

From: [Turner, Ed](#)
To: [Betty Grizzle](#)
Cc: [Tony McKinney](#)
Subject: Meeting maps model text of process and other
Date: Friday, February 3, 2017 6:41:17 PM
Attachments: [Meeting Maps and model text.zip](#)

Hi Betty, The model run I was doing bombed and I will set it off again here in a bit and let it run through the weekend.

Hopefully we will have the PH to Female Distribution model complete and can map that in a series of maps and use it with the den sites in a map too.

Here is a zip with the model process from Nick and the one we are doing. Along with some maps as a start so we can see what you like and what we will change.

Maybe Monday we will see if Tony can help us with the grid process. I have both grids in the same projection and I will adjust the attributes Monday. Maybe Tony can help us stack them to an output we can actually use. If so we can get some dens by snow year information.

Hope this helps, Ed

--

Edwin Turner, Geographer
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760.431.9440 x266

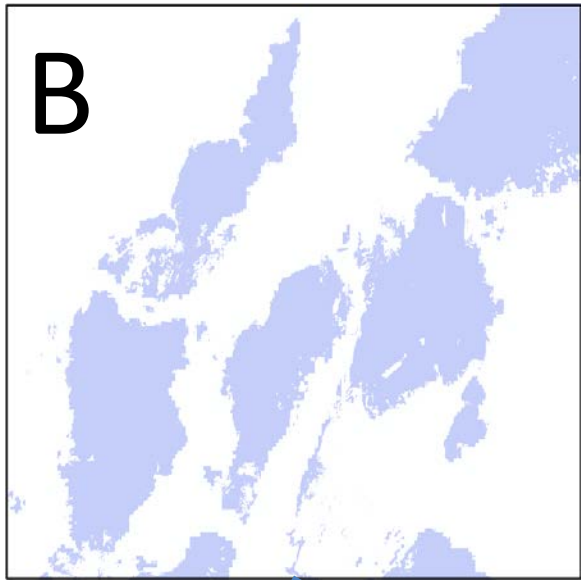
Ed_Turner@fws.gov
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Primary Wolverine Habitat (WCS)



Combined

Female Dispersal layer (WCS)



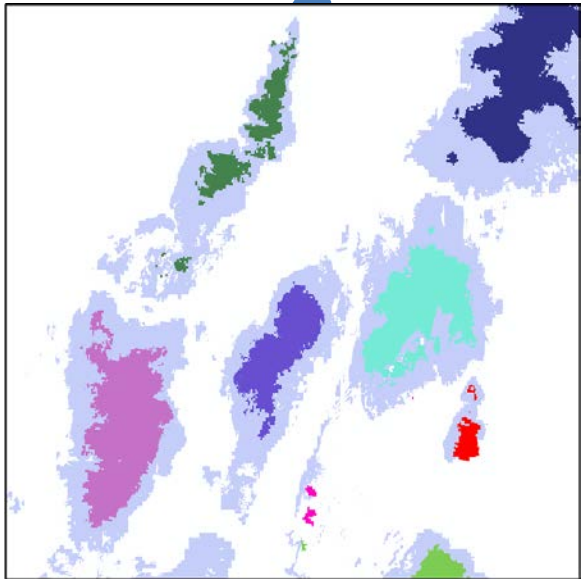
1. Calculate FD_NUM value for each individual or contiguous polygon in the Female Dispersal data.

2. Calculate FD Base Acres and Hectares and select only those areas that are $\geq 10,000$ hectares. Reason being if a female dispersal area is less than 100km^2 (10k hectares) then we would not retain Inman's PH model anyway.

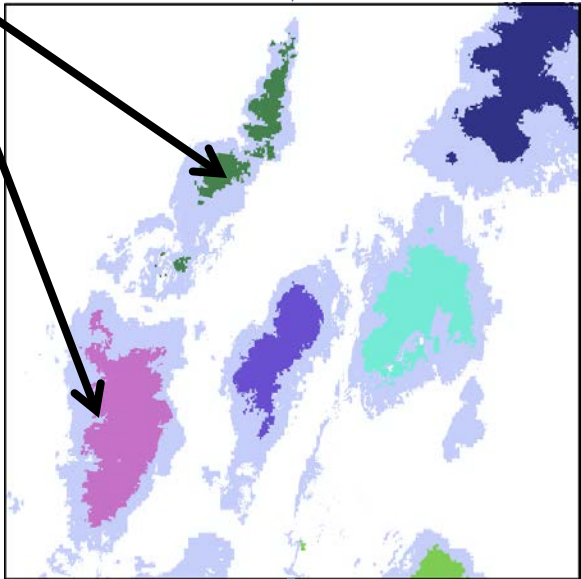
3. Limit attributes in each data to reduce clutter, just turn off those unwanted and then Identity the PH model to the $\geq 10\text{k}$ FD areas.

4. The output from the step "3" provides data that are PH model on areas of FD $\geq 10\text{k}$, now select only the areas that are coded as "Primary Habitat" from the PH model. This will remove any areas of FD that do not have PH contained within. Now dissolve those selected PH areas, as they could be various PH polys that contain the same FD area value. Ex. You may end up with a few hundred or few thousand small PH polys in one contiguous FD area. Dissolving merged all those disjoined polygons into one record for the FD area with which they reside.

Modeled Habitat



Geographic Range

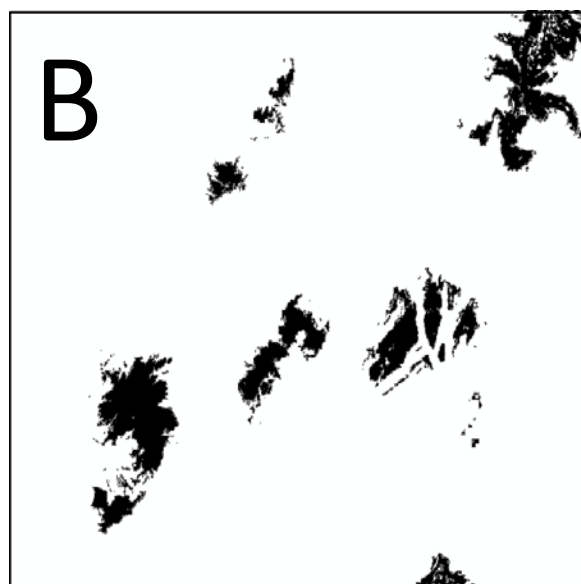


5. Added PH Output acres and hectares values to the dissolved product from step "4" and add a field to carry data forward that meets the $\geq 10,000$ hectare rule. Select all records that are $\geq 10\text{k}$ and buffer only those areas by 20km to follow what Nick Hardy had done with his run.

