Density and Disturbance Calculation Tool (DDCT) Manual

A DDCT will be completed for all applicable projects as outlined in the Sage-Grouse Executive Order 2011-5 (EO) occurring within sage-grouse core areas or connectivity areas.

This manual covers:

- What is a DDCT and why it is needed
- Data needed to run a DDCT
- How to run a DDCT step by step using the model developed by BLM, the preferred method*
- How to report your results
- How to add the model to ArcToolbox
- How to delineate a DDCT step by step without the BLM model
- Density calculation process for linear features
- Anthropogenic disturbances
- How to handle pre 8.1.2008 units

This manual also contains additional information for projects not specifically addressed in the EO. The State of Wyoming and the BLM are using the DDCT process to evaluate and manage the total disturbance (existing, permitted, and proposed) within the State's Sage-Grouse Core Areas (Version 3). The DDCT process will be conducted by federal land management agencies for proposals on federal land and by project proponents on State or private land.

TERM	Disturbance	Disruptive Activity
ALSO REFERRED TO AS	"surface or vegetation disturbance" "direct habitat disturbance"	"anthropogenic disturbance activity" "indirect habitat disturbance"
EXECUTIVE ORDER LIMIT	5% of DDCT Area	Average of 1 per 640 acres within DDCT area
DDCT CALCULATION	disturbance calculation	density calculation

What is a DDCT and why is it needed (See the Governor's Sage-Grouse Executive Order 2011-5 http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/Sage_Grouse_EO_2011_5.pdf)

All activities will be evaluated within the context of maximum allowable disturbance (physically disturbed habitat percentages, location, and number of oil and gas and mining disruptions) of suitable sage-grouse habitat (See Appendix I for the definition of suitable sage-grouse habitat and disturbance of suitable sage-grouse habitat) within the area affected by the project. The maximum disturbance allowed will be analyzed via a Density/Disturbance Calculation Tool (DDCT) process conducted by the federal land management agency on federal land and the project proponent on non-federal (private, state) land.

1. Density/Disturbance Calculation Tool (DDCT) application: Determine all occupied leks within core population

areas that may be affected by the project by placing a four-mile boundary around the project boundary (as defined by the proposed area of physical disturbance related to the project). All occupied leks located within the four--mile boundary and within core population areas will be considered affected by the project.

2. A four-mile boundary will then be placed around the perimeter of each affected occupied lek. The core population area within the boundary of affected occupied leks and the four-mile boundary around the project boundary creates the DDCT area for each individual project. Disturbance will be analyzed for the DDCT area as a whole and for each individual affected occupied lek within the DDCT area. Any portion of the DDCT area occurring outside of core area will be removed from the analysis.
3. If the DDCT includes mapped habitat that does not meet the suitable or transitional habitat definitions per the EO, the unsuitable (by definition not disturbance) will not be included in the DDCT calculation.
4. If there are no occupied leks within the four-mile boundary around the project boundary, the DDCT area will be that portion of the four-mile project boundary within a core population area.
5. If the location of the proposed project boundary causes the DDCT boundary to extend into another core area where there is non-core in between the affected core areas, such as the Hanna and Rawlins core areas, then clip the DDCT analysis to the core area where the proposed project is located. This does not apply to the Natrona and Buffalo core areas. Please refer to Sage-Grouse Update No. 6, page 2 for more explanation.
6. If the proposed project location causes the DDCT boundary to overlap core and connectivity areas clip the DDCT analysis to the core or connectivity area in which the projected is located. Core and connectivity areas are managed for different objectives. If the project is in core then clip to core. If the project is in a connectivity area then clip to connectivity. Please refer to Sage-Grouse Update No. 6, page 2 for more explanation.

Data needed to run a DDCT:

Some of the data listed below will be available on the WGFD ftp site ((ftp://gf.state.wy.us/) User name: ftp_piaa and Password: piaa123). Please check the ftp site first or refer to the agency and/or web address for individual data sources.

Proposed surface disturbance or project boundary: This is the area that is being proposed for disturbance. This file must be a polygon file or a complete line file that can be converted into a polygon. The project proponent must provide this. To use the model provided by BLM add a Disrupt and a Disturb field to the attribute table of this file and populate the fields with a value of one. Examples of project boundaries and an altered attribute table are provided at the end of this document.

Most recent occupied leks/perimeter: Available from the Wyoming Game and Fish Department on the ftp_piaa site. This file is a hybrid of occupied lek perimeters and occupied lek points, buffered by 5 feet. This was done to make sure that all occupied leks were represented by polygons.

Sage-Grouse Core Areas Version 3: Available from the Wyoming Game and Fish Department webpage and the ftp_piaa site. (http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/index.asp).

Sage-Grouse Connectivity Areas: Available from the Wyoming Game and Fish Department webpage and the ftp_piaa site. (http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/index.asp).

Land Ownership: The most recent land ownership file can be found on the Wyoming BLM website (http://www.blm.gov/wy/st/en/resources/public_room/gis/datagis.html) under the PLSS/Ownership heading.

NAIP (National Agricultural Imagery Program) imagery: Used for detecting additional disturbance. True Color images are available in seamless statewide coverage from the following ArcGIS Server site: http://gis.apfo.usda.gov/arcgis/services.

To install this ArcServer click the add data button>from the look in menu navigate to GIS Server (toward the bottom)>Add ArcGIS Server> use GIS Services>Next>Enter http://gis.apfo.usda.gov/arcgis/services in to the internet server box> Finish.
To use the images from the above server click the add data button >navigate to GIS Servers> arcgis on gis.apfo.usda.gov>NAIP>Wyoming_2009_1m_NC

Current surface disturbance file: To use the model provided by BLM, download the blank surface disturbance geodatabase (SurfDist.gdb) and digitize, or load, all current surface disturbances within this geodatabase. Make sure to populate all Disrupt and Disturb cells with a value of 1. These fields are used to calculate the 5% threshold (Disturb) and the 1 average disruption per 640 acres (Disrupt). If a disturbance is determined not to be a disruption then the value can be changed to zero and it will not be counted in the 1 average disruption per 640 acres count. Also, DO NOT rename the SurfDist.gdb or the SurfaceDist feature class within the geodatabase. The model will not run if either of these files are renamed. Some of this data will have to be head's up digitized at a minimum 1:5000 scale from the 2009 NAIP aerial photography images.

Surface disturbance includes but is not limited to roads, well pads, mining operations, cropland, buildings, some vegetation treatments, wind turbines, and pipelines. Remember to clip all disturbances to the final DDCT boundary. To use the model provided by BLM all surface disturbance will have to be within the SurfDist geodatabase. Visual examples of disturbances and the SurfDist attribute table are provided at the end of this document.

Other useful files may include but are not limited to:

Note: Surface disturbance digitized by BLM accounts for all surface disturbances. It may be necessary to examine this file and change the Disturb field value to 0 on features that would not be applicable in the DDCT (e.g. alfalfa field used by grouse, successfully reclaimed development). Surface disturbances must be anthropogenic in nature, except for wildfire not meeting transitional standards, to count toward the disturbance calculations.

Roads: Capture any road greater than or equal to 10ft wide that does not have a noticeable strip of vegetation down the middle. Roads less than 10ft wide that are clearly discernible as improved should also be captured. When possible digitize the road disturbance from ditch to ditch across the road. The Wyoming Department of Transportation (WYDOT) has a good road file for maintained roads. This file will help to identify where some of the roads are located in the DDCT. Smaller or new roads may still have to be digitized. The WYDOT file can be used to buffer state highways by 34ft, county roads by 28ft, and interstates by 38ft each direction. This file is updated annually and can be downloaded from the WYGISC website (http://www.uwyo.edu/wygisc/data/index.html). The most accurate way to capture the footprint of the road disturbance is to digitize it. BLM offices are also a good source of road data.

Oil and Gas Wells: The current well file can be obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC) website (http://wogcc.state.wy.us). Once on the WOGCC webpage click Down Load. Scroll to the bottom of the list, select the Well Header file and click the bucking bronco icon to the left to start downloading. The "WH" file is comprised of active wells and the "PA" file is comprised of plugged and abandoned wells. WOGCC also has an ArcIMS Server site that can be installed similar to the NAIP site, see above. The address for that server is http://wogccms.statewy.us. Clip the wells to the DDCT boundary and digitize each well pad to determine the area disturbed.

Oil and Gas Unit Boundaries: The most current oil and gas unit file can be viewed from the WOGCC website (http://wogccms.state.wy.us). This web address can also be used in ArcMap to add an ArcIMS Server site. This file is updated quarterly. Please see the Additional Information section for more information on units.

Mining: Use the mining plan permit boundaries to digitize actual mining disturbance off the NAIP imagery. Mining files can be downloaded from the DEQ website (http://deq.state.wy.us/lqd). Scroll down the page to the CHIA - Cumulative Hydrologic Impact Assessments heading**.** These files are updated annually, usually in February. For questions or concerns please contact Chad Kopplin with DEQ (307.777.6470 or ckoppl@wyo.gov).

Cropland: Digitize all cropland. If the cropland is determined to be sage grouse habitat it can be coded as 0 in the SurfDist.gdb file.

Buildings: This also includes ranches and developed subdivisions. If there is disturbance around dwellings that would prohibit all sage-grouse use then digitize the entire disturbance. If the building is only used intermittently digitize the actual building footprint.

Vegetation Treatments: Contact WGFD or the land management agency to determine if vegetation treatment data are available for defined transitional habitat (EO Appendix I).

Pipelines: Digitize the disturbance of the pipeline corridor scar. Pipelines regardless of width/distance are not to be considered toward the density calculations. Pipelines will contribute towards the disturbance calculation until the area is successfully reclaimed (EO).

Suitable Sage Grouse Habitat : All acreage within core areas are considered suitable habitat unless the habitat within the DDCT has been mapped per the EO standards.

Additional Information:

Anthropogenic Disturbances: The average of 1 per 640 acres threshold applies only to oil and gas and mining activities.

Disturbance Calculation Process for Linear Features: The impacts of linear disturbances are varied. The following are suggestions for dealing with linear features:

1. Non-2 track roads would contribute towards disturbance calculations. The actual footprint should be digitized.
2. Overhead transmission corridors established in the SGEO 2011-5 (1/2 mile either side of existing 115kV or larger lines and the east-west corridors mapped in the SGEO (Attachment D Map 1 and 2) will not count toward

disturbance calculations for any new projects located outside the corridors. In essence the SGEO established corridors are considered unsuitable habitat for the purpose of DDCT calculations and will not be counted in the numerator or denominator. New transmission lines proposed to be constructed within the identified SGEO corridors are not required to complete a DDCT analysis. New transmission lines proposed to be constructed within core habitat but outside the SGEO established corridors must complete a DDCT analysis to determine disturbance status relative to SGEO thresholds of an average 1 disruptive activity per 640 acres and an average 5% surface disturbance per 640 acres. Disturbance is calculated as Right of Way (ROW) multiplied by length.

3. Pipelines regardless of width/distance would contribute towards the disturbance calculation until the area is reclaimed with perennial grasses and forbs.

Units (prior to 8.1.2008) located within a new project DDCT: When dealing with situations where the DDCT encounters a prior to 8.1.2008 unit, the BLM field manager will need to work collaboratively with both the unit holders and the project proponents to determine the actual disturbance necessary to successfully meet the project goals of both. It is imperative that each of these situations are addressed with flexibility and a solid understanding of the local landscape:

