

From: [Grizzle, Betty](#)
To: [Bush, Jodi](#)
Subject: Re: Research Questions and References
Date: Monday, June 12, 2017 9:53:57 AM

Not what I expected.

On Mon, Jun 12, 2017 at 8:34 AM, Bush, Jodi <jodi_bush@fws.gov> wrote:

So I dont see how this is helpful. He just summarized what other studies said. I was hoping for their own interpretation of the data... What do you think? 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 Mon, Jun 12, 2017 at 8:47 AM, Grizzle, Betty <betty_grizzle@fws.gov> wrote:

Follow-up from Jeff Olsen (AK)...

----- Forwarded message -----

From: **Olsen, Jeffrey** <jeffrey_olsen@fws.gov>
Date: Mon, Jun 5, 2017 at 2:47 PM
Subject: Re: Research Questions and References
To: "Grizzle, Betty" <betty_grizzle@fws.gov>
Cc: John Wenburg <john_wenburg@fws.gov>

Hi Betty,

I've attached a review summary of four studies that provide insight into the phylogenetics and population genetics of wolverine in the contiguous US. In my opinion, it is not clear from these studies that there is evidence for a contiguous US DPS based on the genetic data alone.

Jeff

On Wed, May 3, 2017 at 1:00 PM, Grizzle, Betty <betty_grizzle@fws.gov> wrote:

Hi John and Jeff - I put together a list of questions (see below) to give you a better idea of what we are trying to sort through for North American wolverines, which includes addressing DPS criteria.

I am also attaching selected published references --- some are relatively recent (e.g., 2014, McKelvey et al.), some are not so recent (two papers by Kyle and Strobeck), and some are in-between --- that have evaluated genetic diversity of wolverines in North America. [There are similar studies from Russia and Scandinavia] I also have a master's thesis (Frances 2008) and a PhD dissertation (Zigouris 2014). Let me know if you are interested in those.

Thank you for your time, and please let me know your thoughts as to how we can move forward.

(1a) Do genetic studies indicate that there is a loss of connectivity between wolverines in the northern Rocky Mountains (or the Cascades region) and Canada?

(1b) Relatedly, how does immigration of wolverines from Canada influence the genetic diversity of wolverines in the contiguous United States?

(2a) Based on the genetic information you have, does the contiguous U.S. population of wolverines exhibit a reduction in genetic diversity?

(2b) Relatedly, is there evidence of genetic drift in wolverines in the contiguous US population? What might this mean to long term persistence of wolverines in the US?

(2c) If either (2a) or (2b) are true, have there been consequences to breeding, reproduction, or fitness of wolverine populations in the contiguous US?

(3) What is the "effective population size" of wolverines in contiguous United States, AND across it's entire North American range?

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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

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Jeffrey B Olsen
Conservation Genetics Laboratory
U.S. Fish and Wildlife Service
1011 East Tudor Road
Anchorage, Alaska 99503
mail stop 331

ph 907.786.3598
fax 907.786.3978
jeffrey_olsen@fws.gov
<http://alaska.fws.gov/fisheries/genetics/index.htm>
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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

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