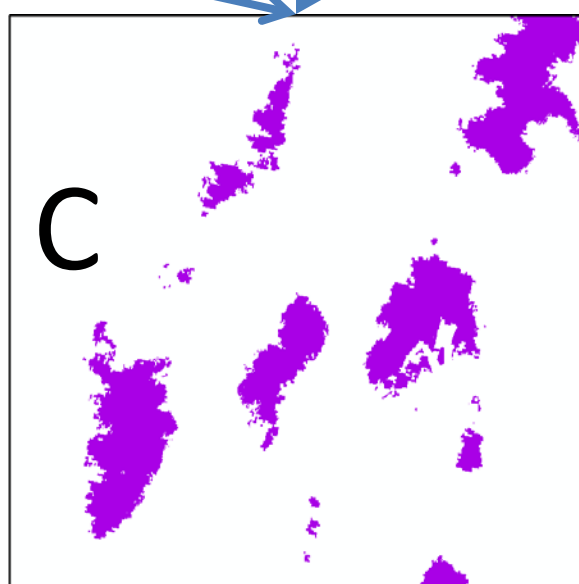
Late spring snow in ≥ 1 year of those surveyed



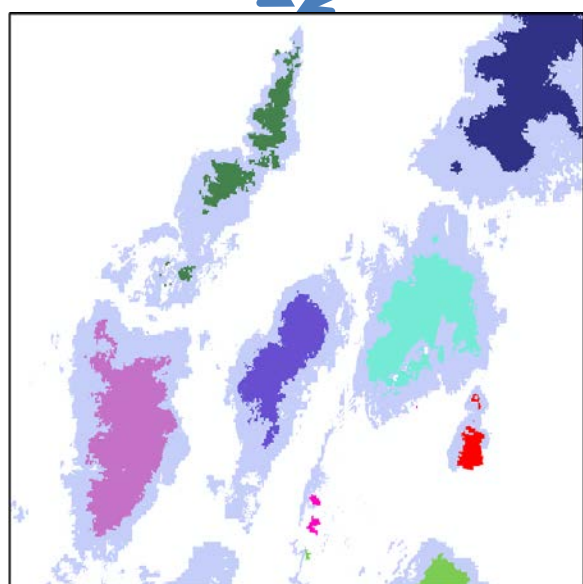
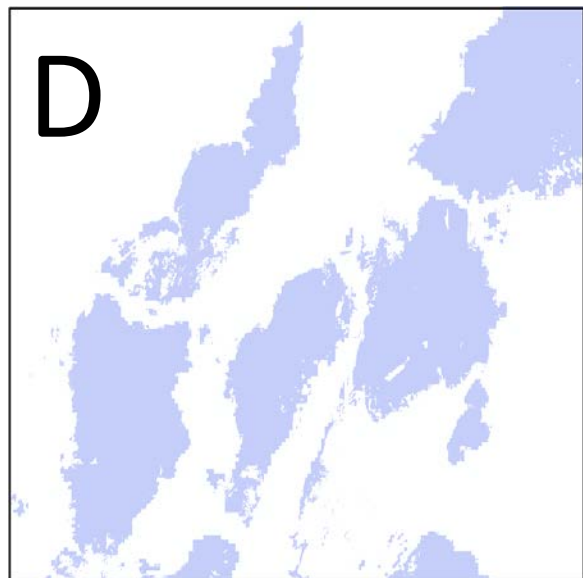
Primary Wolverine Habitat (WCS)



Combined

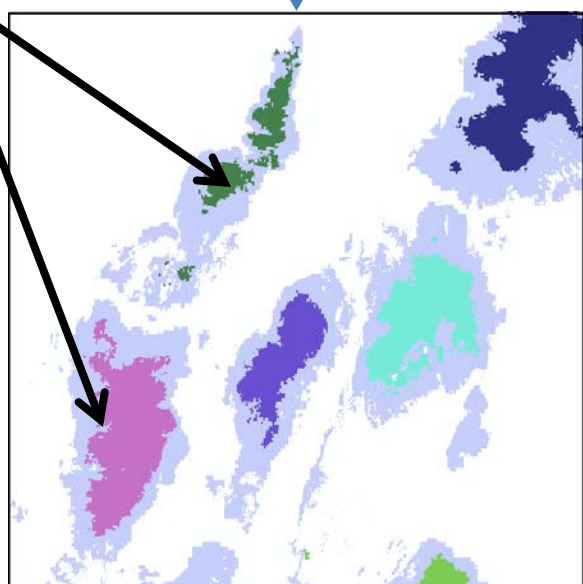


Female Dispersal layer (WCS)



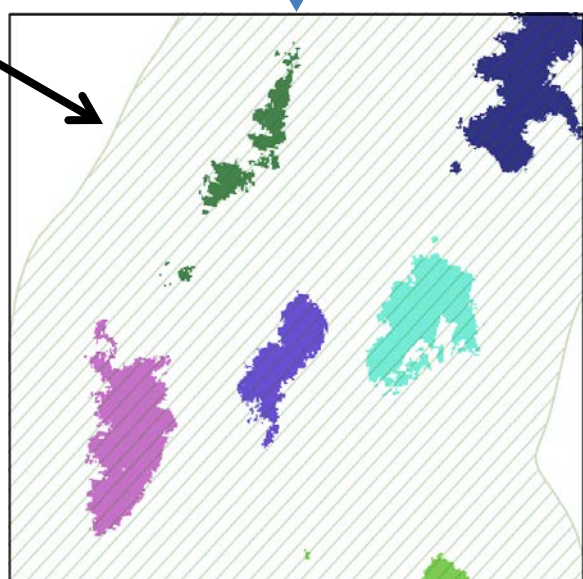
Overlay 'C' with 'D'.
Group C by contiguous areas of 'D'.
Each color represents a joined area of habitat.
e.g. the dark green areas show areas of 'C' that are connected by the same female dispersal polygon, even though they do not touch each other