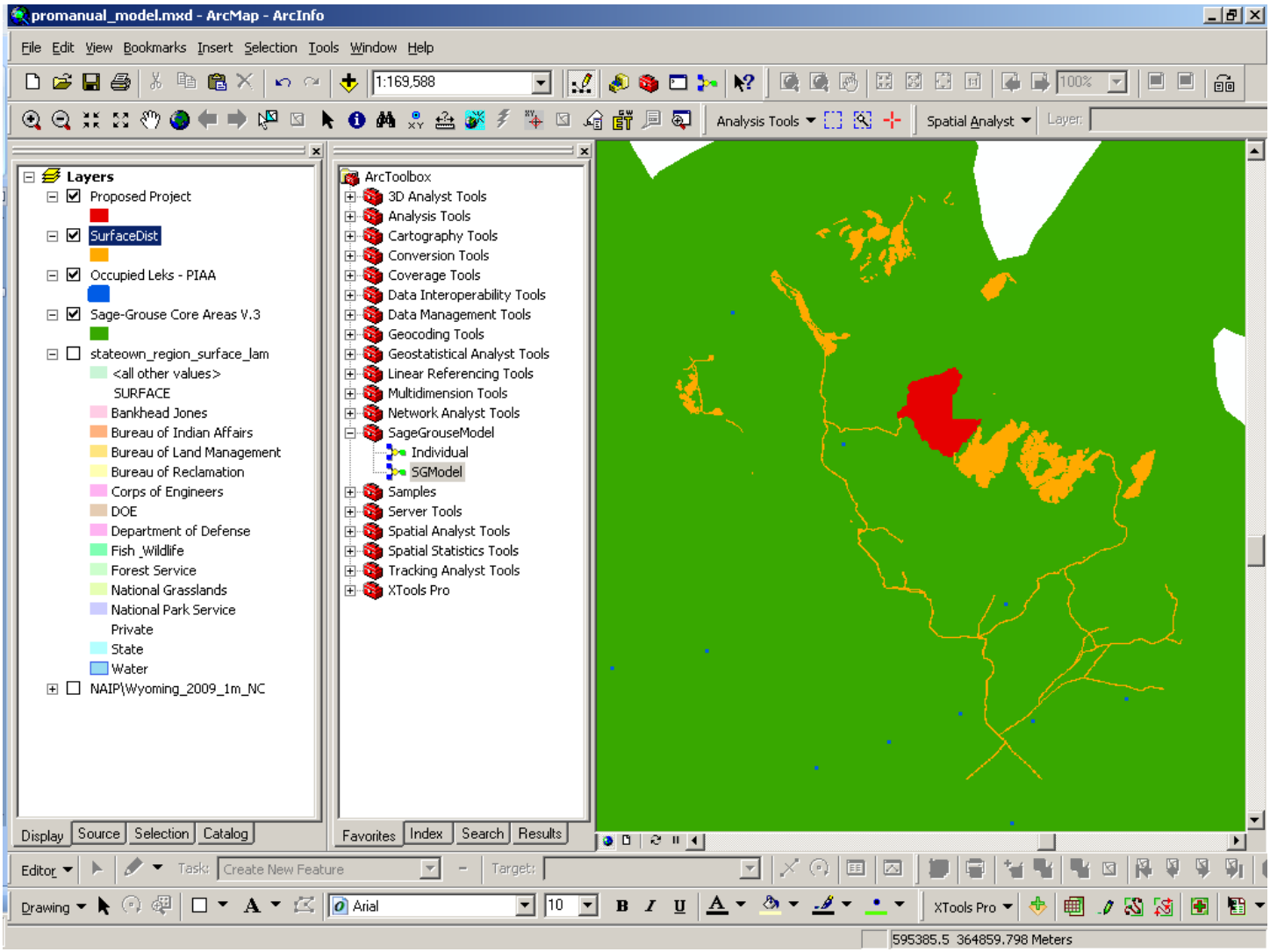
1. New Development inside Units: The key to planning development in units within core areas is to create the least amount of disturbance to suitable habitat. A unit is not automatically considered an approved activity; however, there is an expectation that development of the unit will occur. Each situation will need to be handled case-by-case and information such as development plans and reservoir characteristics will play into the BLM's decision on how to manage density and disturbance. In many cases this will best be accomplished by concentrating activity within existing (prior to 8.1.2008) unit boundaries. Disturbance and density calculations may exceed the thresholds for a DDCT because development is being concentrated in a pre 8.1.2008 unit.

2. New Development outside Units: Within existing (prior to 8.1.2008) recognized federal oil and gas units, drilling and spacing units, and other recognized developments, coordination will be a key element for the BLM, the existing unit holder, and any new project proponent inside or outside the unit. A unit will often have an approved plan of development that contemplates a shorter time period than the life of the project, so available information may only show a portion of the entire development. When projects outside the unit may cause the disturbance/disruption thresholds to be exceeded, the unit holder will need to share their full plan development with the BLM. For those circumstances where a full plan of development may never reach levels anticipated at the outset of the project it is important to determine the realistic future disturbance in order to facilitate other development activities.

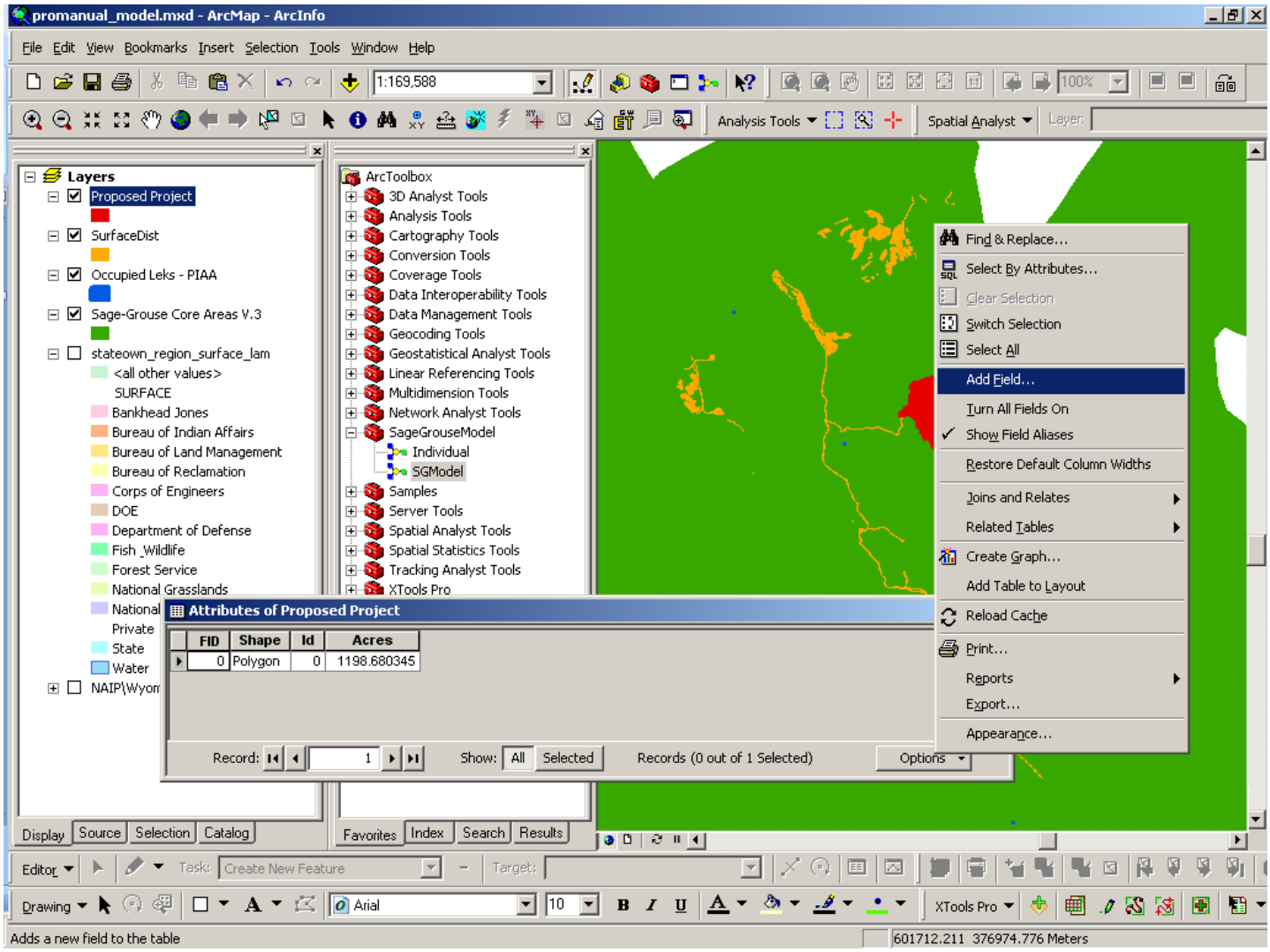
How to Run the DDCT using the Model Provided by BLM (only compatible with ArcInfo ArcGIS license):

Note: For instructions on installing the model please see the end of this document.

1. Make sure the SageGrouseModel toolbox has been added to ArcToolbox.
2. Add the proposed project boundary, sage-grouse version 3 core areas, occupied leks/ perimeter file, state surface ownership, and surfacedist feature class from the surfdist geodatabase to ArcMap. (Add data button>navigate to where those listed files are stored)



3. Open the attribute table of the proposed disturbance file. Add a Disrupt and a Disturb field to the attribute table, short integer type (Options>Add Field, repeat for Disturb field). Populate both fields with a value of 1 (Right click on column heading>Field Calculator>Enter 1 in the calculations box>Click OK, repeat for Disturb field). Creating and populating these fields will insure the model will count the proposed disturbance against the 5% disturbance calculation and the 1/640 disruption count.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Spatial Analyst
Layers
Proposed Project
SurfaceDist
Occupied Leks - PIAA
Sage-Grouse Core Areas V.3
stateown_region_surface_lam
<all other values>
SURFACE
Bankhead Jones
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Corps of Engineers
DOE
Department of Defense
Fish_Wildlife
Forest Service
National Grasslands
National
Private
State
Water
NAIP\Wyom
ArcToolbox
3D Analyst Tools
Analysis Tools
Cartography Tools
Conversion Tools
Coverage Tools
Data Interoperability Tools
Data Management Tools
Geocoding Tools
Geostatistical Analyst Tools
Linear Referencing Tools
Multidimension Tools
Network Analyst Tools
SageGrouseModel
Individual
SGModel
Samples
Server Tools
Spatial Analyst Tools
Spatial Statistics Tools
Tracking Analyst Tools
XTools Pro
Find & Replace...
Select By Attributes...
Clear Selection
Switch Selection
Select All
Add Field...
Turn All Fields On
Show Field Aliases
Restore Default Column Widths
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Related Tables
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Add Table to Layout
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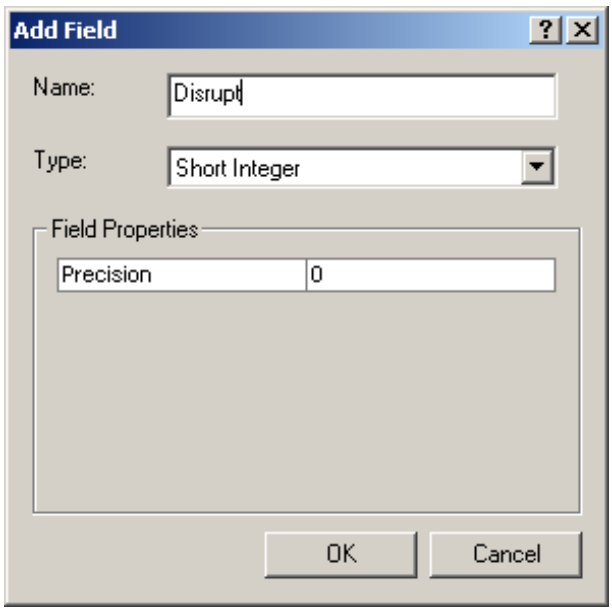
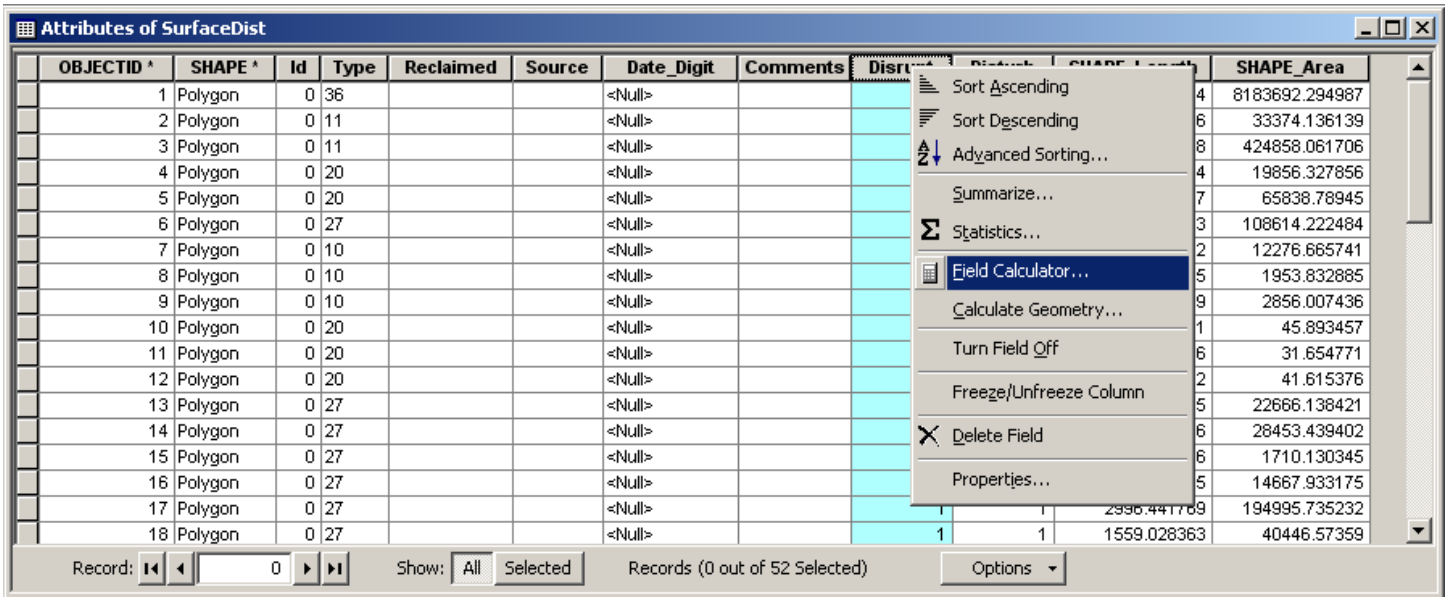
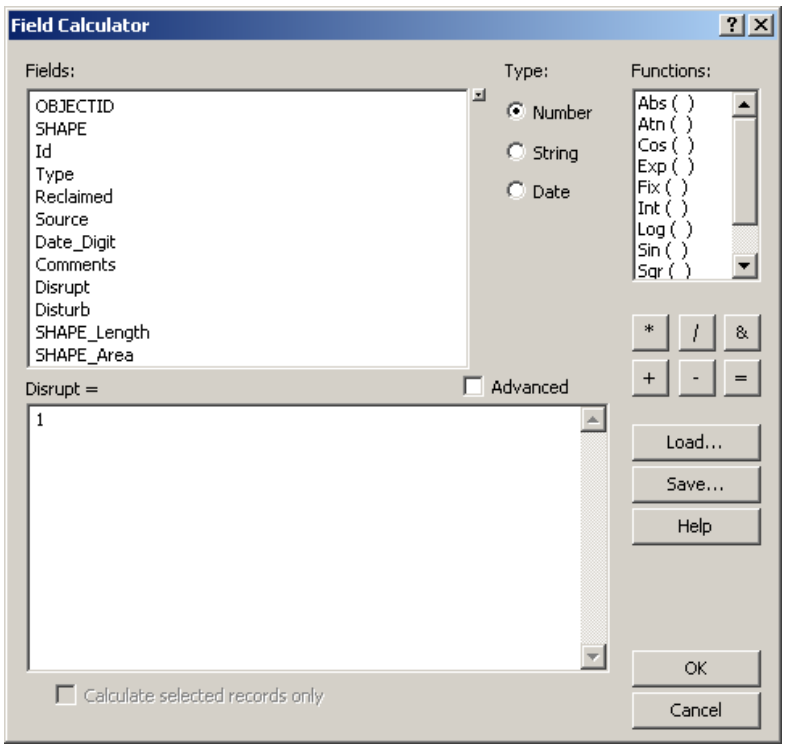

