

From: [Turner, Ed](#)
To: [Guinotte, John](#)
Cc: [Betty Grizzle](#)
Subject: Re: usfs nrfs
Date: Thursday, February 16, 2017 5:08:16 PM
Attachments: [Models_CFWO_Snow_PH_Run_with_Habitat.pdf](#)
[NICKs_fr_wolverine_distribution_HIRES.pdf](#)
[Range_DPS_explain_model.pdf](#)
[Looks like Nick did this.docx](#)

I think you may be talking about Nick and Shawn's DPS Geographic range that we considered "Prior".

I had some of Nick's working data, but not all, so I had to try and put it together and try and understand his process. Since then, we spoke with Nick over at Boise BLM and he said he has final data and that I had working data. He said he'd get back to me about the process, but I went ahead and followed his model concept and ran everything as polygon operations. I questioned him on how he picked up some areas that I did not in his run and I assume that was because he reclassified the original grid cells up to 1000x1000, thus making the patch area cover larger.

I ran everything based on the original grids and told him I did it all in polygon processes. He then told me he thought they ended up doing that in the end, but he would get back to me with his process.

I'll try to get this all organized and maybe Betty will be back Friday before I send it. That way I can make sure you're getting the right stuff.

Here are maps of what he had and what I had.

The one map shows Nick's Prior Range (DPS) and the habitat I came up with and the Range that I came up with. We both built habitat based on Snow between 2000-2007 that was at least 1-7 for cover. If a grid cell had a Zero (0) it was no snow, used the Inman primary habitat, and the Inman Female Dispersal.

I'll send my notes.

The next map is the one that Nick had in his folders representing the modeled habitat and the range based on a 20 km extend (buffer) on the grid. Again he said he used poly process in the end, so this may not be the final of what he had.

Hope this is not too confusing.

I have everything in gdb's and will need to zip and send in a few emails, most likely.

Have to do some Sect. 6 parcel work right now, but will get this out to you tonight or Friday morning.

Have a good evening,

Ed

On Thu, Feb 16, 2017 at 3:08 PM, Guinotte, John <john_guinotte@fws.gov> wrote:

Thanks Ed, No hurry on this as I won't be able to look at it until Tues of next week, but if you get a chance could you send me your working files you came up with for current and historic range boundaries. Betty showed me a few of these on the hard copy maps and I'd like to be able to pull them into GIS.

Best, John

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On Thu, Feb 16, 2017 at 3:02 PM, Turner, Ed <ed_turner@fws.gov> wrote:

Sounds good. Should be here the entire day.

Thanks, Ed

On Thu, Feb 16, 2017 at 1:58 PM, Guinotte, John <john_guinotte@fws.gov> wrote:

Thanks Ed,

Are you around on Tuesday of next week to do a 3 way call with Betty? Would be about finalizing the current US range map. Looks like you've made a lot of progress on this.

Best, John

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On Thu, Feb 16, 2017 at 12:34 PM, Turner, Ed <ed_turner@fws.gov> wrote:

Hi John, This is the complete file as we received it, with just my den code and the link, source, year stuff I put in.

Hope this helps, Ed

On Thu, Feb 16, 2017 at 11:29 AM, Guinotte, John <john_guinotte@fws.gov> wrote:
Hi Ed, One more request. Can you send me the shapefile for the usfs obs? The ones that went through some kind of QA/QC according to Betty.