Modeled Habitat

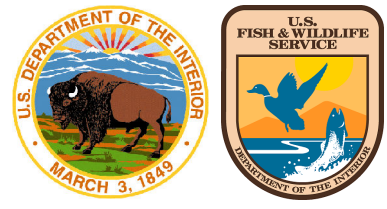


Discard all joined habitat ('E') with a total area $< 100 \text{ km}^2$.
e.g. the dark green area is made up of individual polygons $< 100 \text{ km}^2$, however since they are connected into the same habitat group by the female dispersal layer (and so are the same color) and the total area is $> 100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



U.S. Fish & Wildlife Service

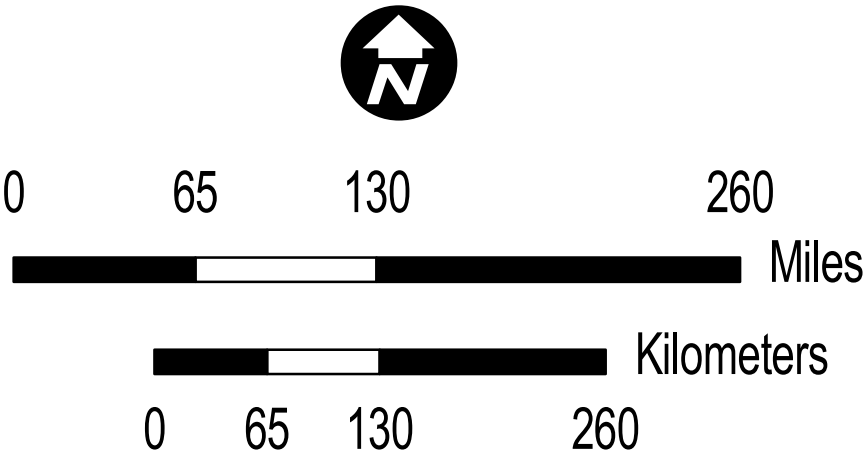
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Wolverine Den Sites and Snow Cover Map

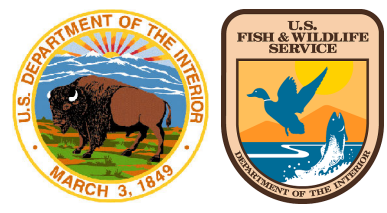


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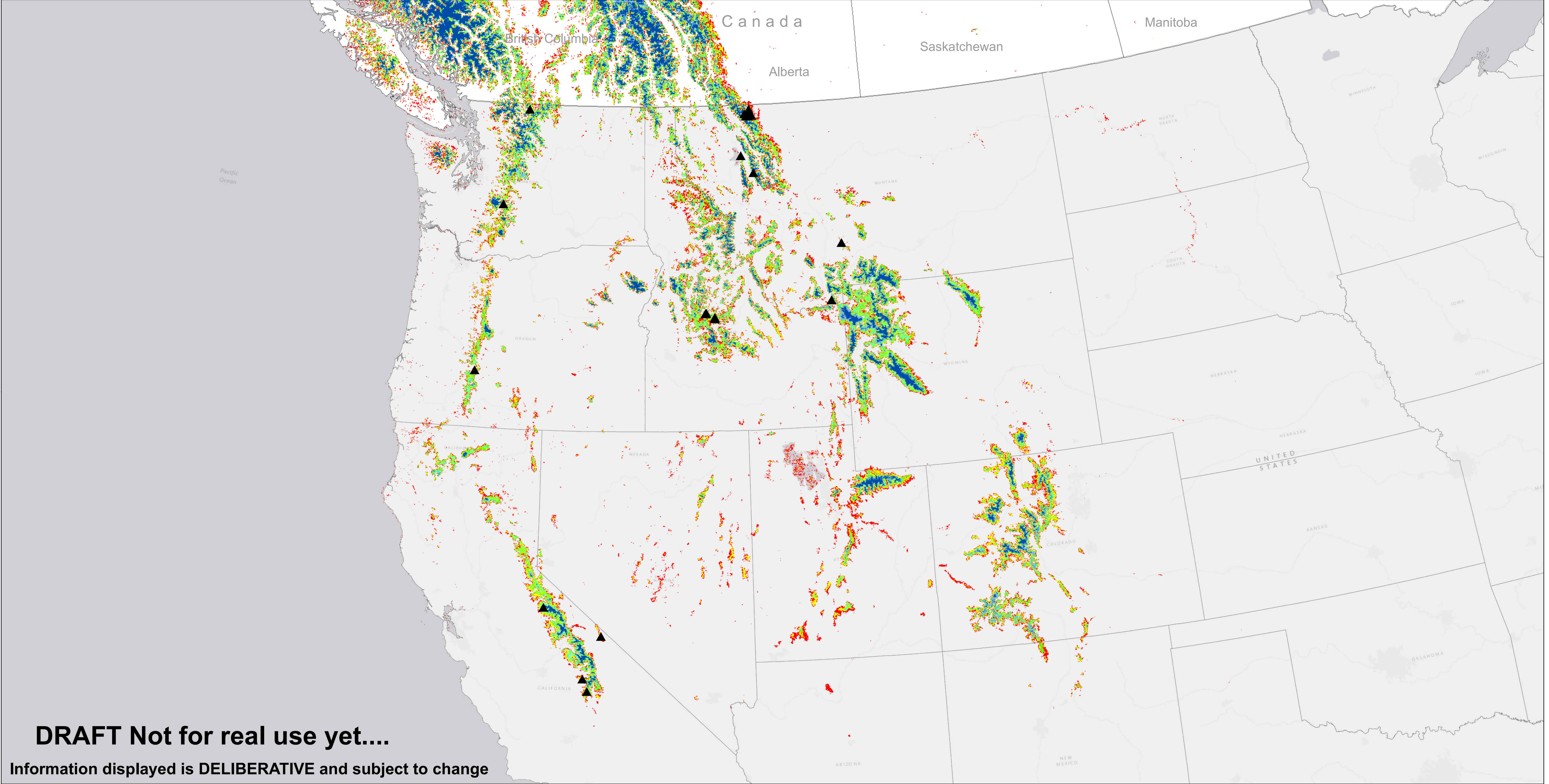
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CARLSBAD FIELD OFFICE
GIS CONTACT: ED TURNER
BIOLOGY CONTACT: BETTY GRIZZLE
(760) 431-9440
DATA SOURCE: USFWS, INMAN (WCS), COPELAND
IMAGE SOURCE: ESRI Online Mapper
Feb 03, 2017
S:\stem\edstemp\American_wolverine\MXDsl\Wolverine_D_DENs.mxd



