# Biodiversity as Patient: Diagnoses and Treatment

Wilhere (2008) wrote a thought-provoking essay addressing what he calls the "how-much-is-enough myth." The author correctly points out that scientists should clearly distinguish statements based on scientific data from ethical judgments when reporting their research. It is equally important to avoid hiding behind scientific work to promote personal opinions. Many researchers are indeed reluctant to admit that at least some steps in their scientific procedures require subjective decisions, and Wilhere argues that this reluctance is especially problematic when research aims to determine the amount of habitat that should be protected to achieve specific conservation goals.

We submit that this question (How much is enough?) should be addressed in 3 distinct steps. First, society and policy makers may identify a conservation problem and state desired goals (e.g., ensure the viability of populations of species X, Y, Z). These goals must then be translated into specific, quantitative targets to be efficiently addressed in conservation planning. In the second step, quantitative and predictive research should play a central role. Assuming species exhibit clear limits in their tolerance to the degree of habitat loss, degradation, or fragmentation, conservation targets should be developed in reference to these limits. In this case, habitat amount or loss can be expressed in terms of the quantity of habitat in the landscape or the relative abundance of (a) critical resource(s). Then the shape of a species' response to gradients in availability of critical resources (Bütler et al. 2004; Snäll et al. 2004; Poulin et al. 2008) or in the richness of a species assemblage as a function of the amount of habitat amount (Radford et al. 2004) can be used to identify tolerance limits and to inform target setting. The key point is that the tolerance of species to alteration of their habitat is independent of any social, political, or economic agenda. By definition these thresholds or limits are critical values that should be respected if the focal species or assemblage is to be maintained. This is not to say that conservation targets should be set precisely at these limits: a safe margin should always be maintained, away from critical, threshold levels indicated by empirical response curves. Here comes the third step: define targets inspired from the best scientific evidence available. This step clearly involves socioeconomic trade-offs.

The main difference between our view and Wilhere's is in the extent to which we expect conservation biologists to integrate economic dimensions in the assessment of risk levels. Conservation ambition (i.e., the cost society is willing to bear to achieve conservation goals) varies tremendously between countries, locations (e.g., inside or outside protected areas), and through time. The researcher's duty should be to provide the best possible scientific evidence for making sound decisions (Wiens 1997; Sutherland et al. 2004; Villard & Nudds 2006), and this research should be designed to be applicable as broadly as possible. As suggested by Wilhere (2008), cost–benefit analyses may reveal important trade-offs between risk reduction and cost to society. Nevertheless, such analyses should remain within the realm of decision making. Doing otherwise would expose conservation biologists to pressure from various stakeholders and run the risk of biasing their conclusions.

As is medicine, conservation biology is a value-laden discipline (Groom et al. 2006), and as a physician must strive to find the best cure to save a patient, the first task of conservation biologists should be to find the best possible solution to biological or ecological aspects of conservation problems, leaving cost–benefit analyses outside the equation. It is a joint failure of both society and conservation when the best available cure is not given to the patient.

**Marc-André Villard*** **and Bengt Gunnar Jonsson†**

*Chaire de recherche du Canada en conservation des paysages, Université de Moncton, Moncton, NB E1A 3E9, Canada, email marc-andre.villard@umoncton.ca

†Department of Natural Sciences, Engineering and Mathematics, Mid Sweden University, Sundsvall S-85170, Sweden

## Literature Cited

Bütler, R., P. Angelstam, and R. Schlaepfer. 2004. Quantitative snag targets for the three-toed woodpecker *Picoides tridactylus*. Ecological Bulletins **51:**219–232.

Groom, M. J., G. K. Meffe, and C. R. Carroll. 2006. Principles of conservation biology. Sinauer Associates, Sunderland, Massachusetts.

Poulin, J.-F., M.-A. Villard, M. Edman, P. J. Goulet, and A.-M. Eriksson. 2008. Thresholds in nesting habitat requirements of an old forest specialist, the Brown Creeper (*Certhia americana*), as conservation



*Conservation Biology*, Volume **, No. *, ***–***

DOI: 10.1111/j.1523-1739.2008.01140.x

targets. Biological Conservation **141:**1129–1137.

Radford, J., A. F. Bennett, and G. J. Cheers. 2004. Landscape-level thresholds of habitat cover for woodland-dependent birds. Biological Conservation **124:**317–337.

Snäll, T., A. Hagström, J. Rudolphi, and H. Rydin. 2004. Distribution pattern of the epiphyte *Neckera pennata* on three spatial scales—importance of past landscape structure, connectivity and local conditions. Ecography **27:**757–766.

Sutherland, W. J., A. S. Pullin, P. M. Dolman, and T. M. Knight. 2004. The need for evidence-based conservation. Trends in Ecology & Evolution **19:**305–308.

Villard, M.-A., and T. Nudds. 2006. Scientific advocacy: confronting the oxymoron. Avian Conservation and Ecology **1:** http://www.ace-eco.org/vol1/iss2/art5. (accessed 24 September 2008).

Wiens, J. A. 1997. Scientific responsibility and responsible ecology. Conservation Ecology **1:** http://www.consecol.org/vol1/iss1/art16/. (accessed 24 September 2008).

Wilhere, G. F. 2008. The how-much-is-enough myth. Conservation Biology **22:**514–517.