Thanks John

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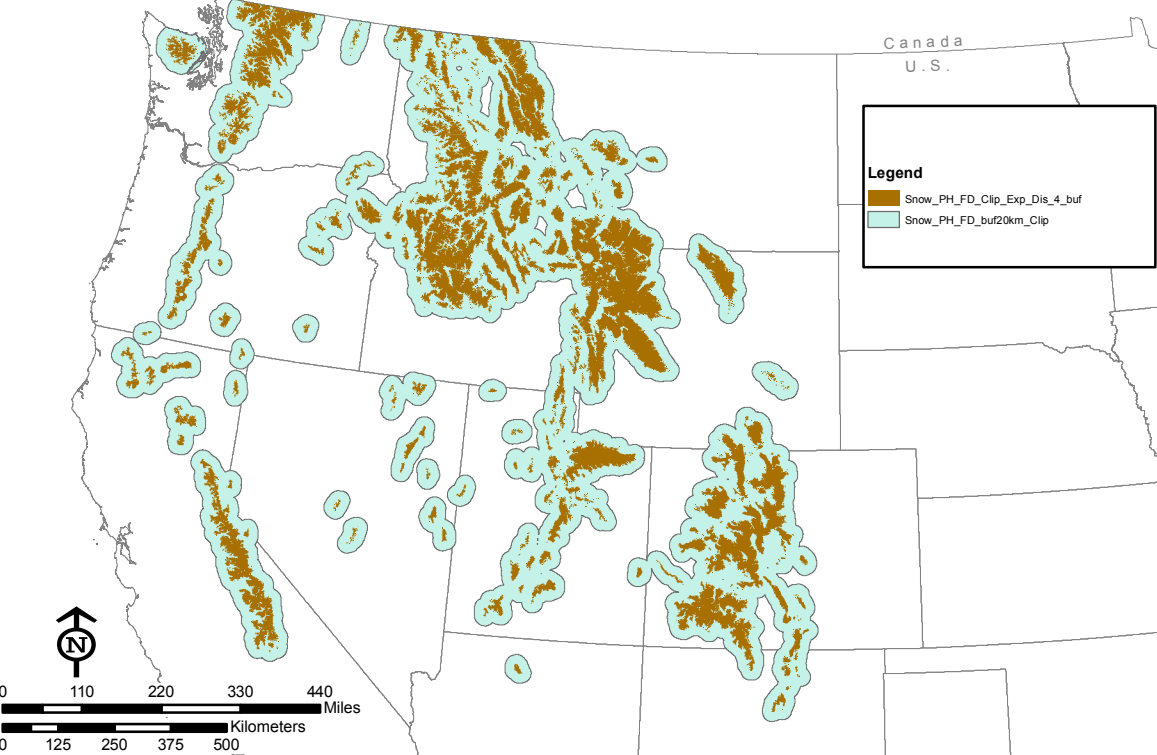
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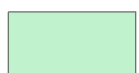
Sources: USGS, ESRI, TANA, AND



States



Modeled wolverine habitat



Wolverine DPS geographic range



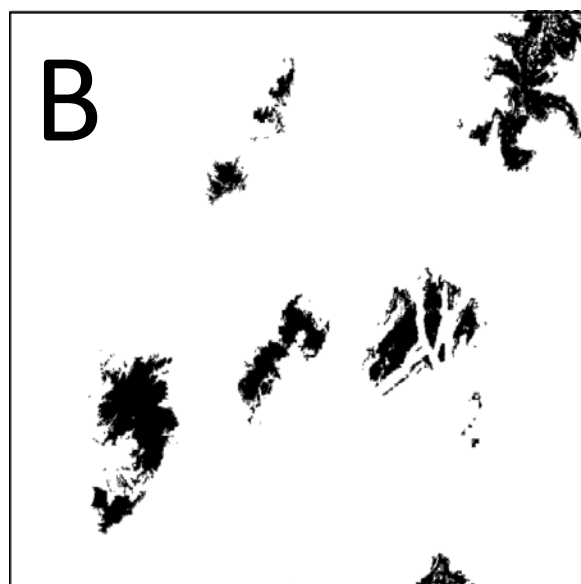
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Miles