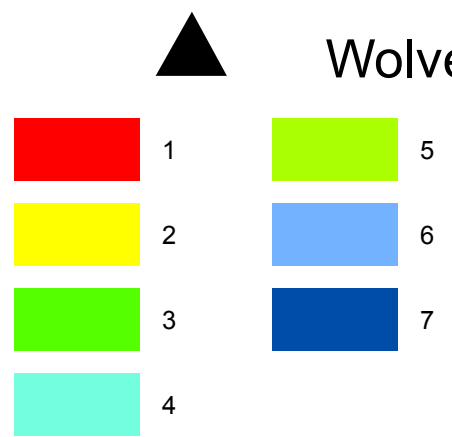
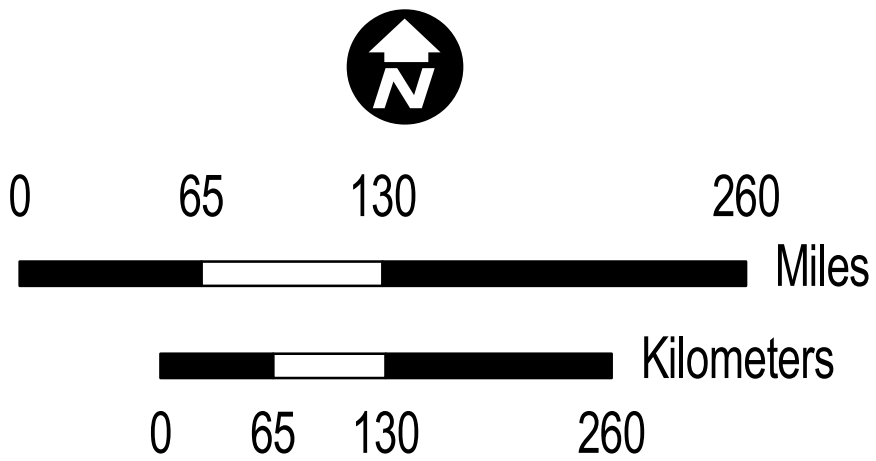
Map represents Wolverine Den Site areas that were covered once or more, by snow during a 3 week period in late April, early May, from 2000-2006. Den Site Locations compiled by CFWO during the 2017 effort. Based on data provided from Federal, State, and Private sources. Dataset is documented as to source.



Wolverine Den Sites and 7 Year Snow Cover Map

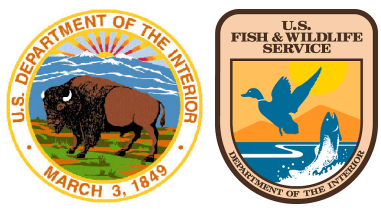


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DATA SOURCE: USFWS, INMAN (WCS), COPELAND
IMAGE SOURCE: ESRI Online Mapper
Feb 03, 2017
S:\stem\edstemp\American_wolverine\MXDslWolverine_D_DENs_7Yr_Snow.mxd

