



Sartorius, Shawn <shawn_sartorius@fws.gov>

Inman argument to include Great Lakes and Northeast in wolverine range

Aubry, Keith -FS <kaubry@fs.fed.us>

Thu, Dec 5, 2013 at 2:52 PM

To: "Sartorius, Shawn" <shawn_sartorius@fws.gov>

Cc: "McKelvey, Kevin -FS" <kmckelvey@fs.fed.us>

Hi Shawn,

Kevin and I have read the highlighted material in the review comments by Dr. Inman that you forwarded to us and, in particular, his claims that our logic was circular in concluding that the Great Lakes and Northeast do not represent wolverine habitat. I found it very difficult to respond to Dr. Inman's comments, however, because he made several erroneous assumptions and assertions at the outset which make such counter-arguments moot.

First of all, it is inaccurate to claim that we "...conclud[ed] that the Great Lakes and Northeast do not represent wolverine habitat". We reached no such conclusions. There is no clear empirical basis for determining whether or not wolverines occurred in the Northeast historically – due to the sparseness of the historical record, that's a matter of interpretation and professional judgment. As we explained in column 2 on p. 2154, there are historical records in the Great Lakes region and Eastern U.S. (and I would argue that there is a relatively strong historical record from the Great Lakes, the vast majority of which were collected in the 1800s). The snow-cover layer does not account for the distribution of those records but, as we explained in the paper, the snow-cover layer is recent (late 1900s), whereas historical records from the Great Lakes date back to the early 1800s, when climatic conditions were substantially colder than they are now at mid-latitudes in the interior of the continent (Jacoby and D'Arrigo 1989). Bill Krohn has also shown historical shifts in marten and fisher distributions in the Northeast during the last 300 years that likely resulted from climatic fluctuations (Krohn 2012). In our paper, we offered some additional perspectives and interpretations, and then concluded: "Thus, available evidence suggests that wolverine records from the northeastern United States probably represent dispersals from populations in other regions. Whether wolverines occurred in that region prior to European settlement is unknown". For the Great Lakes, we concluded: "Thus, as de Vos (1964) suggested, the Great Lakes region probably represented the southern extent of wolverine distribution in eastern North America prior to European settlement". We believe that both of these statements were well supported by the information we presented in our paper, and we stand by them.

Secondly, Dr. Inman claims: "This paper goes beyond assembling the historical, recent, and current records, and attempts to establish a broadscale habitat relationship that explains wolverine distribution and therefore the limits to its potential range. This was done to try and help distinguish wolverine population centers from extra-limital or dispersal-related records, and to identify a climate-related environmental variable that could predict the limits to wolverine distribution". Both of the assumptions in the second sentence are false; as we stated in column 1 on p. 2149 in the Methods section, our objective for overlaying historical occurrence records on broad-scale habitat layers was "To identify potentially important habitat relations...". Contrary to Dr. Inman's claim, our objective was not to "help distinguish wolverine population centers from extra-limital or dispersal related records." Nowhere in the paper do we make such a claim – rather, we used the best and most reliable data set of historical occurrence records that we could compile and then overlaid ALL resulting occurrence records on various habitat layers, not just the records we thought represented some sort of wolverine "population center". Second, it is

inappropriate to suggest that the goal of our analyses was “to identify a climate-related environmental variable that could predict the limits to wolverine distribution”. Contrary to this claim, we had no such agenda; rather, we examined a set of 4 environmental variables that included a vegetation variable, a life-zone variable, a topographic variable, and a snow-cover variable (note that only 1 of the 4 habitat layers is a direct measure of climatic conditions), each of which was chosen solely because there was an empirical basis for hypothesizing a potential relationship with wolverines. The habitat layer that best explained the distribution of our historical occurrence records was the snow-cover layer.

Thus, there was nothing circular in the logic we applied—on the contrary, we let the data speak for themselves and interpreted our results in accordance with our findings, including the areas where the snow-cover layer did not explain the distribution of historical occurrence records. I.e., it would have been inappropriate (and illogical) to assume that the snow-cover layer works well to explain historical occurrence records in the Western mountains and Great Plains, but not in the Great Lakes and Northeast. For the Northeast, we acknowledged that we will never know with certainty if wolverines occurred there historically, due to the sparseness of the historical record. For the Great Lakes region, however, where data were more substantial, we looked for an historical or environmental basis to explain these discrepancies, and provided what we consider to be a compelling argument that wolverines occurred in the Great Lakes region historically, but do not occur there currently, due to climatic warming that occurred during the 1900s and affected the region across broad spatial scales due to its relatively flat topographic relief. In addition, historical and current evidence of wolverine distribution in Ontario supports that hypothesis (Dawson et al. 2000).

We hope these comments are helpful.

Best regards,

Keith Aubry and Kevin McKelvey

Dawson, N. 2000. Report on the status of the wolverine (*Gulo gulo*) in Ontario. Species status report for the Committee on the Status of Species at Risk in Ontario (COSSARO). Ontario Ministry of Natural Resources, Thunder Bay, Canada.

Jacoby, G.C., Jr. and R. D'Arrigo. 1989. Reconstructed northern hemisphere annual temperature since 1671 based on high-latitude tree-ring data from North America. *Climatic Change* 14: 39-59.

Krohn, W.B. 2012. Distribution changes of American martens and fishers in eastern North America, 1699-2001. Pages 58-73 *in* Biology and conservation of martens, sables, and fishers: a new synthesis. K.B. Aubry, W.J. Zielinski, M.G. Raphael, G. Proulx, and S.W. Buskirk, editors. Cornell University Press, Ithaca, New York, USA.

.....
Keith B. Aubry, Ph.D.

Research Wildlife Biologist

USDA Forest Service

Pacific Northwest Research Station

3625 93rd Ave. SW

Olympia, WA 98512

e-mail: kaubry@fs.fed.us

Phone/voicemail: (360) 753-7685

FAX: (360) 753-7737

.....

From: Sartorius, Shawn [mailto:shawn_sartorius@fws.gov]

Sent: Wednesday, December 04, 2013 1:06 PM

To: Aubry, Keith -FS

Cc: Squires, John -FS; McKelvey, Kevin -FS

Subject: Inman argument to include Great Lakes and Northeast in wolverine range

Hi Keith,

I wanted to get your opinion on the issue that Bob Inman brought up regarding the alleged circular logic employed in concluding that the GL and NE do not represent wolverine habitat. On one hand, it's tough to argue against the position that they *might* be or have been suitable. On the other hand, we are required to make determinations based on the science at hand. My interpretation is still that the available evidence (as a whole, habitat and historic record) suggest that the GL and NE were more likely to host occasional dispersing wolverines rather than viable populations. I don't think any of the arguments Bob makes here changes that assessment, but I wanted to see what your thoughts are before I make any conclusions. Please see attached highlighted section:

—

Shawn Sartorius, Ph.D.

Listing and Recovery Biologist

Montana Ecological Services Office

585 Shepard Way, Suite 1

Helena Montana 59601

(406) 449-5225 x208

This electronic message contains information generated by the USDA solely for the intended recipients. Any unauthorized interception of this message or the use or disclosure of the information it contains may violate the law and subject the violator to civil or criminal penalties. If you believe you have received this message in error, please notify the sender and delete the email immediately.