0 200 400
Kilometers

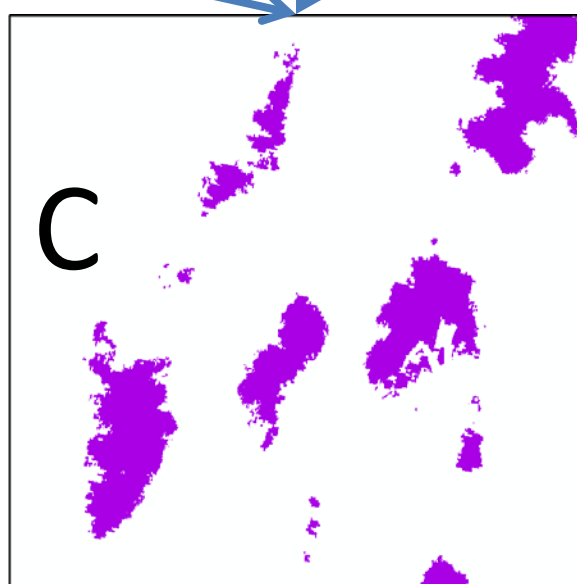
Late spring snow in ≥ 1 year of those surveyed



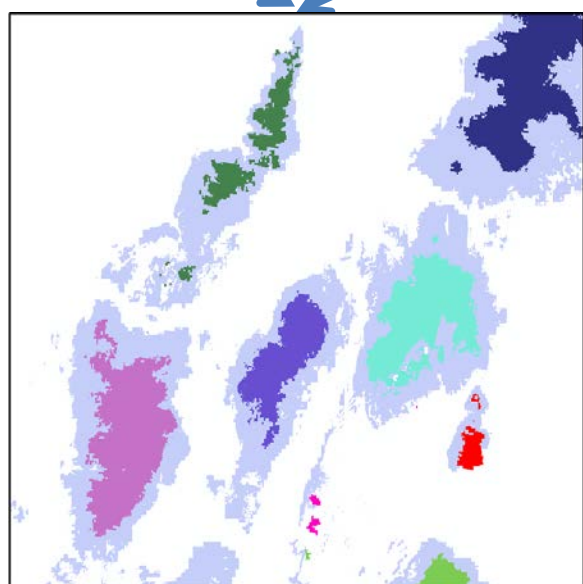
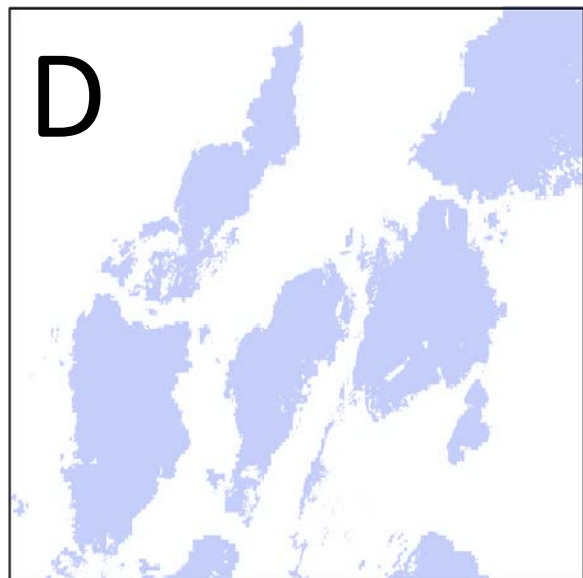
Primary Wolverine Habitat (WCS)



Combined

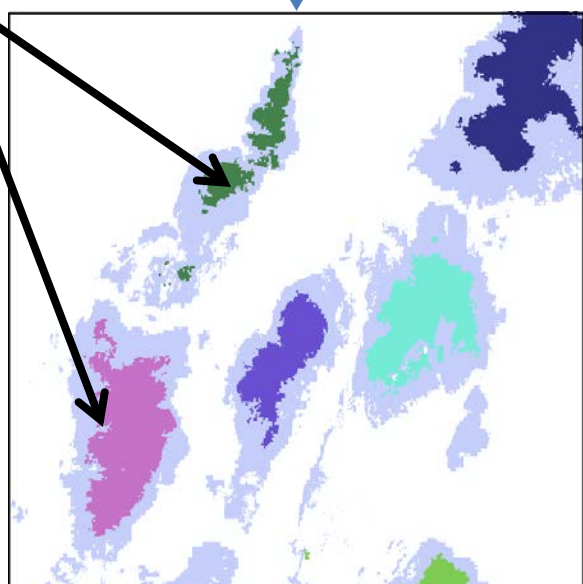


Female Dispersal layer (WCS)



