - Provincia di Sondrio	Every 12 years
Timber utilisation	Volume of timber felled	- Federal Office of Statistics, Forestry Statistics - Provincia di Sondrio	Annually
Protective measures			
Area in the protected landscape zone, in core and buffer zones in the Structure and Land-Use Plans	Protected landscape area as a % of the core and buffer zones	- Office for Spatial Development - Provincia di Sondrio	As required
Number and area of nature reserves in the core and buffer zones in the Structure and Land-Use Plans	Nature reserves as a % of the core and buffer zones	- Office for Spatial Development - Provincia di Sondrio	As required
Protection of cultural assets	Number of protected cultural assets in the community planning	- Office for Spatial Development - Provincia di Sondrio	As required
Protection of local character	Type and cost of protective measure	- Office for Culture , Conservation of Monuments Section - Provincia di Sondrio	As required
Natural risks			
Natural risks, frequency	Number and type of occurrences in the core and buffer zone	- Office for Forestry, Damage Cadastre - Provincia di Sondrio	As required
Natural risks, costs for safety measures	Type and costs of protective measures to ensure safety of the World Heritage	- Office for Forestry /Rhaetian Railway - Provincia di Sondrio	As required
Natural risks, damages caused	Cost of damages within the perimeter of the core and buffer zones	- Property Insurance Institute/ Rhaetian Railway - Provincia di Sondrio	As required



Bernina line > On the Bernina Pass.
T. Keller / Rhaetian Railway

6.b Administrative arrangements for monitoring property

The sponsor association is responsible for the coordination of monitoring, which is carried out by specialised institutions and authorities. The association’s panels of experts “Railway” and “Cultural Landscape” provide professional backup.

The purpose of the sponsor association “UNESCO World Heritage Rhaetian Railway in the Albula/Bernina Cultural Landscape” (cf. 5.e) is the conservation and sustainable utilisation of the site. Responsibility for the coordination of monitoring lies with the association, which has two panels of experts – one for the railway and the other for the cultural landscape – to ensure that monitoring is performed on a continuous basis. The members of the panels are drawn from the relevant professional fields. Monitoring will probably be carried out by specialised institutions and authorities such as the Canton Graubünden Office of Culture’s Care of Historic Monuments Section or the Canton Graubünden Office of Spatial Development.

The association’s address is:
UNESCO World Heritage
Rhaetian Railway in the Albula/Bernina
Cultural Landscape Association
c/o Rhaetian Railway
Bahnhofstrasse 25
CH-7002 Chur
Tel: +41 (0)81 288 63 66
E-mail: unesco@rhb.ch



Albula line > Before reaching Celerina.
T. Keller

6.c Results of previous reporting exercises

There are no independent international expert opinions on the condition of the railway and the cultural landscape; however, there have been a few studies focusing on specific aspects.

Expert opinions on the condition of the railway

To date there have been no independent international expert opinions on the condition of the railway. Between 2003 and 2004, the Rhaetian Railway conducted the first-ever systematic review and evaluation of bridges and viaducts within the World Heritage perimeter (Rhätische Bahn: *Zustand Kunstbauten [Brücken]*; *Albulaline [Thusis–St. Moritz]*, *Berninaline [St. Moritz–Campocologno]*, *Oberengadin [Samedan–Pontresina]*, Chur 17th January 2006). For the tunnels as well, the work started in 2005 was completed recently (Rhätische Bahn: *Zustand Kunstbauten [Tunnels]*, Chur 6th October 2006). Both reports are appended to the candidature documentation (“Annex” File) in electronic form. It is currently drawing up an inventory and assessing the condition of galleries, revetment walls and track for the entire rail network. The surveys are expected to be completed by the beginning of 2007 (cf. 4.a.1).

Expert opinions on the condition of the cultural landscape

Similarly, there have been no international-focus studies on the condition of the Albula/Bernina cultural landscape. In 1999, however, a landscape typology assessment was carried out for the central and upper Albula valley (Tiefencastel to Bergün/Bravuogn) as part of a degree assignment for the University College of Rapperswil. The study also defined objectives for the overall

appearance of the landscape, as well as for types and biotopes. A detailed landscape development concept was compiled for the community of Alvaneu, covering landscape appearance, types and biotopes, farming, forestry and tourism (Marie-Louise Kieffer, Alain Brugger, Matthias Merki, *Landschaftsentwicklungskonzept Alvaneu*, Diplomarbeit im Fach Landschaftsplanung, Hochschule Rapperswil October–December 1999).