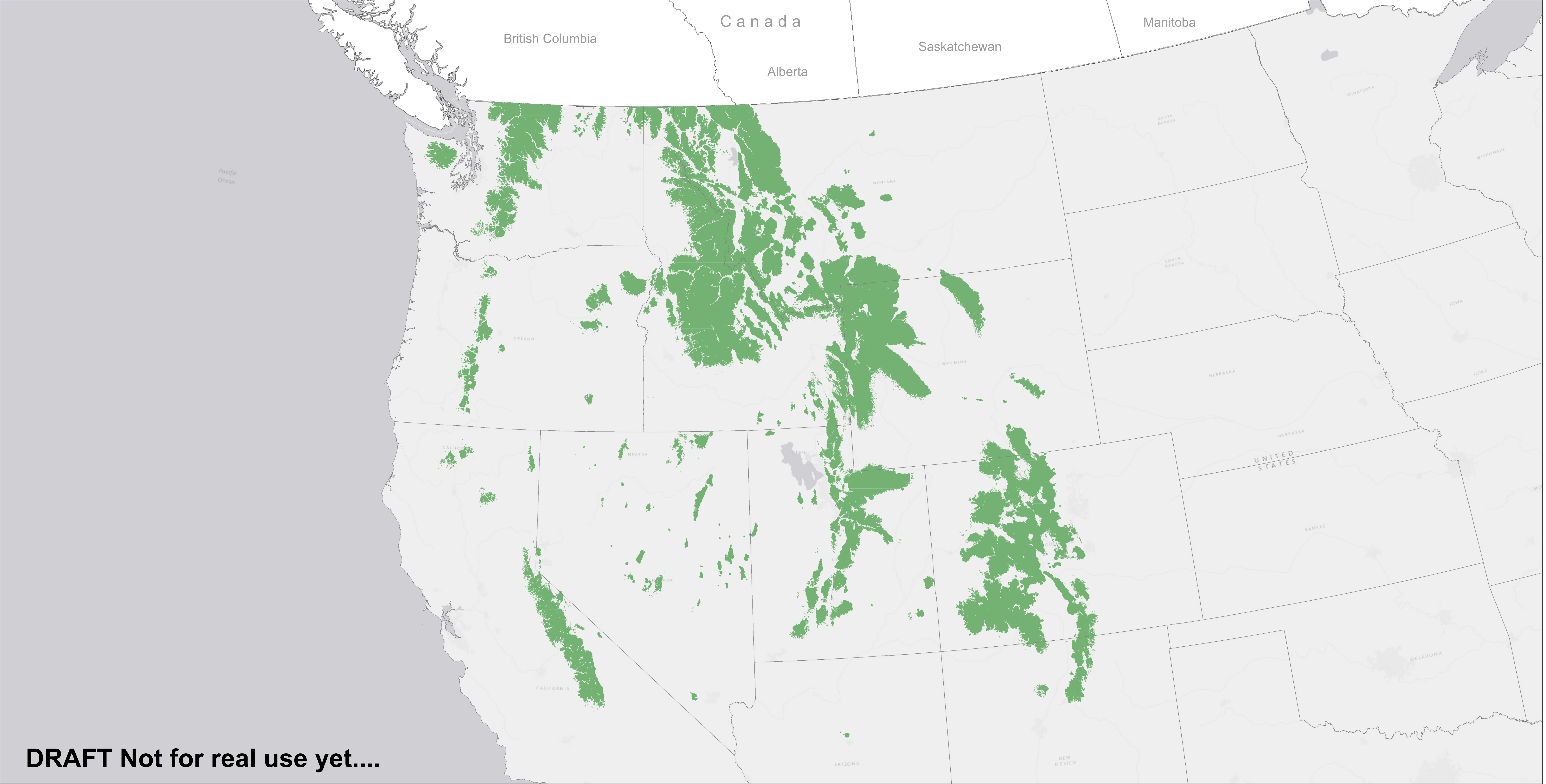


Legend

Map represents Wolverine Den Site areas that were covered by snow. Snow number indicates the number of years the areas was covered by snow during a 3 week period in late April, early May, from 2000-2006. Den Site Locations compiled by CFWO during the 2017 effort. Based on data provided from Federal, State, and Private sources. Dataset is documented as to source.



Wolverine Female Dispersal Map



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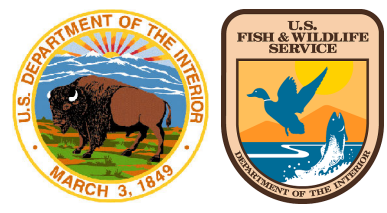
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BIOLOGY CONTACT: BETTY GRIZZLE
(760) 431-9440
DATA SOURCE: USFWS, INMAN (WCS), COPELAND
IMAGE SOURCE: ESRI Online Mapper
Feb 03, 2017
S:\stem\edstemp\American_wolverine\MXDsl\Wolverine_D_FD.mxd



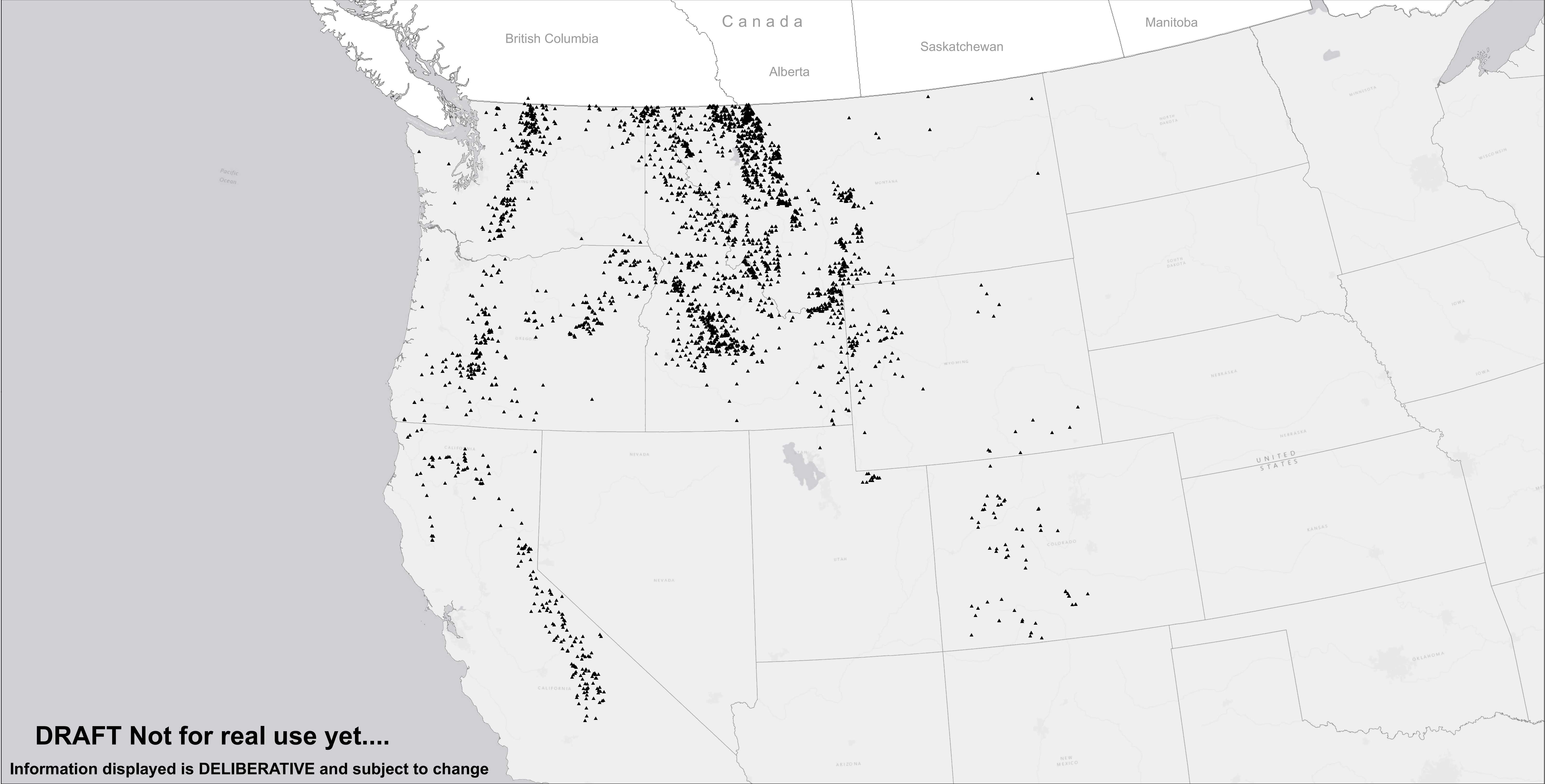
Legend

 Female Dispersal - Map represents areas that were considered modelled Wolverine female dispersal, by Robert Inman at Wildlife Conservation Society (WCS)