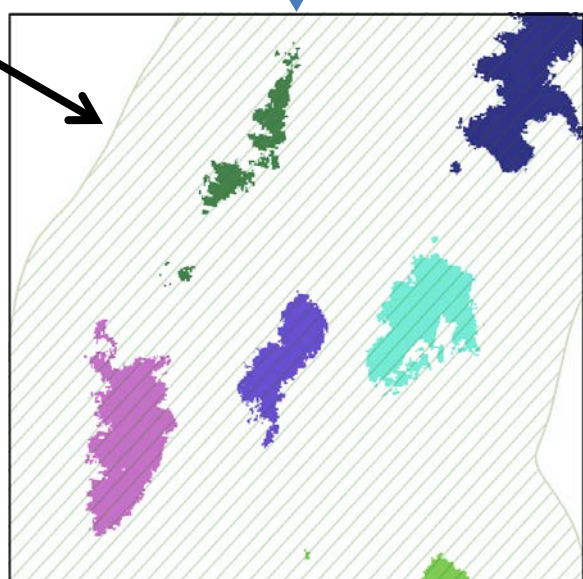
Overlay 'C' with 'D'.
Group C by contiguous areas of 'D'.
Each color represents a joined area of habitat.
e.g. the dark green areas show areas of 'C' that are connected by the same female dispersal polygon, even though they do not touch each other

Modeled Habitat



Discard all joined habitat ('E') with a total area $< 100 \text{ km}^2$.
e.g. the dark green area is made up of individual polygons $< 100 \text{ km}^2$, however since they are connected into the same habitat group by the female dispersal layer (and so are the same color) and the total area is $> 100 \text{ km}^2$ they are kept.
e.g. the red area shows multiple polygons joined by the female dispersal layer. Because the total area of joined habitat (red) is $< 100 \text{ km}^2$ they are discarded.

Geographic Range



Buffer modeled habitat by 20km and smooth output to create the geographic range

Looks like Nick did this: ****Nick will be looking at this soon and will get the complete process to me ****

1. Took all cells from Copeland snow data 2000-2006 where grid values were 1 or larger (did not keep nodata = 0) and extracted those to new Raster. I found a few versions of this that vary in cell size and projection. There are two raster sets, Snow and a PH that both have 500x500 cells, but different projections. Nick's output raster used for remaining process data has 1000x1000 cells, thus his "out_1k" raster name.
2. Took the grid of Inman PH model combined that with the Snow and looks like combined that with Female Dispersal (FD) (I did not have a grid for this so I don't know the size I can measure in ArcMap if needed).
3. Combined all and looks like he clipped it to the US border.
4. All data regardless if Snow, PH was a grid core 1, but he still had to retrain FD unique contiguous area ID or Grid value. This would allow calculations of area to determine if patch meets > 100km² limits to keep and push forward to the "Out_1k" raster product.
5. Next looks like he, used Expand on Out_1k to give a buffer area of 20 units, which would equal 20km, as his raster cell is 1000x1000.
6. Next looks like he converted raster to polygon retaining cell edge.
7. I assumed he used edit function to run a smooth on the output polygon data from the Out_1k raster and based on his filename I assume he used a 20 input for Maximum allowable offset, **but that never worked for me. I never received the same shapes.**
8. Next, it looks like he took his smooth 20 product and clipped it to the USA boundary and then ran a smooth at 50 units. **Again, that never worked for me. I never received the same shapes.**
9. After all that it looks like he removed some of those Oregon, Washington, Nevada, etc. polygons that would not seem like wolverine areas. Betty has Shawn's email that explains which DPS polygons to drop.

Note: I only attempted step # 6, 7, & 8, assuming I was using the right stuff. I have Nick's out_1k_expand20 raster, so I could quickly test out to a poly data, and then try the smooth's.

I did not try the raster "Merge", or possibly take to command line GRID and run stacks, but to do so I first have to get the snow and PH raster's in the same projection and raster form as one is an Unsigned and the other is signed and I'm having difficulties combining those. The other issue is that I only have the FD as a polygon set from Nick's folders and I would need to convert that to a raster or grid and must match the other raster's for it to work.

