

spotted Nutcracker which plays this role - it can transport up to 90% of the grains.

It hides the grains in a store and in this way spreads the seed. The bird is well rewarded in this special relationship, by the exceptionally nutritious Arolla kernels. The nutcracker has an excellent memory, but in good years, they have more seeds than they need. Also, they only know the whereabouts of their own hiding places, so the birds which do not survive the winter leave behind hoards of seeds that can germinate in the spring.

The landscape : Glaciers and men

The reserve is greatly marked by glaciation. Erosion is mainly the result of the vast glaciers which covered the mountains during the Würm period, more than 10,000 years ago. The lower parts of the relief are the ice accumulation zones, where the weight of the ice increases erosion to form basins. After the retreat of the glaciers, the basins became lakes which then gradually filled up with alluvium. The succession of rocky constrictions and plateaux is a characteristic feature of these phenomena. (Plan de Tuéda, Plateau du Fruit, Verrou du Saut). You can learn more about



View over the Gébroulaz glacier - © Parc National de la Vanoise / Ludovic Imberdis



The Reserve House - © Parc National de la Vanoise / Ludovic Imberdis

this particular mountain environment on the glacier trail, between the Reserve House and the col du Soufre. Man has left his mark here, seen in the traces of iron ore excavation in the du Saut mines. The mountain chalets and the ruins which can be seen on the way up to the Saut are indications of the importance of agriculture in the 19th century. Recolonisation by the Arolla Pine of these once pastoral areas at the upper limit of the forest is an indication of agricultural decline in mountain areas. The pastoral system continues in the reserve, with the production of meat and Beaufort cheese.

The reserve welcomes you: Reception and rules

The exhibition at the Reserve House, above the gravel pit, presents the habitats and their occupants. The paths in the reserve, and the refuge du Saut, are other aids to interpretation. The reserve is a place which visitors are welcome to discover, but certain rules must be observed to protect the wildlife, as this is the primary objective.



Dogs are not allowed beyond the lake, and camping and traffic are similarly restricted in order to limit the impact of visitor frequency on the habitat and to provide better conditions for the discovery of nature in the reserve.

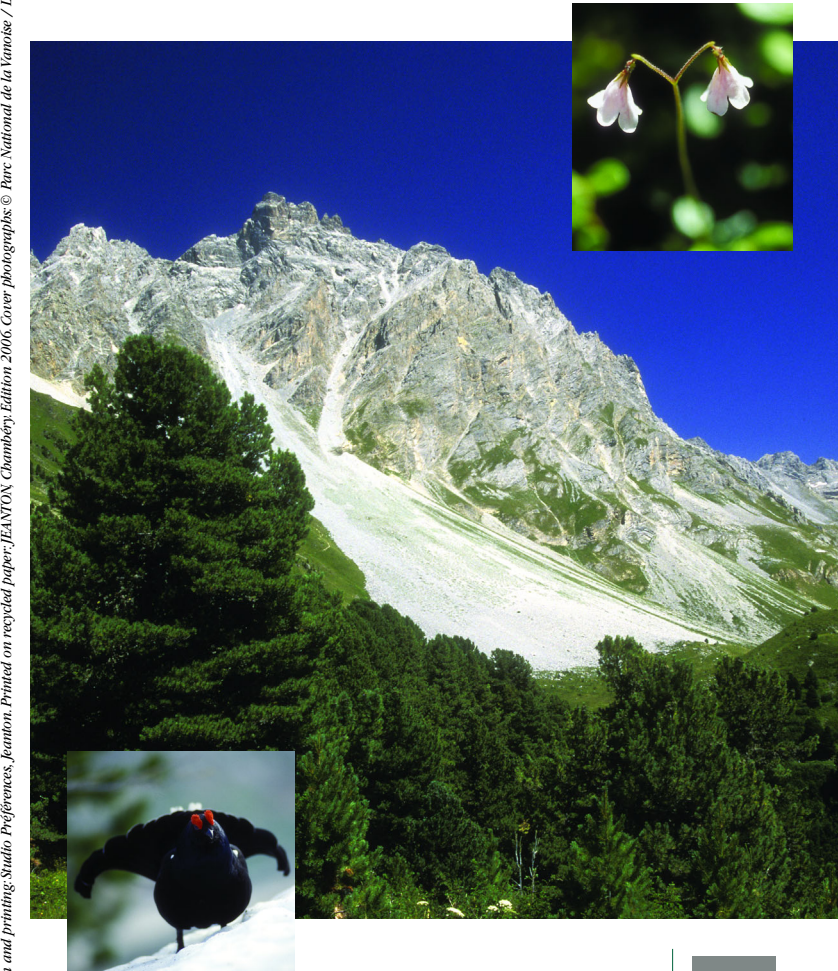
Finally, let us not forget what is most important: how you feel about the reserve is as important as the scientific knowledge of the reserve. So we would like the reserve to change how you feel about nature, and to let you see the wonder of it.



Hiker going towards the col de Chanrouge - © Parc National de la Vanoise / Ludovic Imberdis



Réserve Naturelle PLAN DE TUEDA



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MANAGED BY: Parc National de la Vanoise
135, rue du Docteur Julliard - BP 705
73007 Chambéry - France

Téléphone: + 33 (0)4 79 62 30 54
Fax: + 33 (0)4 79 96 37 18
Internet site: www.vanoise.com



Situation

The Plan de Tuéda Nature Reserve is in the commune of les Allues, at the western extremity of the Vanoise National Park, and covers an area of 1,112 hectares. It was established by Government decree on 12 July 1990.