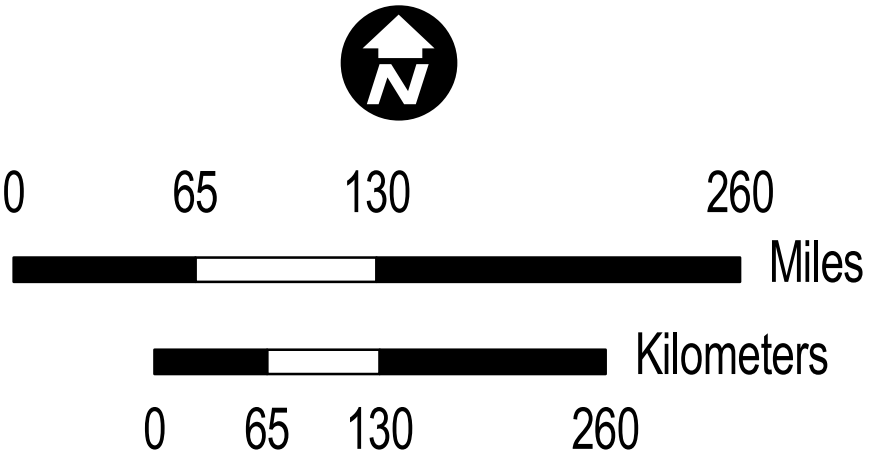
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Wolverine Locations Map

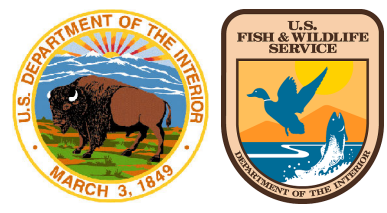


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DATA SOURCE: USFWS, INMAN (WCS), COPELAND
IMAGE SOURCE: ESRI Online Mapper
Feb 03, 2017
S:\stem\edstempl\American_wolverine\MXDsl\Wolverine_D_LOCs.mxd

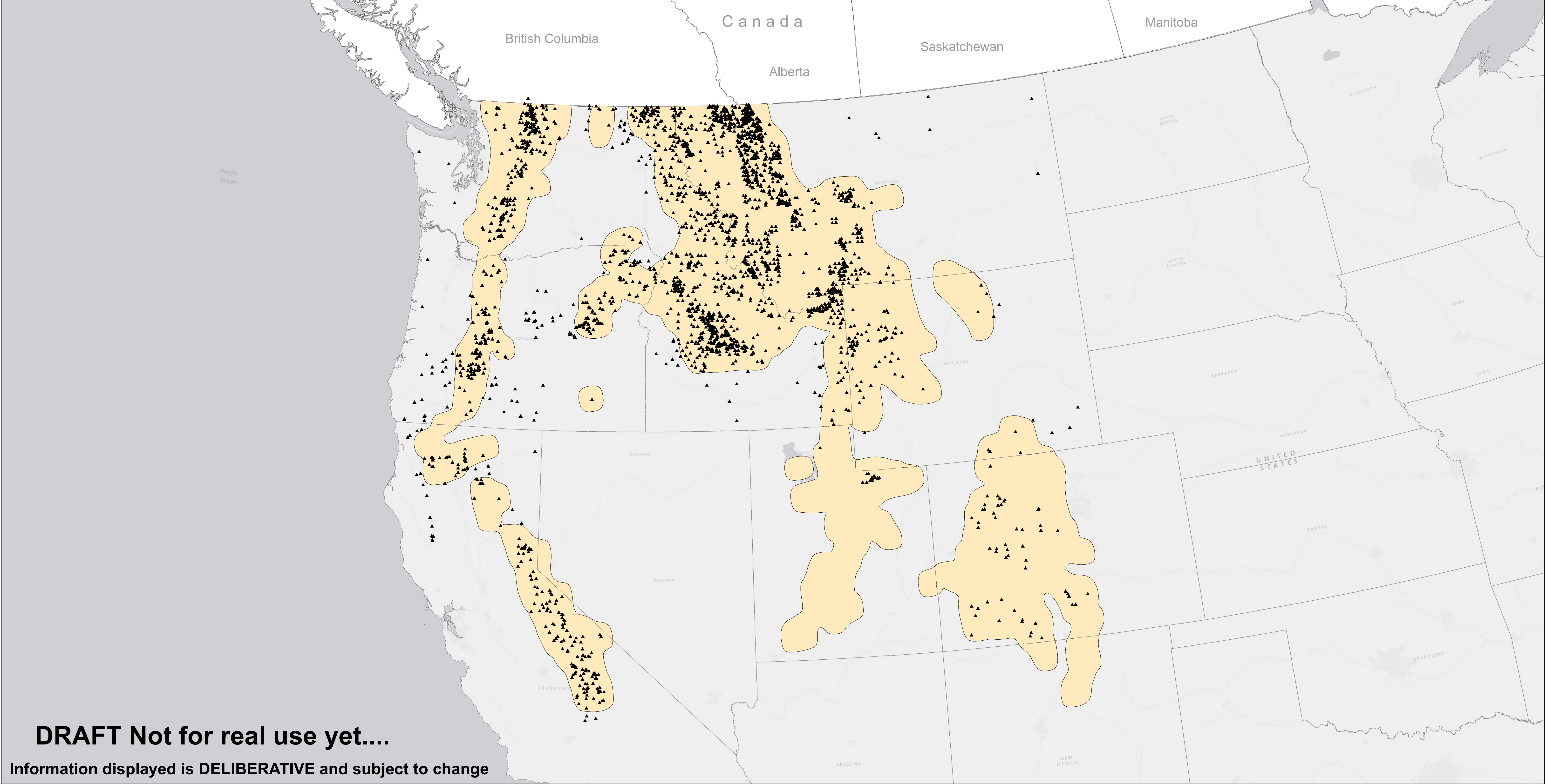


Legend

- ▲ USFWS Compiled Wolverine Locations - Map represents areas all Wolverine locations that CFWO was able to compile during the 2017 effort. Based on data provided from Federal, State, and Private sources. Dataset is documented as to source.