CFWO RUN

We chose to just take the Bob Inman models data (PH, FD) and the Copeland Snow as 2000-2007 blended from Nick's folder and run all that as polygons.

Here is what I have to work with in polys:

1. Took Inman's PH and FD data from Nick's "Inman" folder and projected to Wolverine range-wide Alb projection.
2. Took Copeland's Snow 2000-2006 as one class from Nick's "Snow" folder and projected to Wolverine range-wide Alb projection.
3. Unioned the Snow and PH
4. Coded Snow or PH as value = 1
5. Dissolved the data on value = 1
6. Unioned the Snow/PH with the FD
7. Clip product by USA to limit size
8. Selected only Snow/PH code = 1
9. Dissolved product by FD code and Snow/PH code (this will group all patches by the FD area on which they reside) *** Some areas of Snow/PH that will meet the > 100km² size requirements will fall outside of FD areas. To match closer to what Nick did, we too will look at these non-FD areas and use the size limitations.
10. Select only FD = 0 and run explode. (FD = 0 are areas of Snow/PH that fall outside of the FD areas. (Because all those patches area grouped as Fd = 0, those must be exploded into unique patches to use the size limits).
11. Calculate Hectares as double
12. Select Hectares > 10,000 and code "GT_100km²" = 1 (for areas > 100km²); Select Hectares < 10,000 code as "GT_100km²" = 2 (for areas < 100km²).
13. Select just those that meet size requirement "GT_100km²" = 1, dissolve on the Snow_PH = 1 and output the data so it can be buffered as one record feature (this extra step may help speed up the buffering process as these data are complex in shape).
14. Buffer the output from step #12 by 20km
15. Clip buffer by USA

*** I think in the end, Nick's habitat differs in some areas because he resampled from the original grid cell size that based on the data I could locate, was very small to 500x500. By going to 1000x1000 some of the gaps between original data patches were filled. I used the original polygon files and thus I had areas where the Snow or the PH or the Female Dispersal would not touch. That gives me a slightly different buffered area because I did not have some of the cell area that Nick picked up. See map where I show Nicks data and our data for Habitat output or where I show zoomed in specific area.

Data:

Nick_Wolv_DPS – Nick's output product

WestUSstates – From Nick's folder and is just western US and I used to clip data.

Copeland_Snow_2000_2006 – From Nick's folders and this is just Copeland's snow with only values of 1-7 combined as one grid value to a 1.

Inman_WCS (FD, MD, MH, PH) – Data from Nick's Inman folder that represents Male, Female Dispersal, Maternal Habitat, Primary Habitat.

Snow_PH – Union of Snow and PH

Snow_PH_Diss – All data that is snow or PH gets a value 1 and dissolves on that to create one simple feature record.

Snow_PH_FD – The above unioned with Female Dispersal. This gives areas of FD with unique ID's and snow/ph patches with value 1.

Snow_PH_FD_Clip – Above clipped to the West US data Nick had.

Snow_PH_FD_Clip_Dis – Above dissolved by the FD unique number and the snow/ph value 1. This will group all unique FD areas and the patches within those.

Snow_PH_FD_Clip_Dis_Exp – Above but select FD areas = 0 so we can explode the snow/ph polys that fall outside of female dispersal areas. We needed these because Nick had areas of snow and PH outside of Female Dispersal that are > 100km² in his final product and I need to capture that too. *** This is the actual output Habitat data area and you must select and use on GT_100km² = 1.

Snow_PH_FD_Clip_Exp_Dis_4_buf – Above selected for just areas that had snow/ph > 100km² and dissolved into one blob feature for a simple buffer to 20km. This just made buffering the data quicker.

Snow_PH_FD_buf20km_Clip – Final range (like Nick's DPS) prior to me removing that areas that Shawn had Nick pull. See pdf's they show what polys to drop out. Note not exact match to Nick's smooth50 output, but that's because of 1000x1000 cells and I had smaller data area overall.