

composition and diversity of vegetation to be detected on an inter-annual basis and over the years. The processing of all the data in the long term will permit the adaptation of vegetation in these habitats to be assessed in the context of climatic change.

Study and monitoring of the production and diversity of fungus in experimental plots

An evaluation is made on the influence of climatic variables on the production or diversity of fungus carpophores in the forest habitats of Andorra close to an altitude of 2,000 metres.

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Climate Change and Biodiversity in the European Union Overseas Entities

Guilluame Prudent

Stretching from the Arctic to the South Pacific through the Atlantic, Amazonia, Antarctica and Indian Ocean, the 28 European Overseas Territories present both a remarkable and vulnerable biodiversity. Typically tropical islands, they are generally small in size with limited resources; they are often isolated and exposed to tropical cyclones and sea level rise.

These insular ecosystems are particularly rich, with significant endemism rates, but they are also extremely fragile and often highly deteriorated. Therefore, their resilience to new aggressions is limited. Furthermore, island economies strongly rely on the quality of their natural environment. Notably through tourism, fishing and subsistence farming, a degradation of their environment could deeply affect local communities. Mountain areas do not represent a significant proportion of these territories but some of them shelter unique and threatened biodiversity: sub-Alpine forests in French Polynesia (the only ones in the South Pacific region), high altitude rainforests and mountain forest on Reunion Island, laurel forests in Macaronesia, etc.

The range of environments, from polar to tropical, encompasses a wide range of exposure to climate change. Indeed, this project was the first attempt to capture the diversity of the seven Outermost Regions (OR) and 21 Overseas Countries and Territories (OCT) belonging to six European Union Member States.

The OR include: Guadeloupe and Martinique (France) in the Caribbean, French Guiana in South America and Reunion Island (France) in the Indian Ocean; the Azores, Madeira (Portugal) and the Canary Islands (Spain) in Macaronesia.

The OCT include: the Netherlands Antilles, Aruba (Netherlands), the Cayman Islands, the British Virgin Islands, Turks and Caicos, Bermuda, Anguilla and Montserrat (United Kingdom) in the Caribbean; Mayotte (France) and the Chagos Archipelago (United Kingdom) in the Indian Ocean; French Polynesia, New Caledonia, Wallis and Futuna (France) and Pitcairn (United Kingdom) in the south Pacific; Saint-Helena and dependencies (United Kingdom) in the south Atlantic; Greenland (Denmark), Saint-Pierre-and-Miquelon (France); the Falkland Islands (United Kingdom), the French Southern and Antarctic Territories (TAAF - France), South Georgia and the South Sandwich Islands (United Kingdom), and the British Antarctic Territory in the Polar Regions.

In 2007-2008, the International Union for the Conservation of Nature (IUCN) and the Observatoire National sur les Effets du Réchauffement Climatique (ONERC) prepared a report on the impacts of climate change in the European Overseas Entities. The territories were grouped into main regions: Caribbean, Macaronesia, Amazonia, South Atlantic, Indian Ocean, South Pacific and Polar Regions. The main characteristics and biodiversity of each OR and OCT were presented, as well as the key climate trends identified for these territories, the expected impacts and some ideas toward an adaptation process. An Editorial Board of 22 members was set up to help



Heard Coquille IPF. Photo: Guilluame Prudent.

Initiatives

the project team and authors to design and adjust the content and frame of the report, and more than 80 stakeholders and scientists reviewed the final work.

The resulting report was used as a background document for an international conference held at Reunion Island in July 2008. This conference was an official event of the French presidency of the European Union, aiming to raise awareness about climate change impacts in the European Overseas Territories and to develop a network to build a coordinate adaptive capacity for these territories.

The report "Climate Change and Biodiversity in the European Union Overseas Entities" is available online: www.iucn.org/about/union/secretariat/offices/europe/resources/?1209/

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Caribou of the Canadian Rockies: Understanding Environmental Change in the Context of Conservation and Evolution

Byron Weckworth

Global temperatures were increasing, massive sheets of ice at the higher latitudes were rapidly melting and receding, exposing tracts of bare soil that had lain covered for millennia. Ocean levels were rising, flooding and enveloping coastal terrestrial habitats. The Ice Age was coming to a close, and, during this period of dramatic climatic amelioration from a cold Earth to a warm one, the world's biodiversity was being shuffled about. Flora and fauna everywhere experienced the carnal influences of selection - either adapt to the changing climate, or perish.

In North America the last glacial maximum is known as the Wisconsinan. At its peak, two huge ice sheets, the Laurentide and Cordilleran, covered much of modern day Canada and the northern region of the contiguous United States. These massive glaciers effectively isolated the Beringian sub-continent and high arctic to the north from regions south of the ice. Wildlife populations that had been adjoining prior to glaciation became disjunct and isolated from one another, an evolutionary mechanism often leading to increased biodiversity. An icon of the northern latitudes, the caribou (*Rangifer tarandus*), provides the perfect example. To the north, caribou adapted to the barren-ground tundra habitats and are now recognised as the subspecies *R. t. groenlandicus*. These barren-ground caribou persist in large herds and have the behavioural propensity for long-distance seasonal migrations. South of the glacial ice, caribou adapted to a much different habitat type in the forests, and are recognised as the sub-species *R. t. caribou*. These woodland caribou tend to be more spatially distributed, have smaller herds, and are sedentary, in contrast to their barren-ground brethren. As the glaciers fully receded, this intra-species diversity provided an adaptive advantage that allowed caribou to expand and prevail across most of Canada, while still retaining the barren-ground and woodland distinctions. However, today, across a landscape



Mountain caribou bull. Photo: Mark Bradley.

that is now heavily impacted by humans, the woodland subspecies is formally classified as threatened. As conservation efforts mount, a better understanding of caribou diversity is necessary in order to enact effective management strategies.

Evaluating and understanding caribou diversity

In the Canadian Rockies, caribou diversity becomes further complex. In the province of Alberta, a region dominated by natural resource extraction activities, woodland caribou are split into mountain and boreal ecotypes, based loosely upon their distribution and behaviours. The imprecision of the ecotype designations and their threatened status produced an environment ripe with urgency for scientific research to help clarify and guide policy and management directives. To that end, in early 2007 an interdisciplinary and multi-institution collective initiated the Canadian Rockies Woodland Caribou Project (CRWCP) to broadly determine causes for decline in woodland caribou of Alberta and British Columbia, with emphasis on declining populations in the Canadian Rockies. After only the first two years of the project, the CRWCP's first scientific publication (McDevitt et al. 2009) uncovered some amazing and unexpected results, the foremost of which is revealing a "hybrid swarm" of caribou in the Canadian Rockies of Alberta and British Columbia.

Caribou biologists had previously noted that some caribou in the Canadian Rockies had distinct summer and winter ranges. The spatial isolation of these ranges suggested some behavioural form of seasonal migration, a trait akin to barren-ground caribou, not the woodland subspecies. Through