**Hogum Wildlife Modeling Process**

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This document outlines the process I used to analyze wildlife for the Hogum project area. All processes and models reference the GIS request submitted by the Wildlife staff which is located here: **???????**

**Wolverine**

For the Hogum GBAU Zone 1:

1. (Union) Overlap of:
   1. Treatments
   2. Persistent spring snow (Copeland’s model)
   3. Primary (Inman’s model)
   4. Maternal (Inman’s model)
   5. Male dispersal (Inman’s model)
   6. Female dispersal (Inman’s model)
   7. Project area
   8. Grizzly Bear Analysis unit (GBAU)

*For wolverine, the GBAU is the broader effects boundary*

**Data:**

Treatment Units: T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\HogumHumbugNEPA.gdb\Treatments\TreatmentUnits\_ProposedAction\_20200624

Project Area: T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\HogumHumbugNEPA.gdb\ProjectBoundary\ProjectBoundary\_20190329

GBAU:

T:\FS\Reference\GIS\r01\_hlc\LayerFile\Wildlife\GrizBearAnalysisUnits\_Zone123.lyr

Copelands Snow Model: T:\FS\Reference\GIS\r01\_hlc\LayerFile\Wildlife\WolverineSnowJCopeland\_NA2009\_500m\_R1.lyr

Inman’s Model: T:\FS\Reference\GIS\r01\_hlc\LayerFile\Wildlife\WolverineHabitat2013\_Inman\_R1.lyr

**Products:** T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGWolverineUnion20200713.xlsx

T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HHWolverine20200623.gdb\HGWolverineTreatCopeInmanPrjGBAUUnion20200713

**Grizzly**

The BFTP layer had roads/trails combined which creates issues with existing modeling methodology. Restricted use ATM codes needed to be defined and edited for consistency. Willow example was used to create a ruleset. Several data entry errors existed that required adjustments. Roads still reflected planned status or new that were completed. Existing Grizzly security layers had to be re-created four different ways using the BFTP to meet the Wildlife staff requests. Ultimately, 4 different route layers had to be created and symbolized properly and listed below are the resulting layers including the base layer:

1. Base dataset (2905 features) – TravelPlanAt4Rev\_20190416. Dataset for the BFTP.
   1. Data location: T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGGrizzly20200713.gdb\TravelPlanAt4Rev\_20190416
2. All motorized routes (2199 features) – A snapshot of all motorized routes in the BFTP. This was used to create Grizzly security existing condition scenario. Ruleset using Willow example as follows:
   1. Data location: T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGGrizzly20200713.gdb\BFTPWildlifeOpenRoutes20200721
3. Open motorized routes (2152 features) – A snapshot of all open motorized routes that are open during the non-denning period from April 1 – November 30. This was used to create Grizzly security for the open motorized routes. Ruleset as follows:
   1. ROUTE\_STATUS = 'EX - EXISTING' AND ALT4\_REVISED IN( NULL , '02-RES','04-RES','09-RES', '10-RES', '11-RES', '12-RES', '14', '15', 'M-07.00', 'M-08.00', 'M-08.09', 'M-08.10', 'M-08.105', 'M-10.00', 'MT NEW CONSTRUCTION OPEN', 'MT NEW CONSTRUCTION98', 'MT RECONSTRUCTION OPEN', 'MT RECONSTRUCTION CLOSED', 'MT RECONSTRUCTION CLOSED', 'MT RECONSTRUCTION98', 'NO-ROW', 'OPEN-HWY LEGAL', 'OPEN-LX', 'ROAD NEW CONSTRUCTION', 'ROAD RECONSTRUCTION','STATE','UC-M-07.00','UC-M-11.00','UC-OPEN','UC-OPEN-10')
      1. Of the records selected in Step a, the null records need additional filtering.
         1. If null and the JURISDICTION field = FS-FOREST SERVICE, remove from further consideration any values where the OBJECTIVE\_MAINT\_LEVEL is “1-BASIC CUSTODIAL CARE (CLOSED). 47 Routes dropped
         2. If null and “JURISDICTION” field = “C-COUNTY, PARISH, BOROUGH”, “P-PRIVATE”, STATE, AND “SH-STATE HIGHWAY”, keep records. 1618 met this query
4. All motorized routes with haul/temp roads (2952 features of which 47 are temp roads) – 47 Temp roads added to data and 26 designated as haul routes. A field was added “ProjectRoadDesignation” and populated to designate route use. Note that some of the haul routes are in DECOM status.