Add Field
Name: Disrupt
Type: Short Integer
Field Properties
Precision 0
OK
Cancel

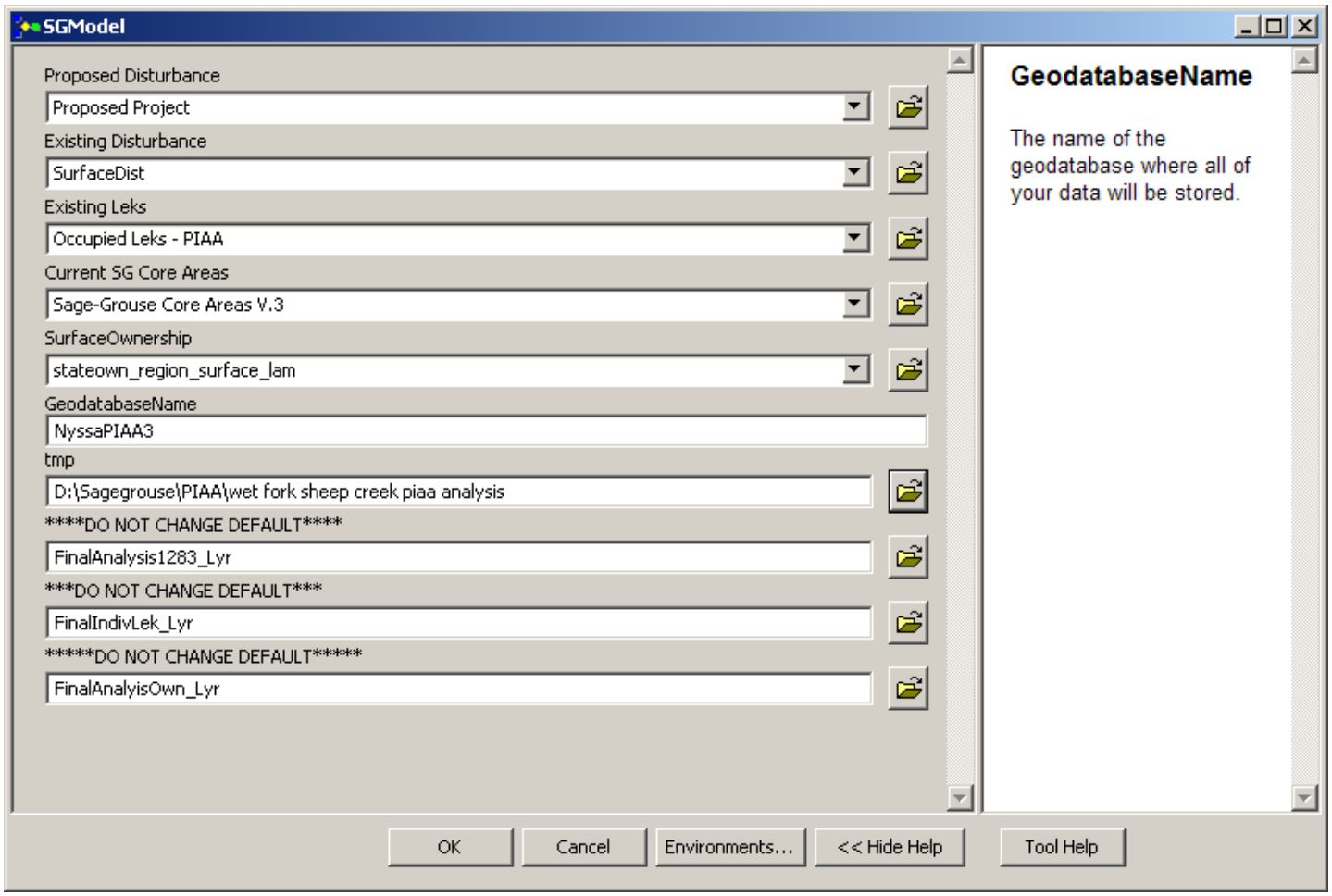
4. Open the attribute table of the SurfaceDist feature class and ensure the SurfaceDist Disrupt and Disturb fields are populated with 1's and 0's (Right click on column heading>Field Calculator>Enter 1 or 0 in the calculations box>Click OK, repeat for Disturb field) according to the type of disturbance. If a feature is not deemed a disruption or disturbance the value can be changed to 0 later and the model rerun to get accurate values. [1]



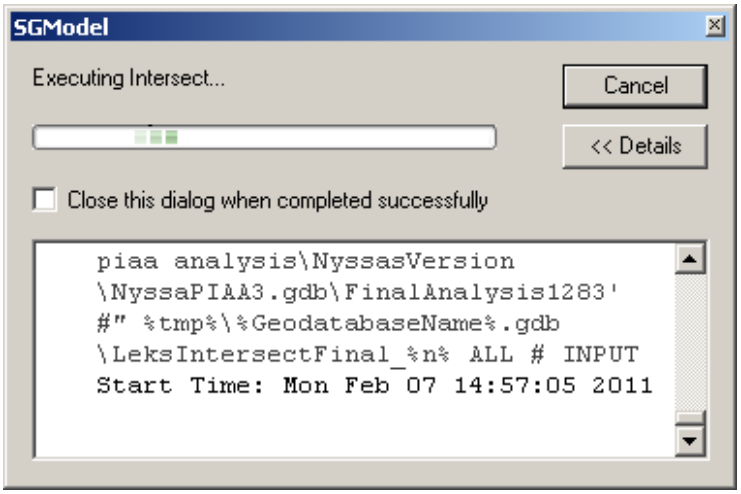


[1] Oil and gas and mining activities are the only disruptions that count towards the 1/640 density calculation

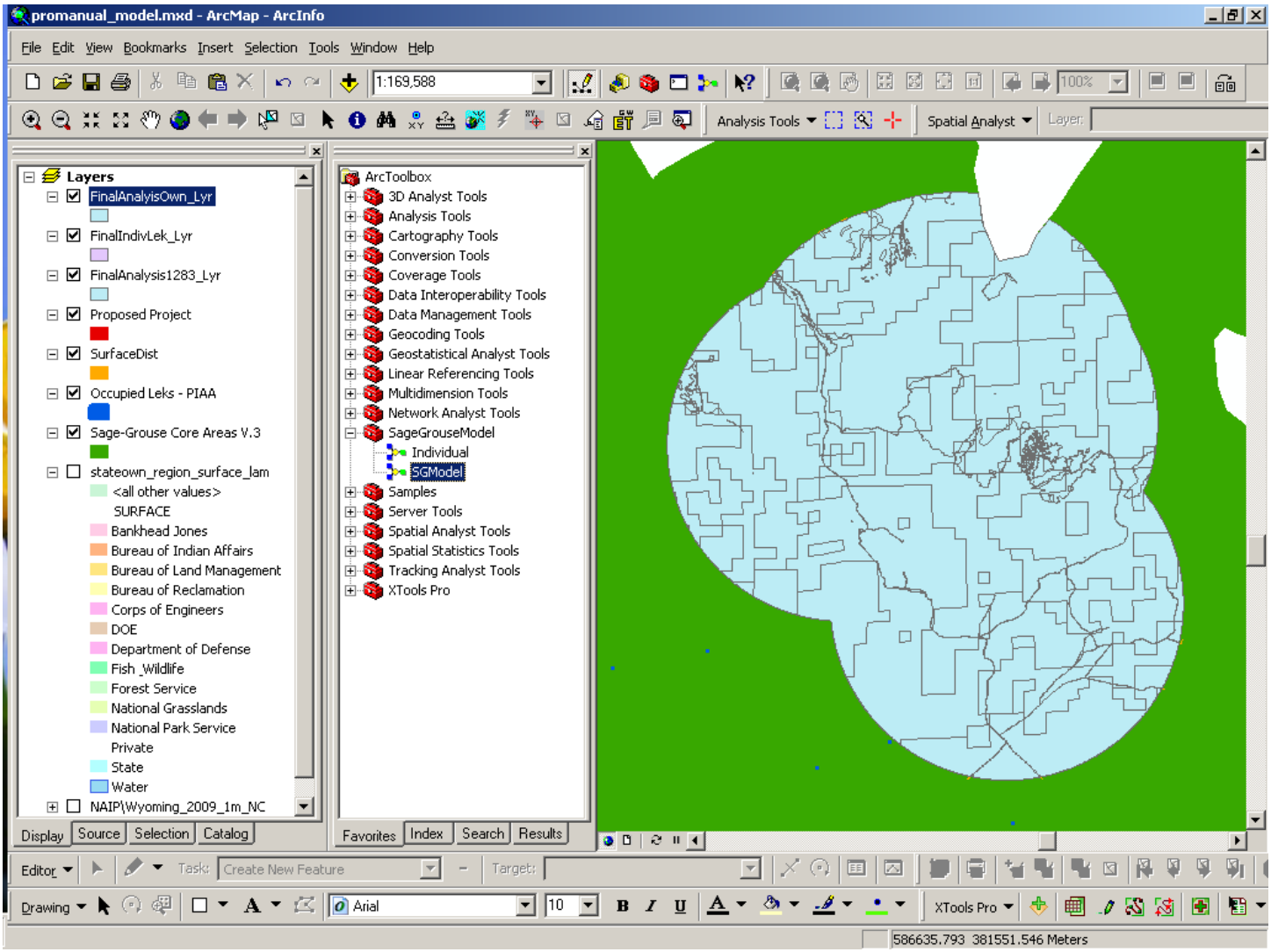
5. Double click on the “SGModel” tool.
6. Fill in the appropriate fields in the pop up box using the five files already added to ArcMap.



7. Designate a location to save the model outputs.
8. Click OK to run the model. The model could take up to 15 minutes to run.



9. Click Close when the model has completed. Three files should have been added to ArcMap, FinalIndivLek_Lyr, FinalAnalysis1283_Lyr, and FinalOwn1283_Lyr. These are the final model outputs. To see all the model outputs navigate to where the model was stored in Step 7 and add the desired files to ArcMap.



10. Make sure all current surface disturbances have been captured within the SurfDist geodatabase. Add the NAIP imagery to ArcMap. Scan the NAIP imagery at 1:5000 scale to determine that the current surface disturbance file captured all surface disturbance. Digitize any left out surface disturbance and then rerun the model starting from Step 1. Remember, if the model is rerun to rename the first set of model outputs (FinalAnalysis1283_Lyr and FinalIndivLek_Lyr) or the model will not run again. If the entire surface disturbance has been captured skip to next step.
11. Look in the attribute table of FinalAnalysis1283_Lyr to see what percentage of surface disturbance the DDCT has reached. If there are display issues with the acreage calculation please refer to the "How to Add the Model to ArcToolbox" section of this manual.

Attributes of FinalAnalysis1283_Lyr

OBJECTID *	Shape *	Final	Acres	Total_1	Percent
1	Polygon	Disturbed	3427.19587	Total	4.816679
2	Polygon	Undisturbed	67725.476022	Total	95.183321

Record: 0 Show: All Selected Records (0 out of 2

12. Open the attribute table for the FinalIndivLek_Lyr file and check to see what the percent disturbance is for each lek within the DDCT boundary.