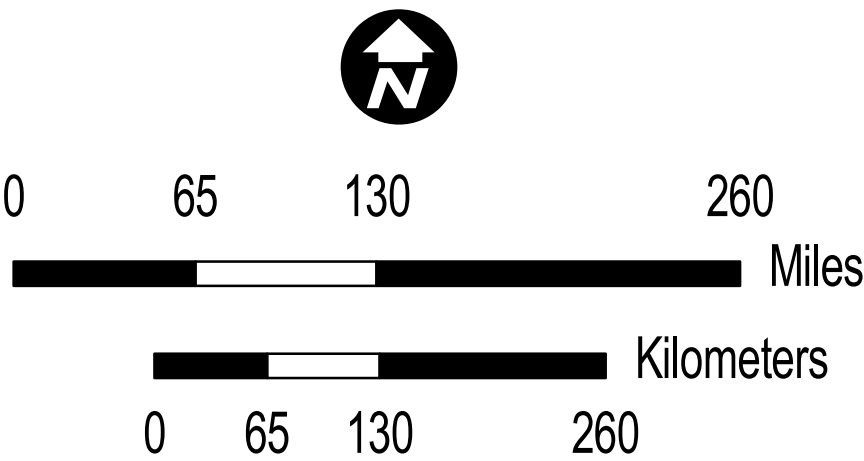
Wolverine Locations and Prior Geographic Range Map



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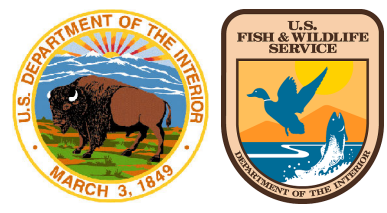
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DATA SOURCE: USFWS, INMAN (WCS), COPELAND
IMAGE SOURCE: ESRI Online Mapper
Feb 03, 2017
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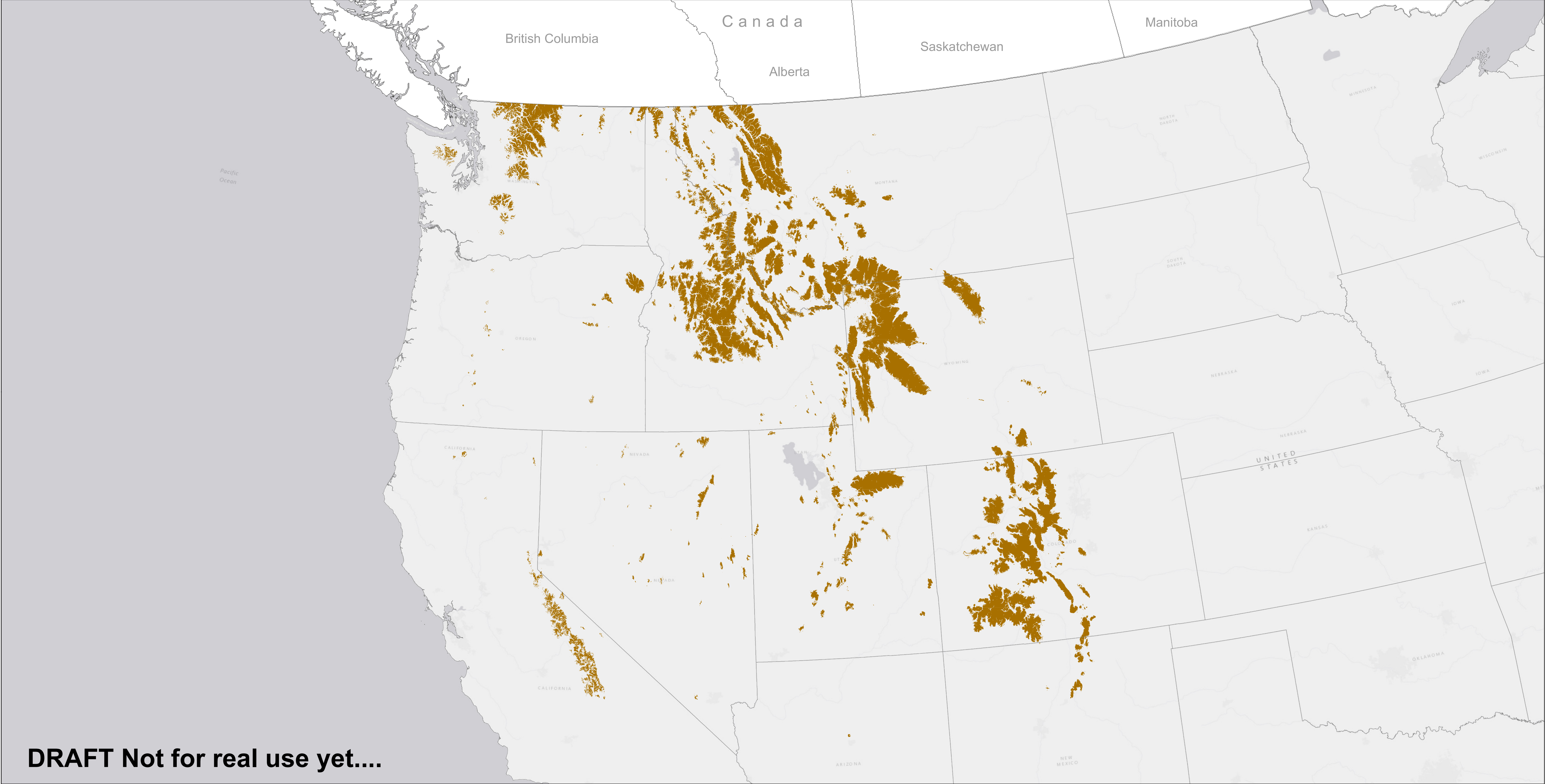


Legend

 USFWS Compiled Locations and Prior Geographic Range - Map represents areas that were considered the Geographic Range created prior by Nick Hardy and Shawn (Last Name), USFWS, and all Wolverine locations that CFWO was able to compile during the 2017 effort.