Open motorized routes with haul/temp roads (2199 features of which 47 are temp roads) - 47 Temp roads added to data and 26 designated as haul routes. A field was added “ProjectRoadDesignation” and populated to designate route use. Note that 10 of the haul routes are in DECOM status and 6 are 06-RES (Closed to wheeled motorized use yearlong, closed to snowmobile use 10/15-12/1).

**Grizzly Security Analysis**

For the Humbug GBAU Zone 1:

The decision was made to use the BFTP for this analysis. Since the layer in HLC SDE reflects INFRA several new security layers needed to be created for the four different scenarios requested by the Wildlife staff. The four scenarios are as follows:

1. Develop security areas for the Hogum GBAU based upon the BFTP with All Motorized roads and trails considered. The Willow ATM codes from the Grizzly Habitat Effectiveness column where used to determine road and trail status. A 500-meter buffer was applied to the routes and the buffered area subtracted from the Lincoln Ranger District. Remaining patch sizes of 2500 acres or more were retained to create Grizzly Security Habitat.
   1. Data: T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGGrizzly20200730.gdb\HGGrizSecAllMotor20200725
2. Develop security areas for the Hogum GBAU based upon the BFTP with Open Motorized roads and trails considered. The Willow ATM codes from the Grizzly Habitat Effectiveness column where used to determine road and trail status. A 500-meter buffer was applied to the routes and the buffered area subtracted from the Lincoln Ranger District. Remaining patch sizes of 2500 acres or more were retained to create Grizzly Security Habitat.
   1. Data: T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGGrizzly20200730.gdb\HGGrizSecOpenMotor20200725
3. Develop security areas for the Hogum GBAU based upon the BFTP with All Motorized roads and trails considered including proposed action haul routes and temp roads. A 500-meter buffer was applied to the routes and the buffered area subtracted from the Lincoln Ranger District. Remaining patch sizes of 2500 acres or more were retained to create Grizzly Security Habitat.
   1. Data: T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGGrizzly20200730.gdb\HGGrizSecPAAllMotor20200724
4. Develop security areas for the Hogum GBAU based upon the BFTP with Open Motorized roads and trails considered including proposed action haul routes and temp roads. A 500-meter buffer was applied to the routes and the buffered area subtracted from the Lincoln Ranger District. Remaining patch sizes of 2500 acres or more were retained to create Grizzly Security Habitat.
   1. Data: T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGGrizzly20200730.gdb\HGGrizSecOpenMotorPA20200724

**Reference material:**

Willow example spreadsheet used to determine road and trail rulesets:

T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\Spreadsheets\Copy of Willow\_Copy of DescriptionRestrictionCodeswithWildlifeAttributes\_SelectedAlt\_012716.xlsx

**Compilation of emails from Wildlife staff with product requests:**

T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\Documentation\Email comments from Pat Shanley and Staff.docx

**Ruleset expressions:**

T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\Expressions

**Products:** T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGGrizzly20200730.gdb\HGGrizSecUnion20200724

T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\Spreadsheets\HGGrizSecUnion20200724.xlsx

**Grizzly Open Route Density Analysis**

**Grizzly Denning Analysis**

For the Humbug GBAU Zone 1:

Union denning habitat with PA treatment units and Humbug GBAU. Create a spreadsheet with pivots for analyzing Denning Habitat vs GBAU/PA treatments.

