

From: [Shoemaker, Justin](#)
To: [Bush, Jodi](#)
Cc: [Grizzle, Betty](#); [Stephen Torbit](#); [John Guinotte](#)
Subject: Re: Updated Genetics Option Paper
Date: Thursday, June 15, 2017 6:43:29 AM
Attachments: [Talking Points for Wolverine Genetic Discussion2_BJGedits_JMSedits2.docx](#)

Another draft attached addressing Jodi's comments.

Justin Shoemaker
Classification Biologist
U.S. Fish and Wildlife Service, Region 6
Phone: 309-757-5800 x214
Email: justin_shoemaker@fws.gov

On Wed, Jun 14, 2017 at 3:48 PM, Bush, Jodi <jodi_bush@fws.gov> wrote:

Couple of things...

Can we be clearer that the bullets below Microsatellite analysis are options and that we don't have to do all 4 (we don't right?)

Same with second large bullet about conducting an independent review.

DPS. Can we start by restating briefly about what we said previously in FR and then go into how new information may show something different....? And we are saying that the genetic work discussed previously in the document could shed further light on this question right? I think we need to say that clearer.

thats it. JB

Jodi L. Bush
Office Supervisor
Montana State Ecological Services Office
585 Shepard Way, Suite 1
Helena, MT 59601
(406) 449-5225, ext.205

On Wed, Jun 14, 2017 at 2:24 PM, Shoemaker, Justin <justin_shoemaker@fws.gov> wrote:

I added my review to Betty's version and renamed it. See attached.

Are we planning to use this tomorrow? If so I think Mike needs to see it first.

Justin Shoemaker
Classification Biologist
U.S. Fish and Wildlife Service, Region 6
Phone: 309-757-5800 x214
Email: justin_shoemaker@fws.gov

On Wed, Jun 14, 2017 at 2:57 PM, Grizzle, Betty <betty_grizzle@fws.gov> wrote:

See my edits and one comment (attached with new file name).

On Wed, Jun 14, 2017 at 12:22 PM, Stephen Torbit <Stephen_Torbit@fws.gov> wrote:

Here is a slightly updated version of genetics option paper. Please review.

ST

Stephen C. Torbit

Assistant Regional Director

Science Applications

U.S. Fish and Wildlife Service

134 Union Blvd.

Lakewood, Colorado 80228

303-236-4602 – Office

720-626-7504 – Cell

--

Betty J. Grizzle, D.Env.
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
2177 Salk Ave, Suite 250
Carlsbad, CA 92008
760-431-9440, ext. 215
760-431-5901 fax

Talking Points – Funding Request for Wolverine Genetic Analyses

Background

In the U.S. District Court decision (April 4, 2016), the court ~~remanded~~ ~~vacated~~ our withdrawal of the wolverine proposed rule for further consideration based on two primary issues: 1) ignoring best available science in dismissing the threat to wolverine from climate change and 2) ignoring best available science by dismissing the **threat to wolverine from genetic isolation and small population size**. Specifically, the court said that, in our 2014 withdrawal, we failed to articulate how our statements regarding the following did not constitute adverse effects to wolverine:

- Apparent loss of connectivity between Rocky Mountains and Canada prevented influx of genetic material needed to maintain or increase the genetic diversity in contiguous U.S.
- Effective population size is too low to support the subpopulations in contiguous U.S.
- Genetic drift has already occurred in subpopulations in contiguous U.S. as compared to Canada, and a continued loss of genetic diversity may lead to inbreeding depression and inability of wolverines in contiguous U.S. to persist

Thus, we need to evaluate our statements that there is “good evidence” that genetic diversity is lower in wolverines in the contiguous U.S. as compared to Canada and Alaska. We also need to determine whether there is a threat for inbreeding depression based on small population ~~size~~. The following talking points provide potential pathways for addressing the court’s remand.

Microsatellite analysis options

- **Option 1** - Provide funding to USFS genomics lab (Missoula) to prepare mitochondrial DNA and microsatellite loci analyses using existing samples provided to this lab (by western States) to examine current genetic structure of wolverines in contiguous U.S. Costs are estimated at \$60,000 based approximately 300 samples collected already submitted, at \$200/sample. ~~However, if only microsatellite loci analyses is conducted, which is the approach needed to evaluate population genetics, the total costs will only be reduced by about \$500. decline slightly reducing the overall cost by approximately \$500.~~
- **Option 2** - Provide funding to ~~an~~ independent lab (e.g., Wildlife Genetics International (WGI), British Columbia) for this analysis. This will require that the USFS lab release ~~the~~ collected samples. WGI has previously run genetic analyses for wolverines. However, because the USFS has already processed these samples, ~~the quality of the DNA for a secondary extraction these samples~~ will likely be degraded ~~in quality~~ and therefore may not provide useful results.
- **Option 3** - Provide funding to FWS Conservation Genetics Laboratory in Alaska. This would also require that samples be retrieved from USFS lab. Cost estimated at \$100/sample and several months (estimate) to complete. However, the costs may, in the long run, be similar to USFS as they have not previously run any genetic testing for wolverine and therefore would require several weeks of lead time and acquisition of materials.
- **Option 4** - Provide funding to an independent genetics group, assess current wolverine genetic data and publications and provide FWS with an overview of the state of knowledge and a critical assessment of wolverine genetics. -No outreach has occurred for this option, therefore no cost estimate can be provided at this time. -We are still assessing potential reviewers for this option.

If the microsatellite analysis is funded, options to conduct independent review of USFS results

- Option 1 - Provide funding to FWS Alaska lab to obtain from the USFS lab approximately 20 samples and analyze this subsample to verify USFS lab results. Cost likely to be \$100/sample.
- Option 2 - Provide funding to independent lab (e.g., WGI, who have analyzed 1000s of wolverine samples) to prepare a review and interpretation of the results of the USFS analysis to assess current genetic structure of populations of wolverines across North America (not just the contiguous U.S.) using results from other studies, including data obtained from wolverine specimens in Alaska and Canada.

Effective population size analysis (if funds available)

- Provide funding for independent assessment of minimum viable population size following methods from Koskela (Finland) using results from USFS lab.

DPS

We previously argued for discreteness of the contiguous United States wolverine population based on the international border and differences in conservation status in Canada and the United States. The following is from our analysis of discreteness under our DPS policy in the 2010 12-month finding, also relied upon in the 2013 proposed rule: "The international boundary between Canada and the United States currently leads to division of the control of exploitation and conservation status of the wolverine. This division is significant because it allows for potential extirpation of the species within the contiguous United States through loss of small populations and lack of demographic and genetic connectivity of the two populations." We did not rely on marked genetic differences in our determination of significance for the DPS in the 2010 finding and 2013 proposed rule; significance of the wolverine in the contiguous United States was based on a significant gap in the range argument.

Formatted: Underline

Formatted: Underline

Preliminary interpretation by the FWS Alaska lab of recent genetic studies indicate that wolverines in the contiguous U.S. are likely decedents of wolverines that migrated from Canada years ago to repopulate the area after persecution of predators ceased. As such, wolverine populations in the contiguous U.S. may not represent a distinct genetic structure (no unique alleles) as it may apply to discreteness in our DPS policy. Genetically speaking, recent studies also show nothing significant in the contiguous U.S., as it may apply to the DPS policy.

Additional knowledge gained through a more thorough and complete comparison of the genetic structure of wolverine population in the contiguous U.S. as well as Alaska and Canada would provide a more legally and scientifically robust basis on which to base our DPS determination.

Commented [BJG1]: Having a little trouble understanding the intent here. Is this referring to studies published by Zigoridis et al. or COSEWIC or something else?