Wolverine Primary Habitat Map



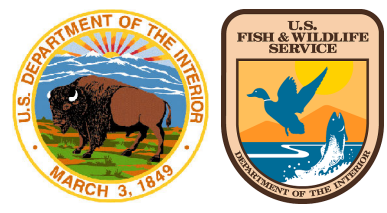
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GIS CONTACT: ED TURNER
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(760) 431-9440
DATA SOURCE: USFWS, INMAN (WCS), COPELAND
IMAGE SOURCE: ESRI Online Mapper
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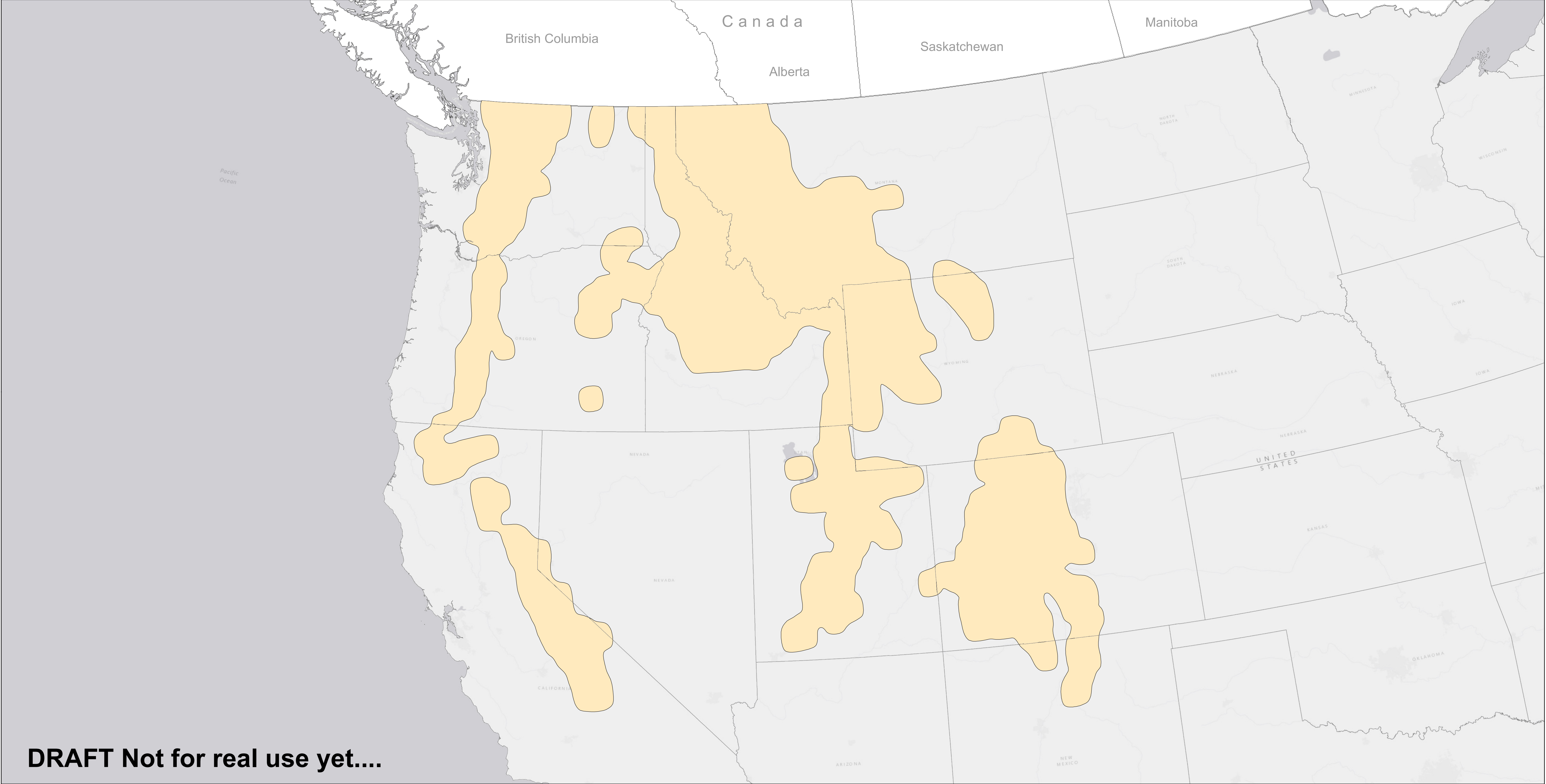
Legend

 Primary Habitat - Map represents areas that were considered Wolverine modelled primary habitat, by Robert Inman at Wildlife Conservation Society (WCS)

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Wolverine Prior Geographic Range Map



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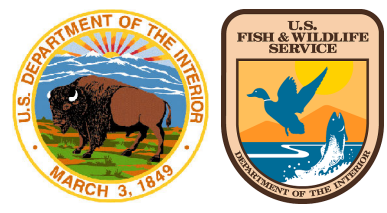
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DATA SOURCE: USFWS, INMAN (WCS), COPELAND
IMAGE SOURCE: ESRI Online Mapper
Feb 03, 2017
S:\stem\edstemp\American_wolverine\MXDslWolverine_D_Prior_Range.mxd



Legend

 Prior Geographic Range - Map represents areas that were considered the Geographic Range created prior by Nick Hardy and Shawn (Last Name), USFWS, using the Snow model, PH model, FD model limiting areas to >= 100km2 and finally buffered to 20km.

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Wolverine Snow Map



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DATA SOURCE: USFWS, INMAN (WCS), COPELAND
IMAGE SOURCE: ESRI Online Mapper
Feb 03, 2017
S:\stem\edstemp\American_wolverine\MXDsl\Wolverine_D_Snow.mxd



Legend

 Snow Cover - Map represents areas that were covered once or more, by snow during a 3 week period in late April, early May, from 2000-2006. Jeff Copeland

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