**Data:** T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\HogumHumbugNEPA.gdb\Treatments\TreatmentUnits\_ProposedAction\_20200624

T:\FS\Reference\GeoTool\agency\DatabaseConnection\r01\_hlc\_default\_as\_myself.sde\S\_R01\_HLC.Wildlife\_Grizzly\S\_R01\_HLC.GrizBearDenningHabitat\_PCA\_Zone1

T:\FS\Reference\GeoTool\agency\DatabaseConnection\r01\_hlc\_default\_as\_myself.sde\S\_R01\_HLC.Wildlife\_Grizzly\S\_R01\_HLC.GrizBearAnalysisUnits\_Zone123

**Products:**

T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGGrizzly20200730.gdb\HGDenningUnion20200724

T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\Spreadsheets\HGDenningUnion20200724.xlsx

**Grizzly Open Route Density**

For the Humbug GBAU Zone 1:

Using the BFTP roads layer, query all open motorized roads for the GBAU using the Willow ruleset and apply a multiplier of 1.0 for Non-Private and a .25 for Private. Add temp roads and haul routes for pivot analysis using a spreadsheet.

**Reference material:**

Willow example spreadsheet used to determine road and trail rulesets:

T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\Spreadsheets\Copy of Willow\_Copy of DescriptionRestrictionCodeswithWildlifeAttributes\_SelectedAlt\_012716.xlsx

**Ruleset:**

**Data:**

**Products:**

**Lynx**

Hey Jeff, I just told Graham that all we expect to get form you is total LAU acres, ownership acres, acres of lynx habitat by structural stage and acres of lynx habitat by structural stage within treatment units. There is not a need for you to deal with the BA.  That base info you provide will populate all the needs of the BA. It just takes work by the bio to shape that data that is obviously not fully understood yet.

**Elk FP Hiding and Thermal Cover Standard 3**

**Guidance:** Since VMAP was edited I had to run a VMAP processing model that uses FACTS Activities in the past 15 years and Project Edited VMAP to create Habitat based upon VMAP fields. This model uses the field “TREECANOPY” to determine hiding and thermal cover which is the same as canopy cover except it is easier to use for a select statement since it has a numeric code. The intermediate step applied the patch size requirement (Standard 3) of <= 40 acres for Summer range HC and <=15 for Winter range TC.

**Model:** T:\FS\Reference\GeoTool\r01\_hlc\Toolbox\NEPAProjectTools\Wildlife\HLCWildlife20190604.tbx\ElkFPCoverIntermediate(Treecanopy)

**Intermediate Model Ruleset**

**(Model1ElkFPCoverIntermediate (TreeCanopy))**

Select “NonForage” "TREECANOPY" in ( 5000, 7000 ) water, sparse veg

Select “Forested” "TREECANOPY" = 4002 CTR 25-39.9%

Select “Forage” "TREECANOPY" in ( 3100 , 3300 , 8600 , 4001 ) herbaceous, shrub, Hardwood mix >40%,, CTR 10-24.9%

Select HC = HC AND TC = Forested "TREECANOPY" in (4003 , 4004) AND "TREESIZE" in (4100, 4200, 4300, 4400, 4500) AND NOT ((ACTIVITY\_CODE > '4100' AND ACTIVITY\_CODE < '4200') OR LOCAL\_QUALIFIER IN ('NF-HIGH SEVERTY', 'NATURAL FUELS')) CTR 40-59.9%, CTR>=60%, DBH 0-4.9”, DBH 5-9.9”, DBH 10-14.9”, DBH >=15”

Select TC "TREECANOPY" = 4004 AND "TREESIZE" in (4300,4400,4500) CTR>=60%, ”, DBH 10-14.9”, DBH >=15”

Select "ELKHCHAB" in ( 'HC' , 'HC\_SeedSap' ) AND "GISAcres" >=40

Select "ELKTCHAB" ='TC' AND "GISAcres" >=15

**Data:**

1. VMAP (Edited for project) T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\HogumHumbugNEPA.gdb\VegMaster\HH\_VMapV19\_20190329
2. FACTS T:\FS\NFS\HelenaLewisClark\Project\HogumHumbugNEPA\GIS\Data\WildlifeAnalysis\HGElk20200804.gdb\FACTSActivities15YR20200811

The result (existing condition) is a hiding cover and thermal cover feature class which are used in the following models to determine remaining hiding/thermal cover ***after treatment units have been erased***.