A reserve for the Park

The reserve adjoins the National Park, and, in terms of natural habitats, it is complementary to the park. Most of the protected zone of the National Park is at altitudes of more than 2000 m, whereas a number of species and habitats do not go as high as this. The nature reserve specifically protects the Arolla Pine forest, the black grouse and the Twin Flower.



Twin Flower - © Parc National de la Vanoise / Michel Bouche

The habitats

The nature reserve starts at an altitude of 1650 m, rising to a maximum of 3153 m. It consists of a valley on two levels, separated by a 300 metre-high escarpment. The lower part, the Plan de Tuéda, is situated at 1700 metres, between wooded slopes of the Arolla Pine. The higher part, the Plateau du Fruit, is at between 2000 and 2100 m and consists of close-cropped rocky grassland overlooked by the high surrounding mountains - Aiguille du Fruit, Mont-Coua and Mont du Vallon. It ends in a glacial constriction leading up to the Saut.

This wide range of altitude permits a great diversity of habitats. The characteristic contrasts of mountain areas (altitude, aspect, nature of rock and soil) provide multiple conditions which result in a very diversified plant life.

Special features

It is especially the size (350 hectares) and characteristics of the Arolla Pine forest which justified setting up a reserve. In the past, the Arolla Pine (easily recognisable, with its bunches of five needles) was widespread in the Alps. As alpine pastures encroached down into the upper limit of the forest, and as the pinewood was used in cabinet making, so the forest gradually disappeared.

The forest also contains the largest French station of Twin

Flowers, a relic of the glacial periods, which exist in France in only five places, all of them in Savoie. This modest little plant is found on very mossy screes.

The black grouse is an example of an animal which receives only partial protection from the National Park. It lives essentially between 1400 and 2300 metres. It is a representative bird of the mosaics of habitats found on the edge of the forest. Its courtship displays are a really surprising sight. The numbers of this species are dwindling, owing to the abandonment of mountain agriculture (traditional methods of agriculture were favourable for it), and to the spread of ski-resorts.



Female black grouse - © Parc National de la Vanoise / Stéphane Mélé

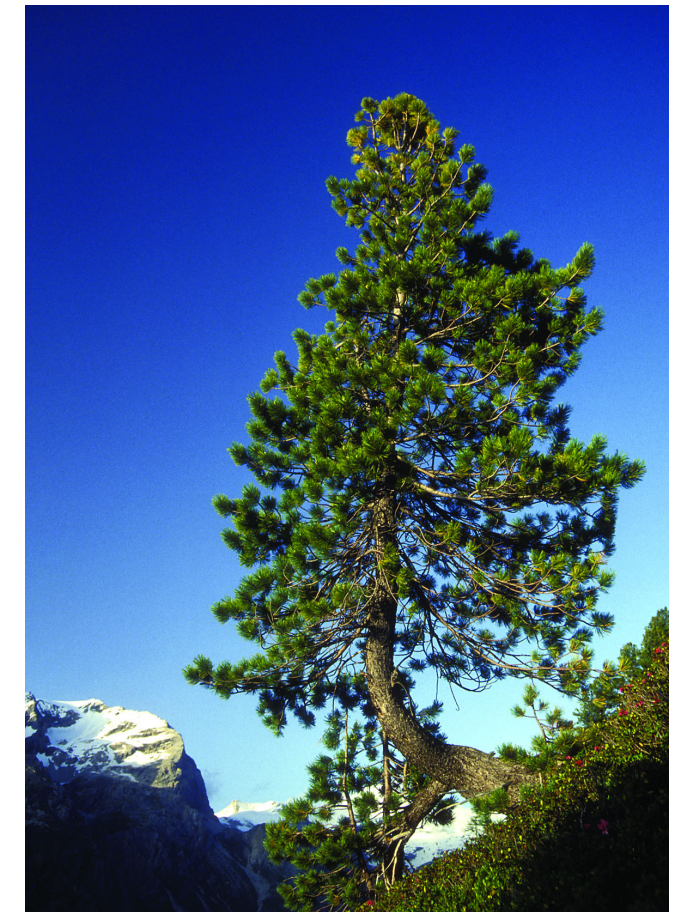
Off-piste skiing is not allowed in the reserve so as to avoid disturbing the animals. Winter is a critical time for wild animals, and the food available to the black grouse is extremely meagre, only sufficient to cover its basic metabolic requirements. The birds spend most of their time resting, to conserve energy, either on a branch or in an "igloo". Any disturbance results in energy expenditure, and exhausts the birds, making them less able to survive the winter. The ban also favours the growth of trees which otherwise have their tops cut off by passing skiers.

The marsh, which is near the entrance to the reserve, is another important element even if it is not immediately striking.

It is a relic of the way the Tuéda plateau used to function. It was a vast marshy plateau before the opening of a gravel quarry, resulting in a water-filled gravel pit which served to store the water of the Doron des Allues river when in spate.

A special relationship: Nutcracker and Arolla

Unlike most other conifers, the Arolla pine has indehiscent cones (i.e. they do not open at maturity), containing heavy, wingless grains. So it would have great difficulty regenerating away from the shade of the mother-plant without the help of animals (a phenomenon known as zoochory). It is mainly the



Arolla pine and Rustyleaved Alpenrose - © Parc National de la Vanoise / Philippe Benoit