Attributes of FinalIndivLek_Lyr

OBJECTID *	Shape *	Disturb	Acres	Final	LekID	Lek_1	Percent
1	Polygon	<Null>	1603.497397	Disturbed	27-Mud Springs 3	Lek 0	4.96296
2	Polygon	<Null>	30705.796536	Undisturbed	27-Mud Springs 3	Lek 0	95.03704
3	Polygon	<Null>	1993.585757	Disturbed	27-Old Highway	Lek 1	6.170952
4	Polygon	<Null>	30312.383651	Undisturbed	27-Old Highway	Lek 1	93.829048

Record: 0 Show: All Selected Records (0 out of 4 Selected) Option

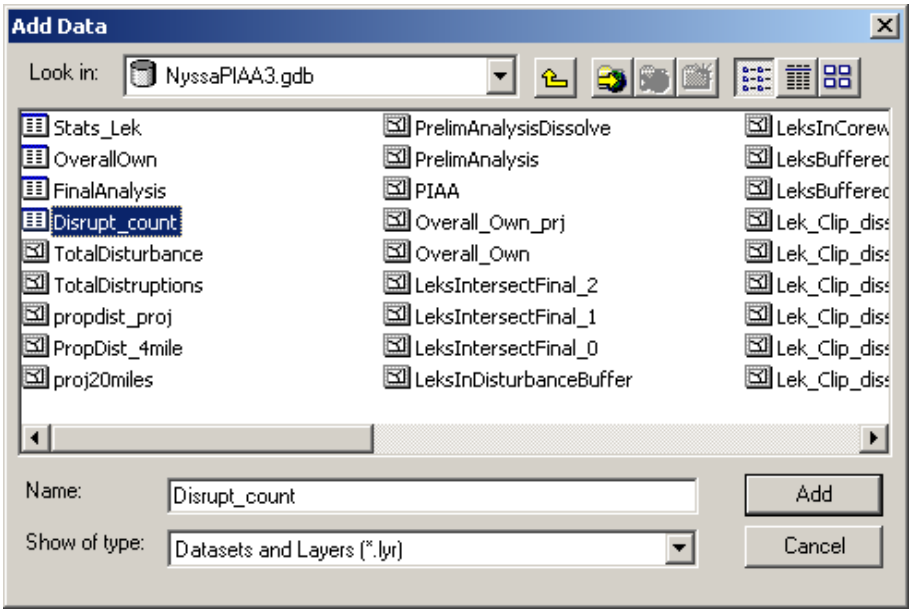
13. Open the attribute table for the FinalAnalysisOwn_Lyr and check to see what percentage of disturbance is occurring on each surface ownership type. This is especially important to BLM to highlight how much of the disturbance is within agency control.

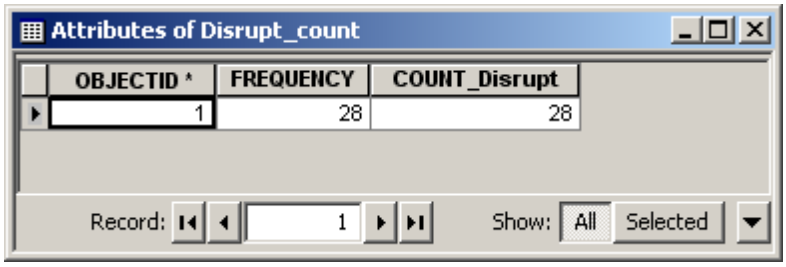
Attributes of FinalAnalyisOwn_Lyr

OBJECTID *	Shape *	Final	SURFACE	Shape_Length	Shape_Area	Acres	Total_1	SUM_Acres	Percent
1	Polygon	Disturbed	Bureau of Land Management	62785.787904	2527409.782047	624.53406	Total	71097.463332	0.87842
2	Polygon	Disturbed	Private	166733.661704	6696254.404264	1654.67388	Total	71097.463332	2.327332
3	Polygon	Disturbed	State	103676.743182	5756203.831594	1422.383254	Total	71097.463332	2.00061
4	Polygon	Undisturbed	Bureau of Land Management	298059.16501	97838776.171086	24176.391402	Total	71097.463332	34.004577
5	Polygon	Undisturbed	Private	442270.334768	115917896.871531	28643.82155	Total	71097.463332	40.288106
6	Polygon	Undisturbed	State	267357.077227	58985835.930242	14575.659186	Total	71097.463332	20.500955

Record: 1 Show: All Selected Records (0 out of 6 Selected) Options

14. Navigate to where the output DDCT geodatabase was stored in Step 7. Add the table Disrupt_count to ArcMap. Open this table to see the count of disruptions within the DDCT. Use this number to check whether the DDCT is exceeding the 1 average disruption per 640 acres threshold.





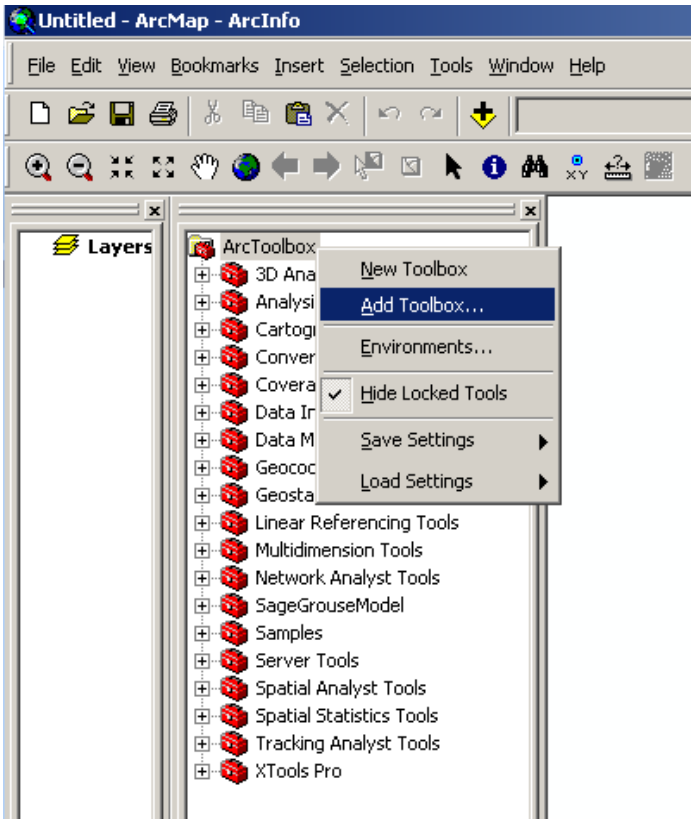
How to Report Your DDCT Results to the Appropriate Permitting Agency:

Provide a map of the DDCT results including: the DDCT boundary, sage-grouse core areas, core area occupied leks and perimeters, proposed project boundary, and current surface disturbance clearly labeled. Also, include DDCT figures (disturbance, density, etc), comments on the project, and the output DDCT geodatabase.

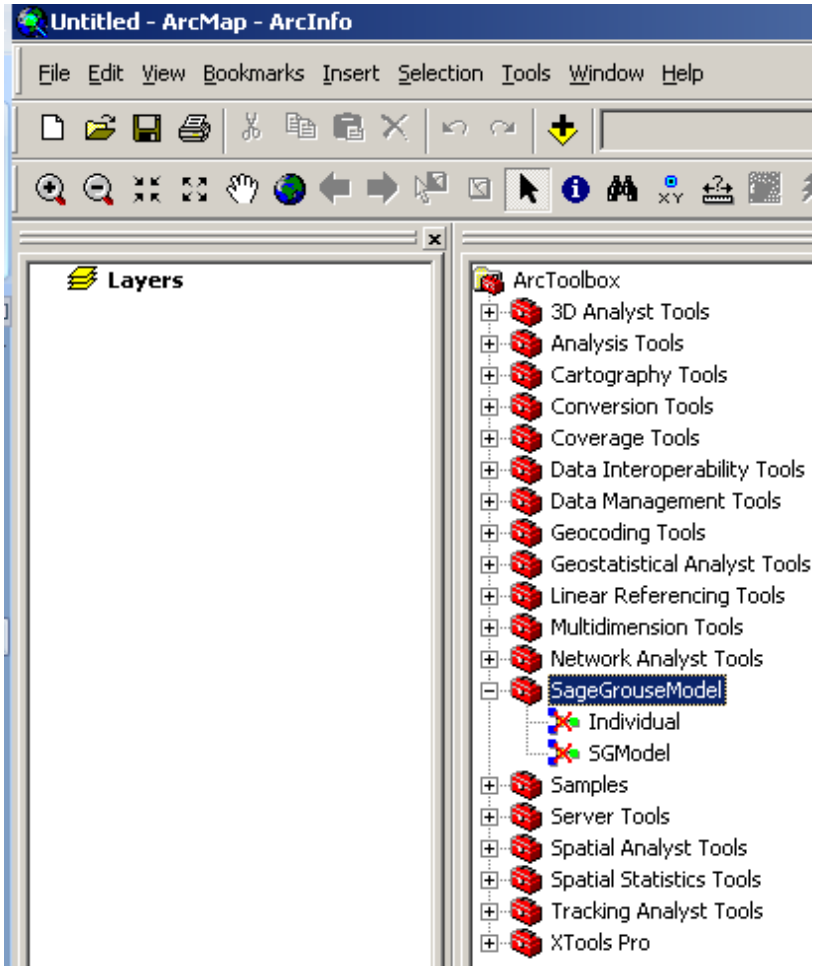
How to Add the Model to ArcToolbox:

You must know where the model is stored on your computer to complete these steps.

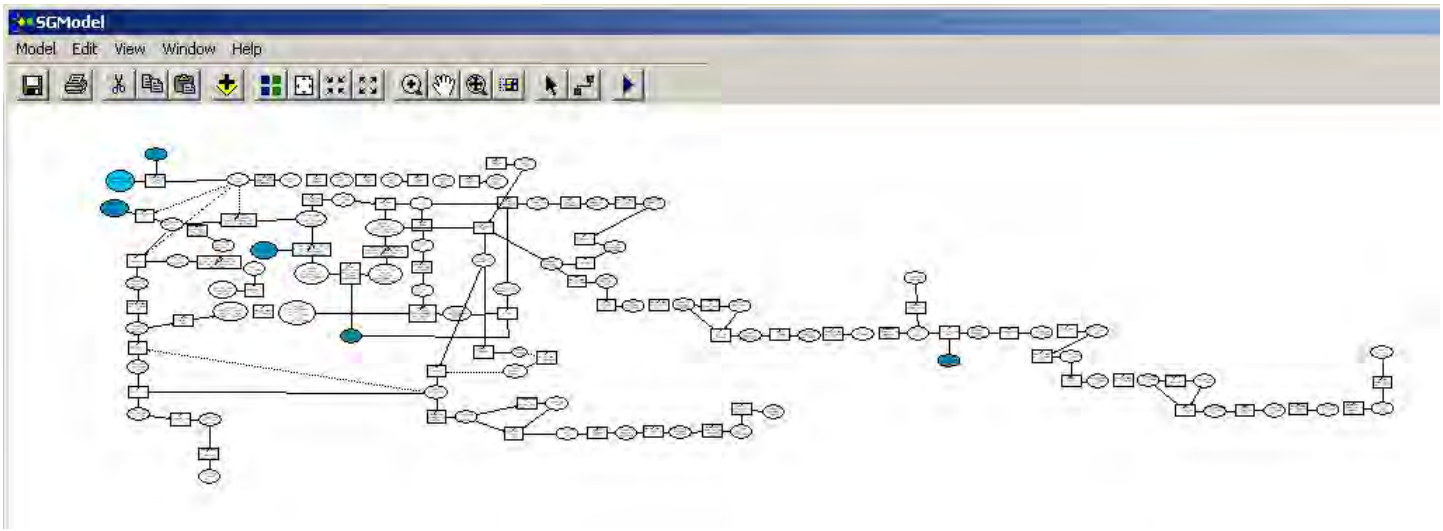
1. Open ArcMap
2. Display the ArcToolbox Window (Click on the red toolbox icon on standard toolbar).
3. Right click on ArcToolbox (top of window) and select Add Toolbox.



4. Navigate to where the SageGrouseModel Toolbox is stored, select it and click Open.
5. After the toolbox is added right click ArcToolbox again and select Save Settings to Default. This will insure the model is available every time ArcMap is opened.
6. Expand the SageGrouseModel toolbox by clicking on the + next to it.



7. There will be two models, SGModel and Individual; SGModel will have a red X through the icon. To fix the red X and make the model run complete the following steps:
    a. Right click on the SGModel and select Edit.
    b. Look for the Create File GDB box. It will be a white box with a red X, located in the upper left hand corner of the model and highlighted with a red circle below. Double Click it.



   c. Navigate to the Data Management Workspace toolbox and add the “Create File GDB” Tool (should be located at C:\program files\ArcGIS\ArcToolbox\Toolboxes\Data Management Tools\Workspace\Create File GDB).
   d. Save the model and close it.
8. The red X through the model icon should be gone and the models are ready to run.

How to Delineate a DDCT Step by Step:

If you run the model provided by BLM then you will not have to delineate a DDCT step by step. It is important to understand the concepts and actions the model is completing. This process is outlined in Attachment B of the Executive Order.

1. Buffer the proposed disturbance area or project boundary by 4 miles. (ArcToolbox>Analysis Tools>Proximity>Buffer)
2. Clip the project boundary buffer created in Step 1 to the sage-grouse core areas. (ArcToolbox>Analysis Tools>Extract>Clip)
3. Use the clipped project boundary created in Step 2 to select all occupied core area sage-grouse occupied leks/perimeters occurring within that 4 mile buffer. (Select by Location > Select features from occupied leks/perimeters that are within created buffer)
4. Buffer all occupied leks/perimeters captured in Step 3 by 4 miles. (ArcToolbox>Analysis Tools>Proximity>Buffer)
5. Clip the occupied lek/perimeter buffer to the sage-grouse core areas. (ArcToolbox>Analysis Tools>Extract>Clip)
6. Union the clipped project area buffer and the clipped occupied lek/perimeters buffer together. (ArcToolbox>Analysis Tools>Overlay>Union)
7. Dissolve the above Union into a polygon. This polygon represents the DDCT area. (ArcToolbox>Data Management Tools>Generalization>Dissolve)
8. Locate all existing disturbance within the DDCT. After analyzing all the available disturbance files scan the entire DDCT with the 2009 True Color NAIP imagery in the background at a 1:5000 scale. Digitize all disturbances that have not been captured, or appear inaccurate, in the SurfDist geodatabase, available on the ftp_piaa site. Turn on Editing> Task is Create New Feature> Use the Sketch Tool (looks like a pencil) to digitize disturbance. Make sure to use the SurfDist geodatabase as it will help standardize data collection for a statewide disturbance file. Make sure none of the disturbance polygons overlap; this will over calculate the disturbed acres. Dissolve all disturbance files and/or all polygons within that file together after the digitizing to eliminate this problem.
9. Clip the disturbance file to the DDCT boundary. (ArcToolbox>Analysis Tools>Extract>Clip)
10. Calculate the acreage for the surface disturbance file, the DDCT, and the proposed project boundary. (X-Tools Pro>Table Operations>Calculate Acres)
11. Add the total disturbed acres and the total acres of the project boundary together and compare to 5% of the DDCT acres.
12. Count the number of disruptions in the DDCT and verify that it does not exceed the average of 1 disruption per 640 acres threshold.
13. To conduct the individual occupied lek analysis, retrieve the occupied lek/perimeter buffer file that was clipped to the sage-grouse core areas in step 5. Use this file to clip each occupied lek buffer to the surface disturbance and proposed disturbance files. Calculate acreage figures based on those clips to evaluate to individual impacts to the occupied leks within the DDCT boundary selected in step 3. This analysis is only used to derive alternatives and has no bearing on the overall outcome of the 5% disturbance threshold and the 1 average disruption per 640 acres threshold.
14. Report results by providing a map of the DDCT analysis with the DDCT boundary, sage-grouse core areas, occupied core area occupied leks and perimeters, proposed project boundary, and current surface disturbance clearly labeled. Also, include DDCT figures, comments on the project, and the file outputs from performing the DDCT analysis.

Examples of Proposed Project Boundaries:

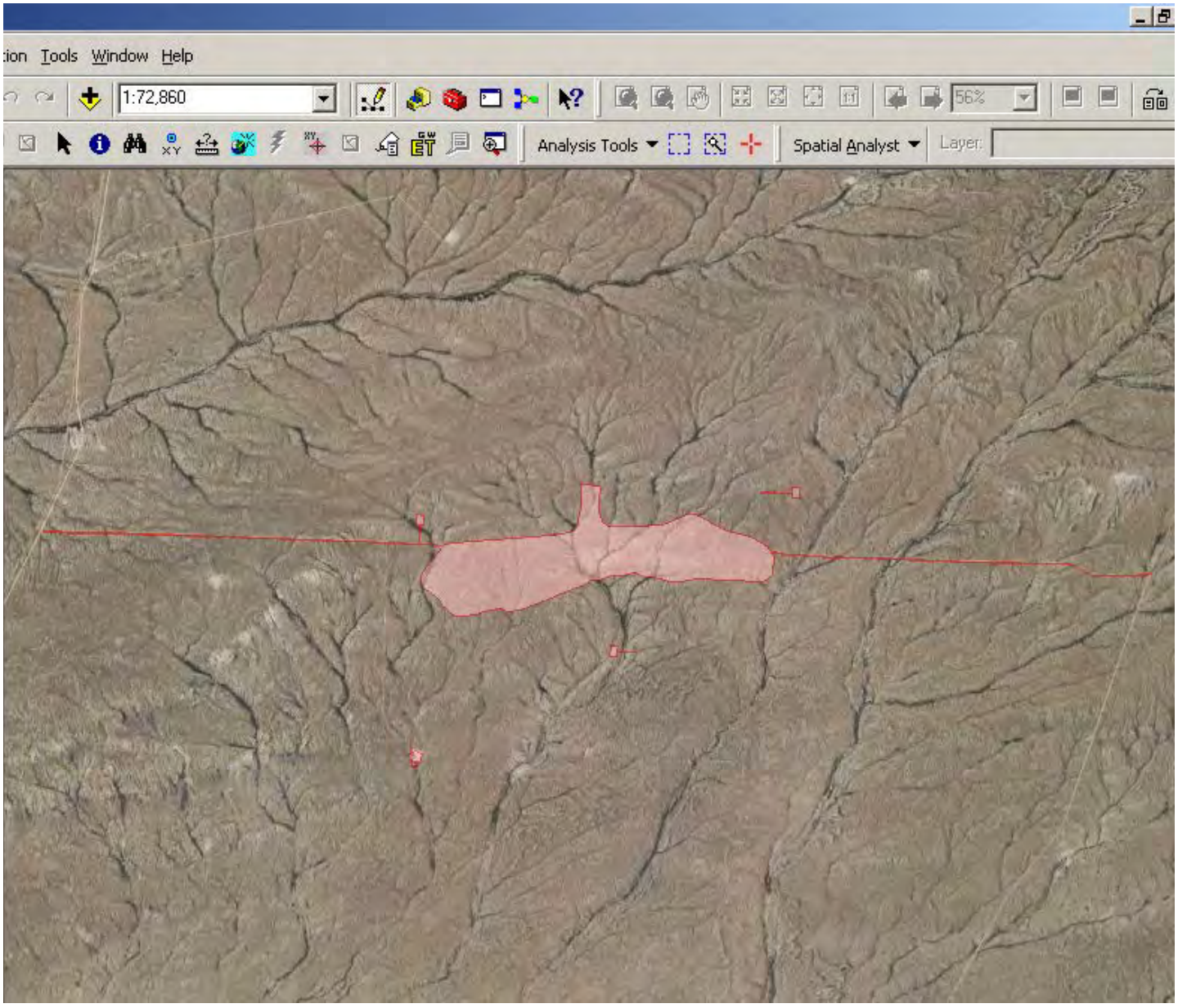
Attribute table with Disrupt and Disturb fields populated with a value of 1.

Attributes of proposed surface disturbance

FID	Shape	Id	Acres	Disrupt	Disturb
0	Polygon	0	496.995301	1	1
1	Polygon	0	514.077481	1	1

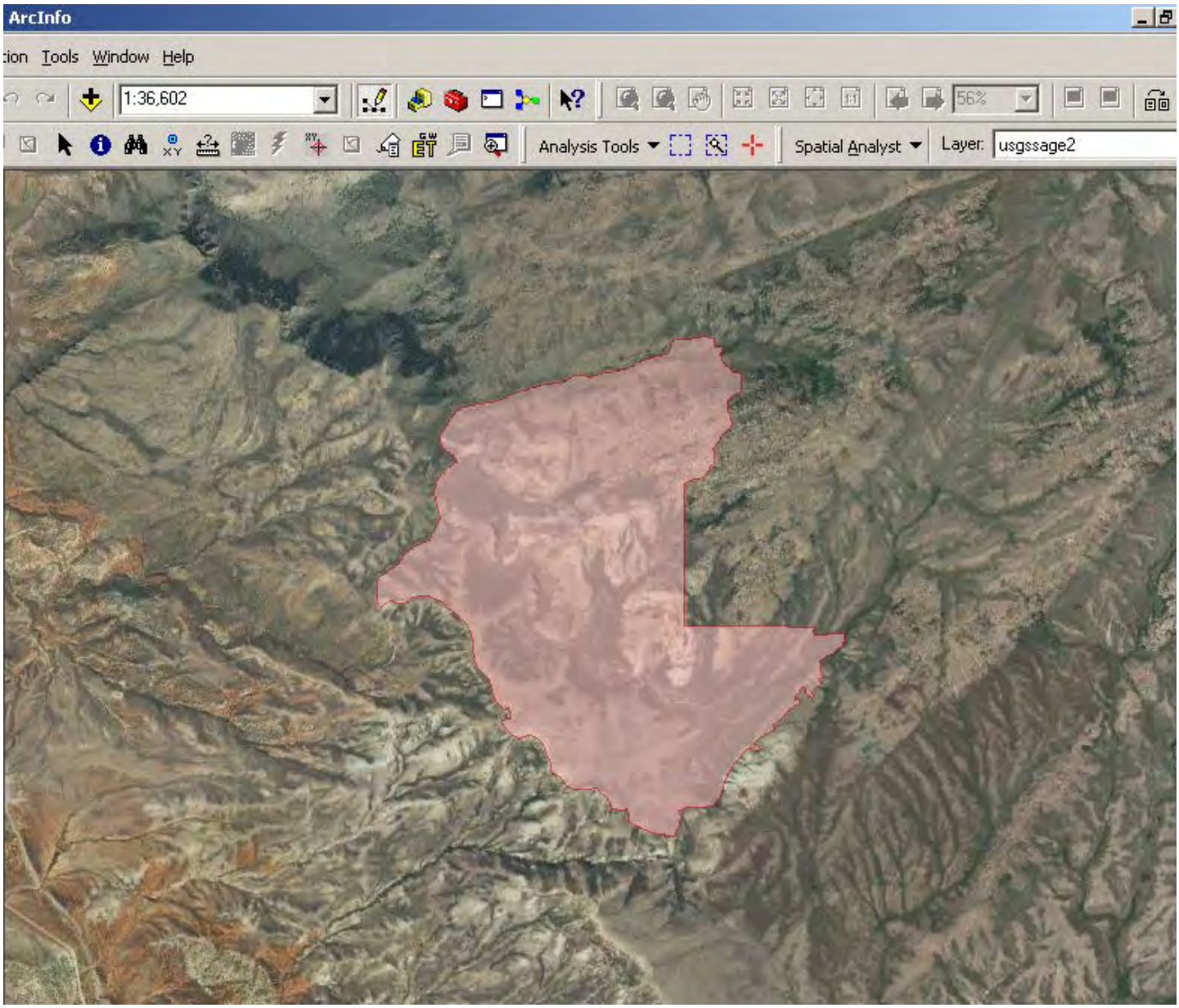
Record: 1 Show: All Selected Records (0 out

Mine:



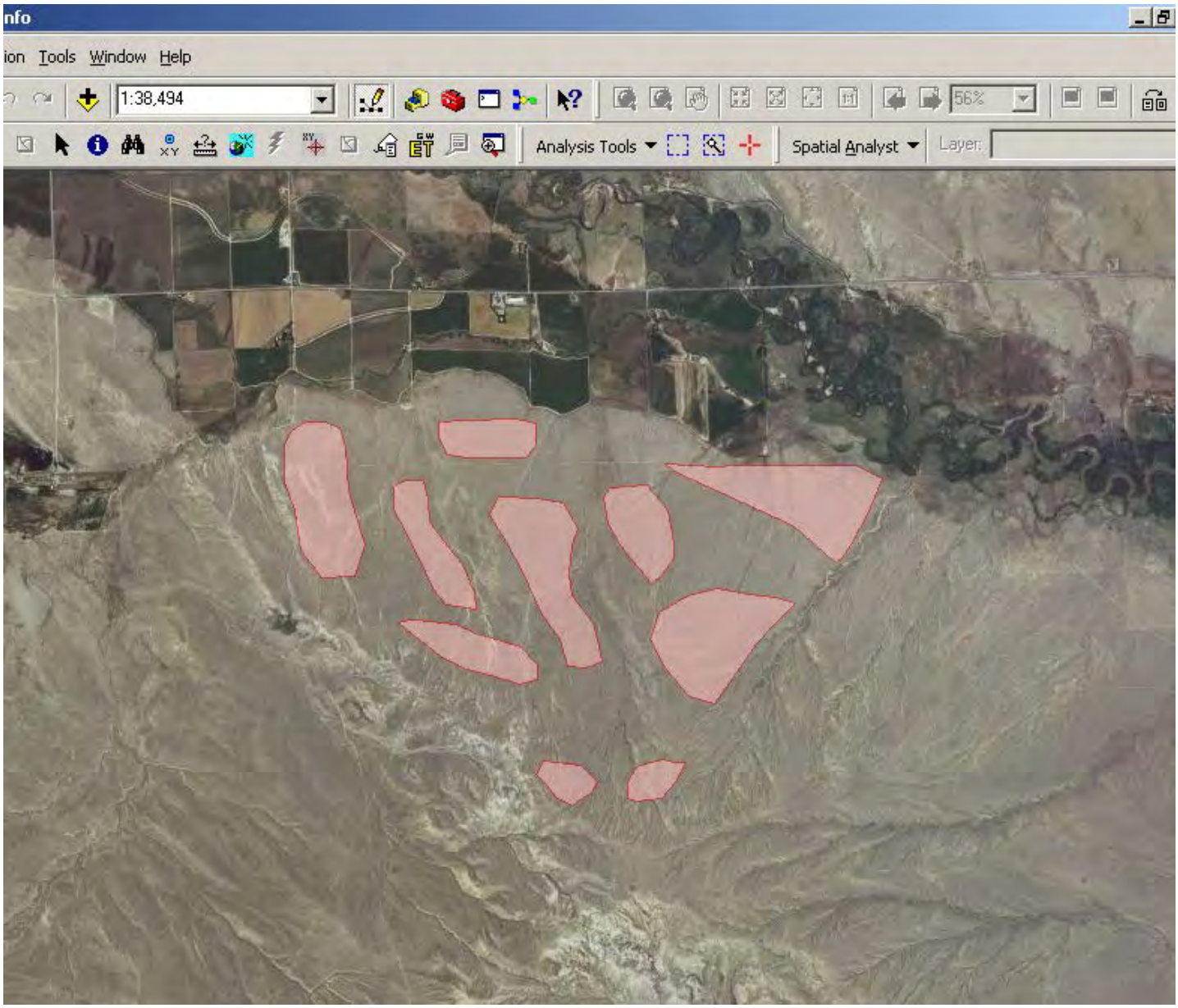
Examples of Proposed Project Boundaries:

Burn Vegetation Treatment:



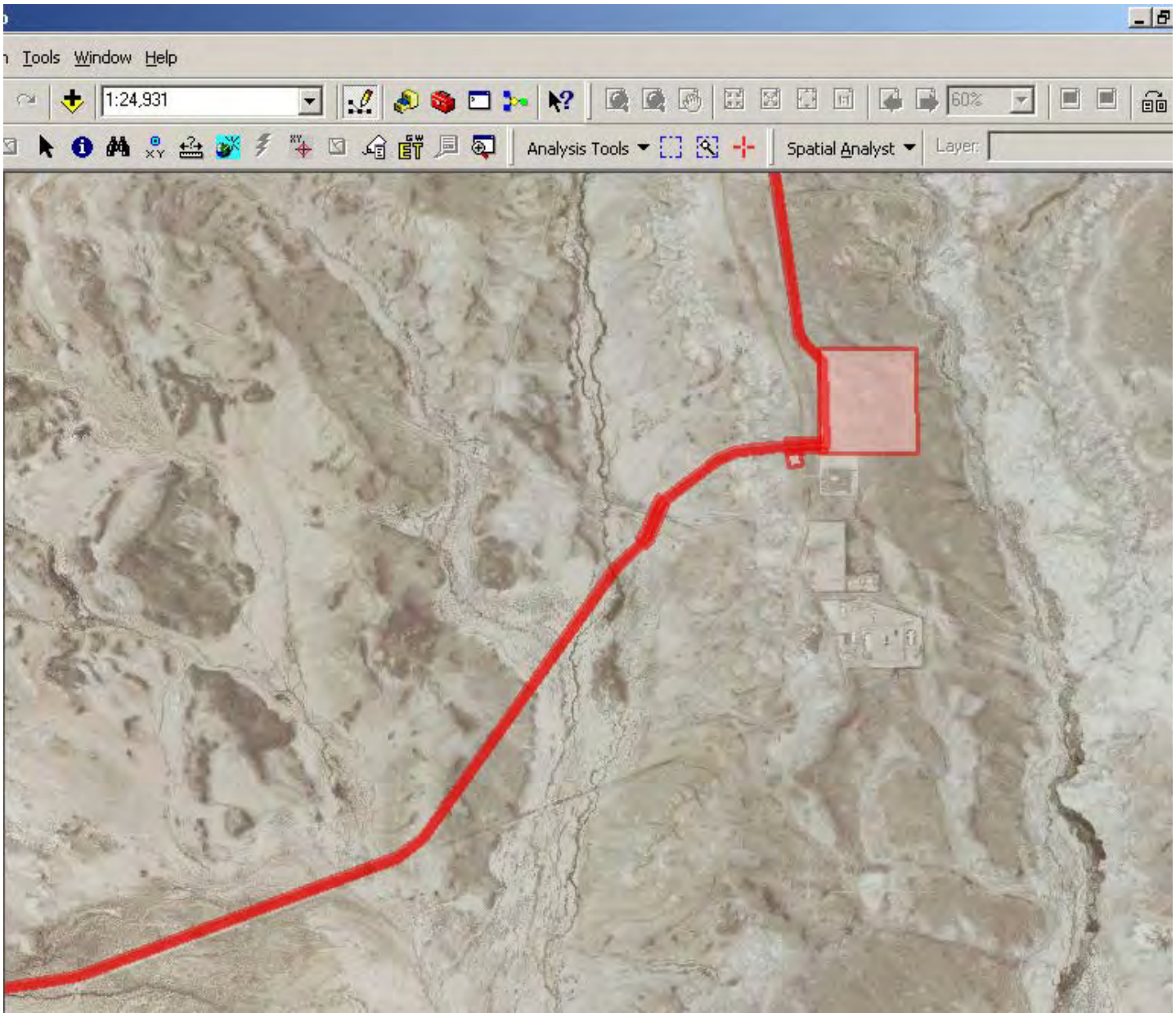
Examples of Proposed Project Boundaries:

Mowing Vegetation Treatment:



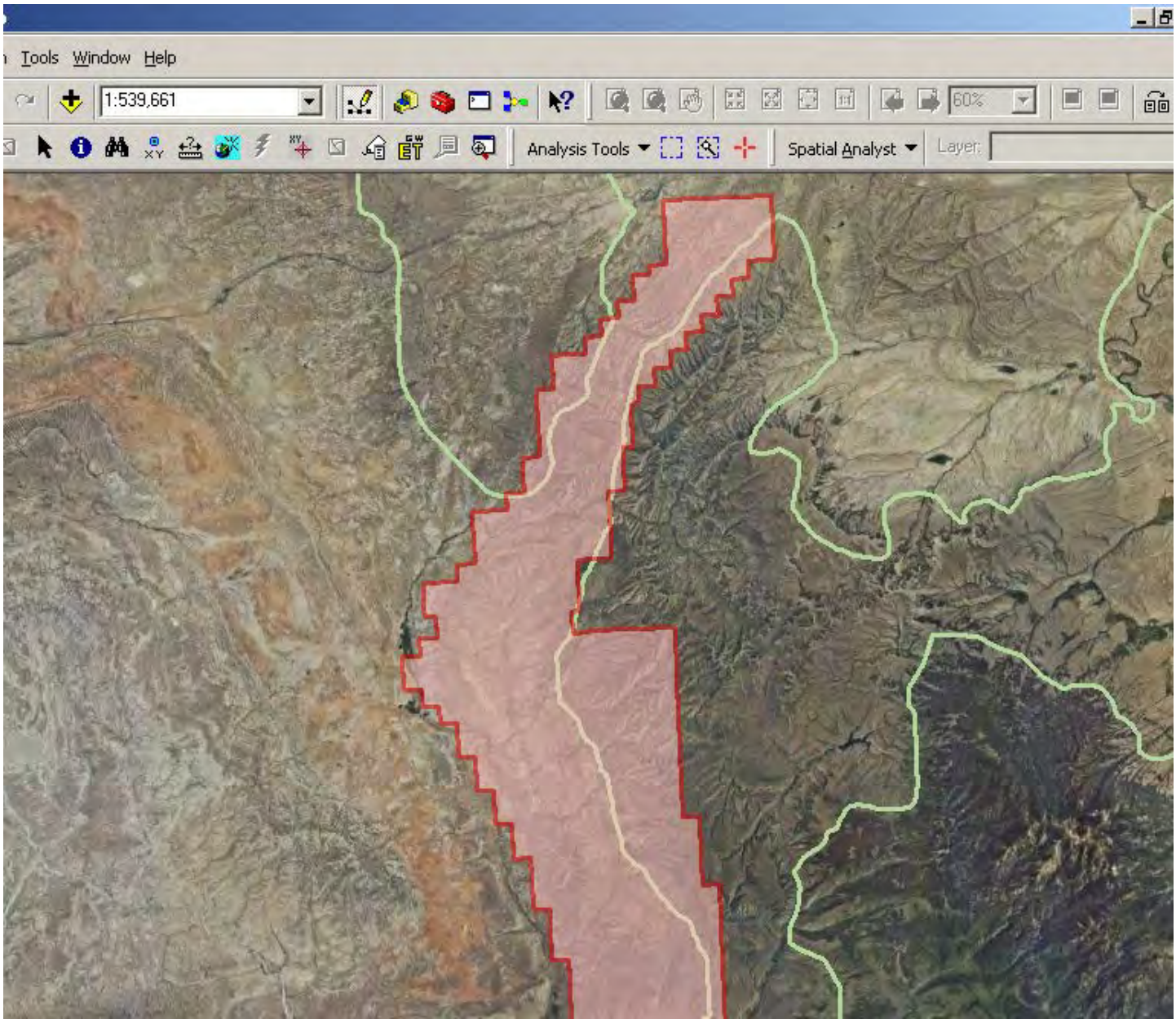
Examples of Proposed Project Boundaries:

Pipeline Section:



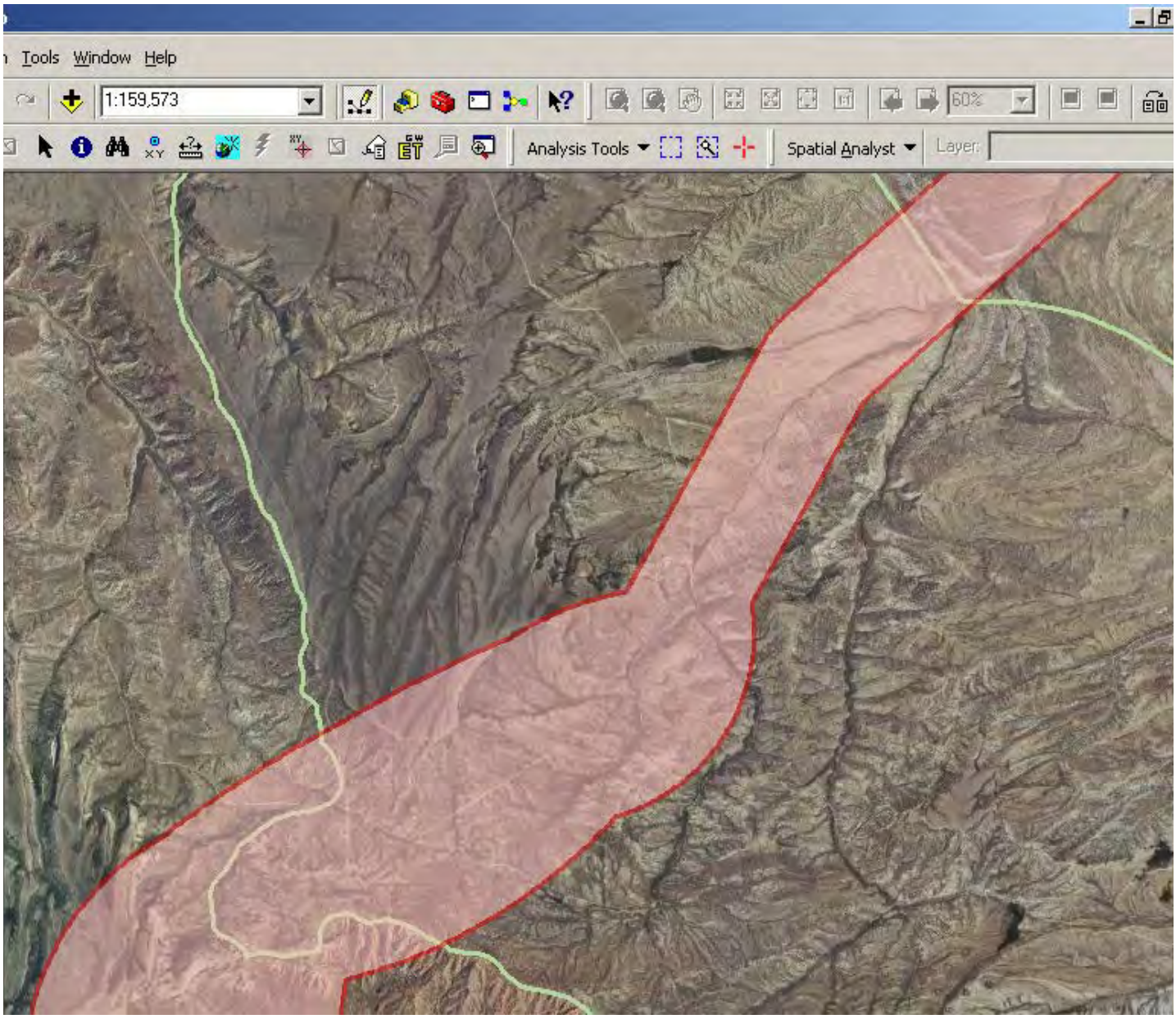
Examples of Proposed Project Boundaries:

Oil and Gas Field:

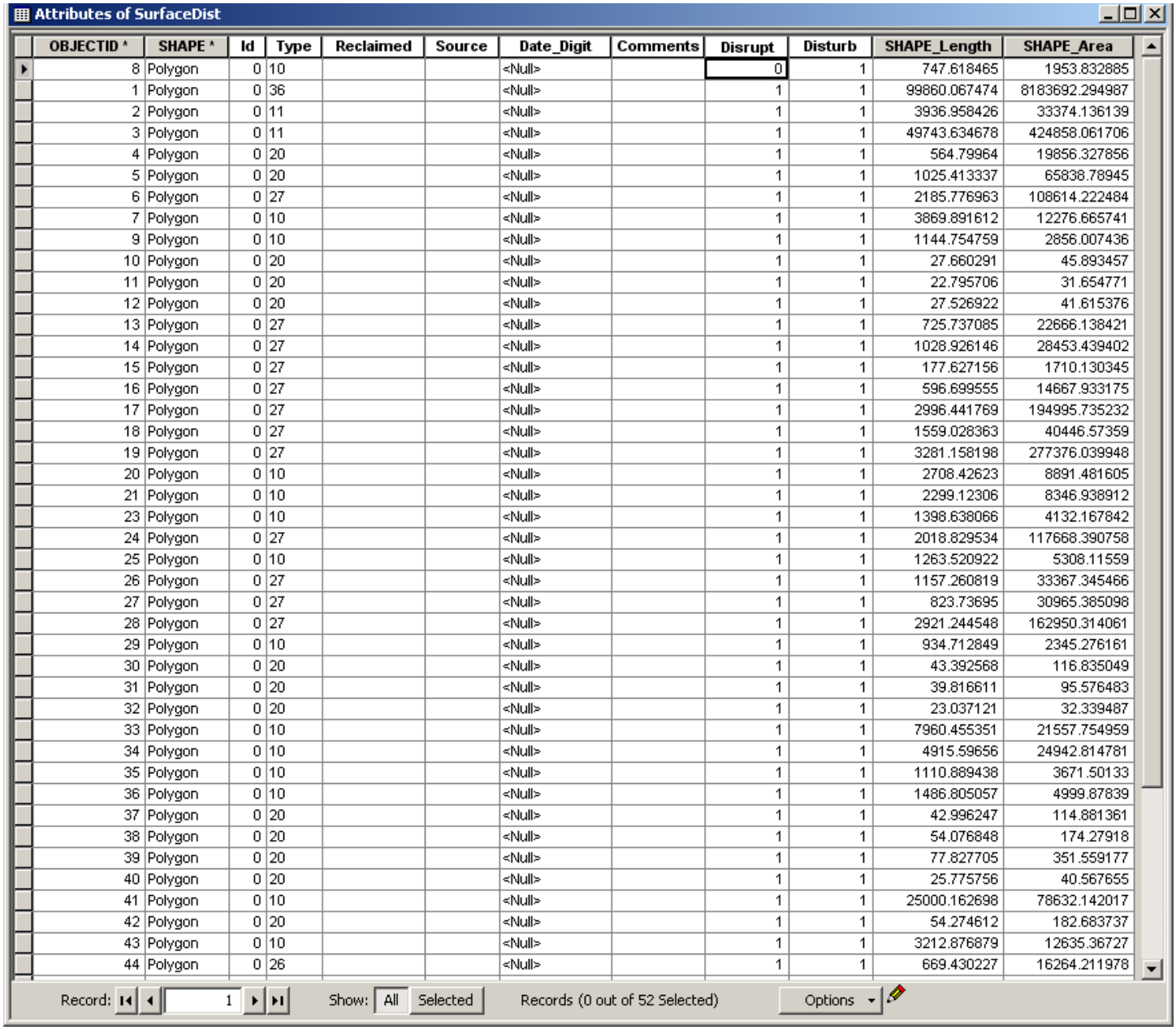


Examples of Proposed Project Boundaries:

Transmission Line Scoping Polygon (if specific disturbance plan provided use that boundary):



Examples of Existing Disturbance: SurfDist geodatabase filled out attribute table:



Attributes of SurfaceDist

OBJECTID *	SHAPE *	Id	Type	Reclaimed	Source	Date_Digit	Comments	Disrupt	Disturb	SHAPE_Length	SHAPE_Area
8	Polygon	0	10			<Null>		0	1	747.618465	1953.832885
1	Polygon	0	36			<Null>		1	1	99860.067474	8183692.294987
2	Polygon	0	11			<Null>		1	1	3936.958426	33374.136139
3	Polygon	0	11			<Null>		1	1	49743.634678	424858.061706
4	Polygon	0	20			<Null>		1	1	564.79964	19856.327856
5	Polygon	0	20			<Null>		1	1	1025.413337	65838.78945
6	Polygon	0	27			<Null>		1	1	2185.776963	108614.222484
7	Polygon	0	10			<Null>		1	1	3869.891612	12276.665741
9	Polygon	0	10			<Null>		1	1	1144.754759	2856.007436
10	Polygon	0	20			<Null>		1	1	27.660291	45.893457
11	Polygon	0	20			<Null>		1	1	22.795706	31.654771
12	Polygon	0	20			<Null>		1	1	27.526922	41.615376
13	Polygon	0	27			<Null>		1	1	725.737085	22666.138421
14	Polygon	0	27			<Null>		1	1	1028.926146	28453.439402
15	Polygon	0	27			<Null>		1	1	177.627156	1710.130345
16	Polygon	0	27			<Null>		1	1	596.699555	14667.933175
17	Polygon	0	27			<Null>		1	1	2996.441769	194995.735232
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21	Polygon	0	10			<Null>		1	1	2299.12306	8346.938912
23	Polygon	0	10			<Null>		1	1	1398.638066	4132.167842
24	Polygon	0	27			<Null>		1	1	2018.829534	117668.390758
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26	Polygon	0	27			<Null>		1	1	1157.260819	33367.345466
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30	Polygon	0	20			<Null>		1	1	43.392568	116.835049
31	Polygon	0	20			<Null>		1	1	39.816611	95.576483
32	Polygon	0	20			<Null>		1	1	23.037121	32.339487
33	Polygon	0	10			<Null>		1	1	7960.455351	21557.754959
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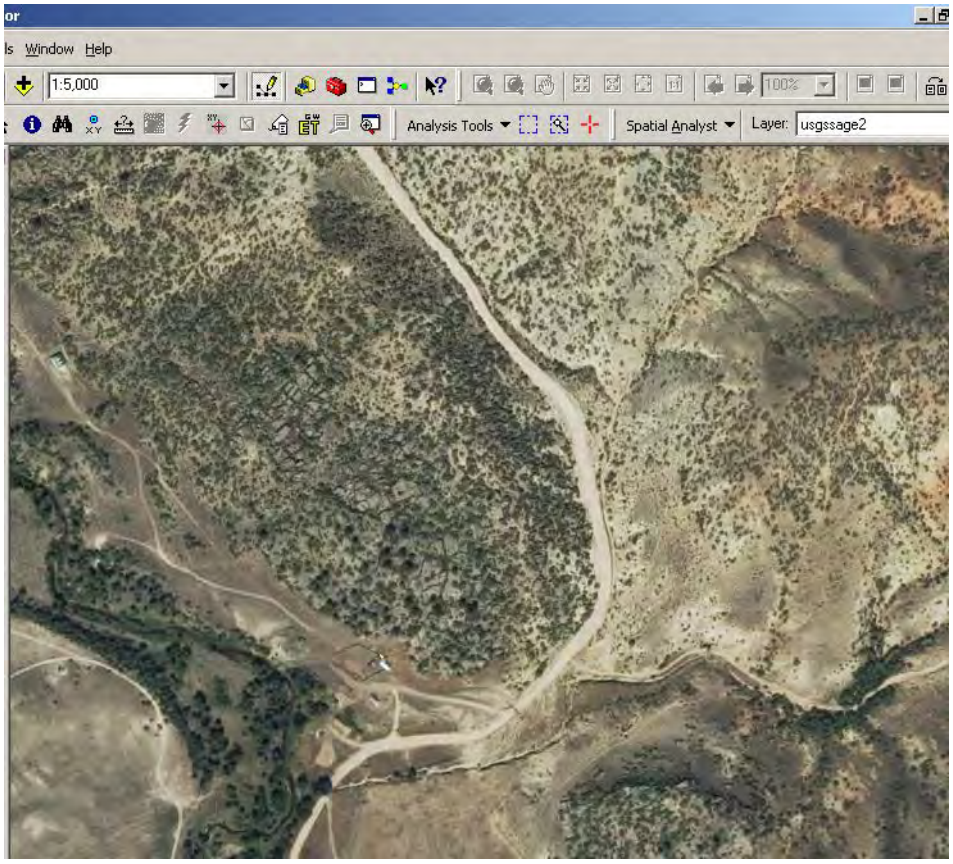
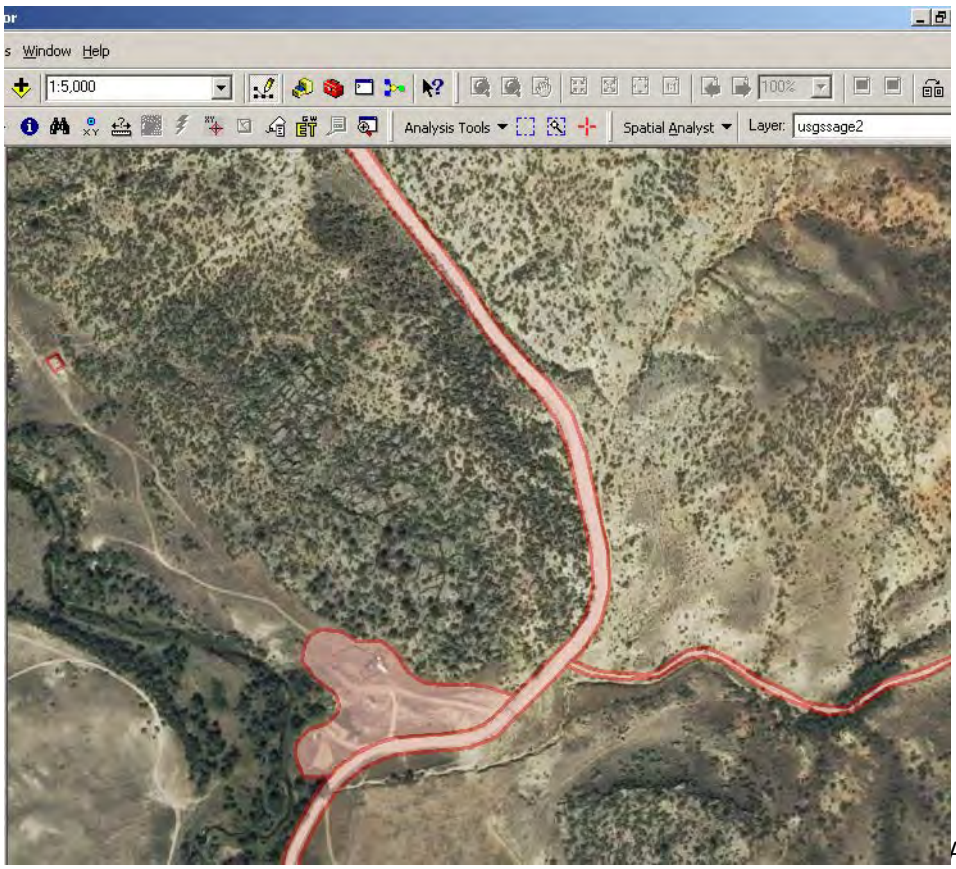
39	Polygon	0	20			<Null>		1	1	77.827705	351.559177
40	Polygon	0	20			<Null>		1	1	25.775756	40.567655
41	Polygon	0	10			<Null>		1	1	25000.162698	78632.142017
42	Polygon	0	20			<Null>		1	1	54.274612	182.683737
43	Polygon	0	10			<Null>		1	1	3212.876879	12635.36727
44	Polygon	0	26			<Null>		1	1	669.430227	16264.211978

Record: 1 Show: All Selected Records (0 out of 52 Selected) Options

Examples of Existing Disturbance: Ranch, road, and building:

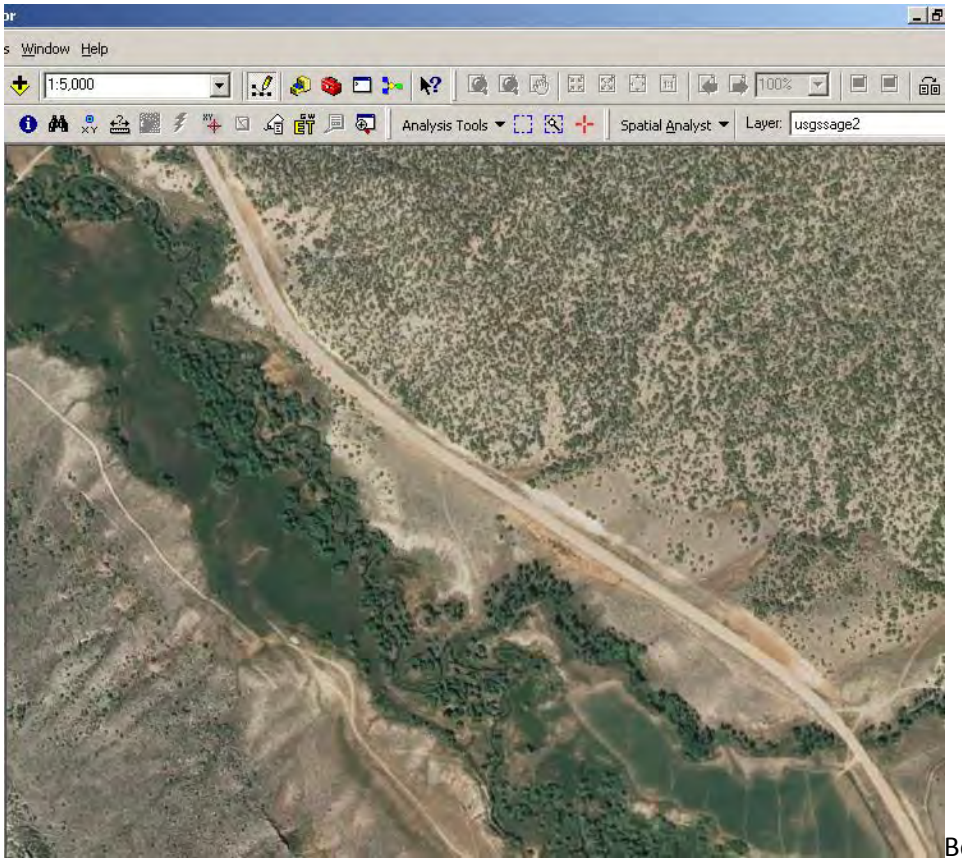


Before



After

Examples of Existing Disturbance: Road and cropland:



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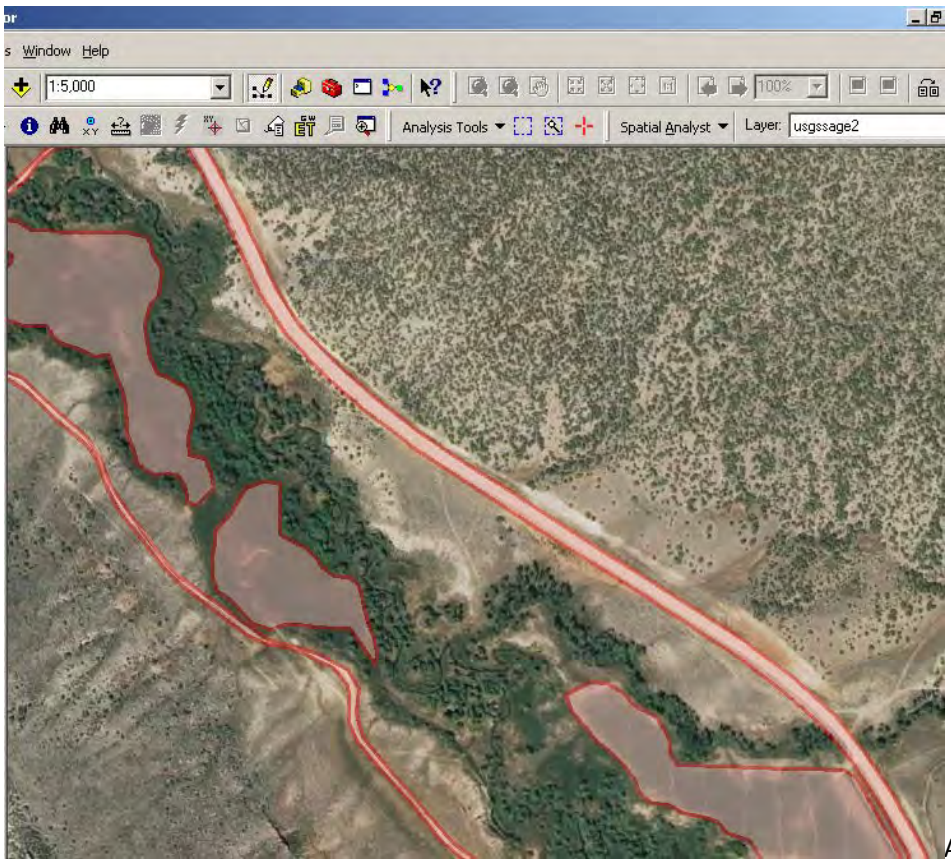
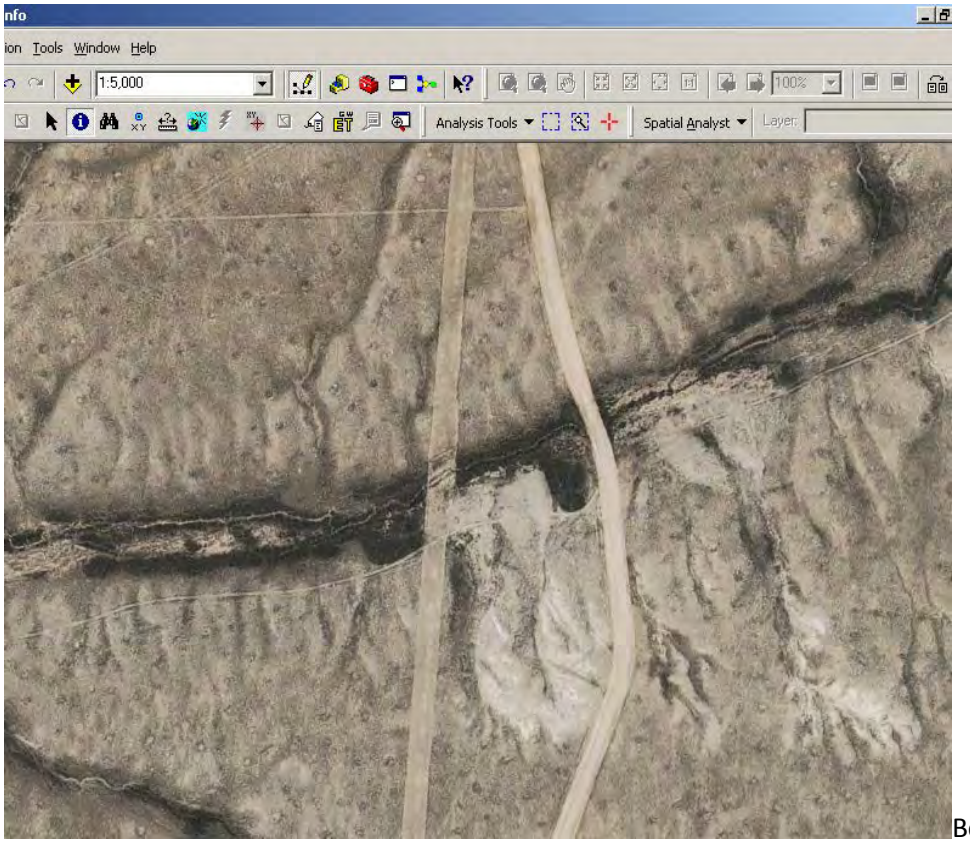


After

Examples of Existing Disturbance: Road and pipeline/utility corridor scar:



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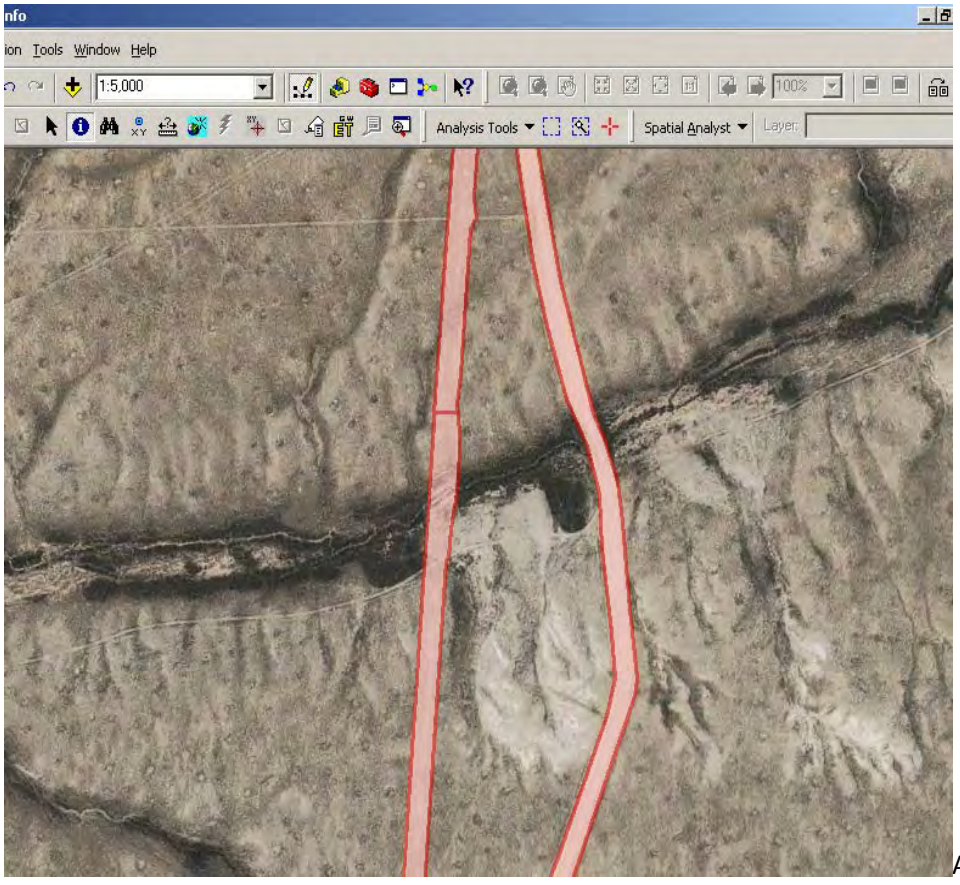
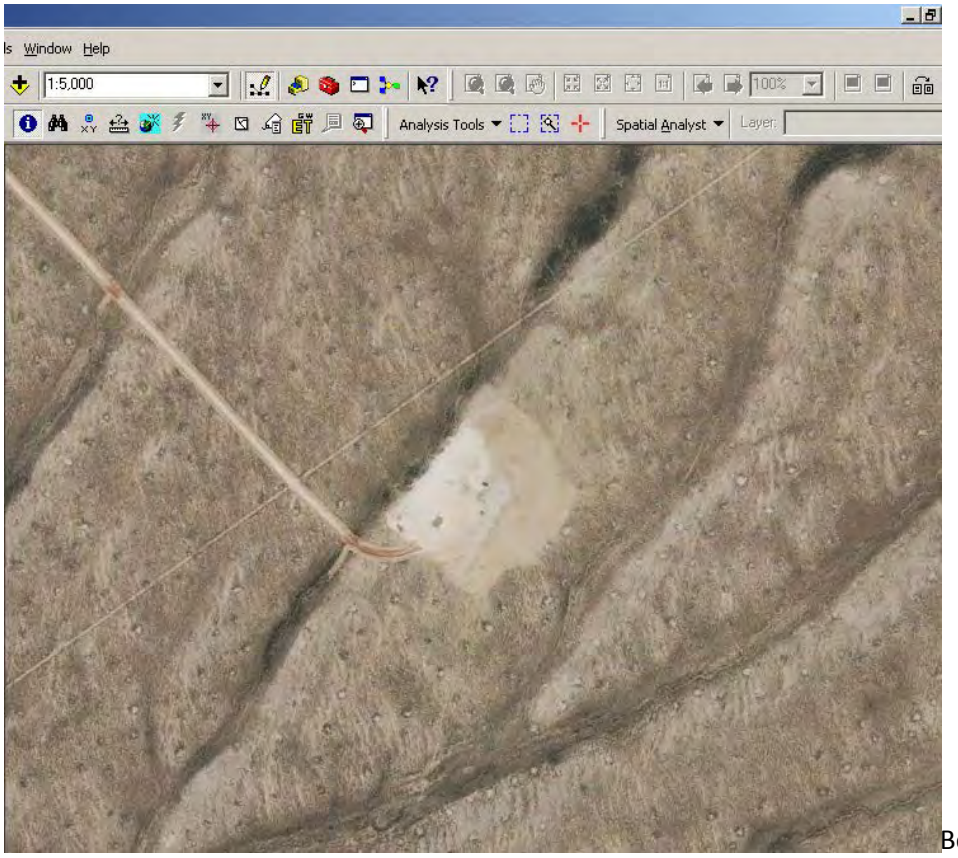


After

Examples of Existing Disturbance: Well pad and road:



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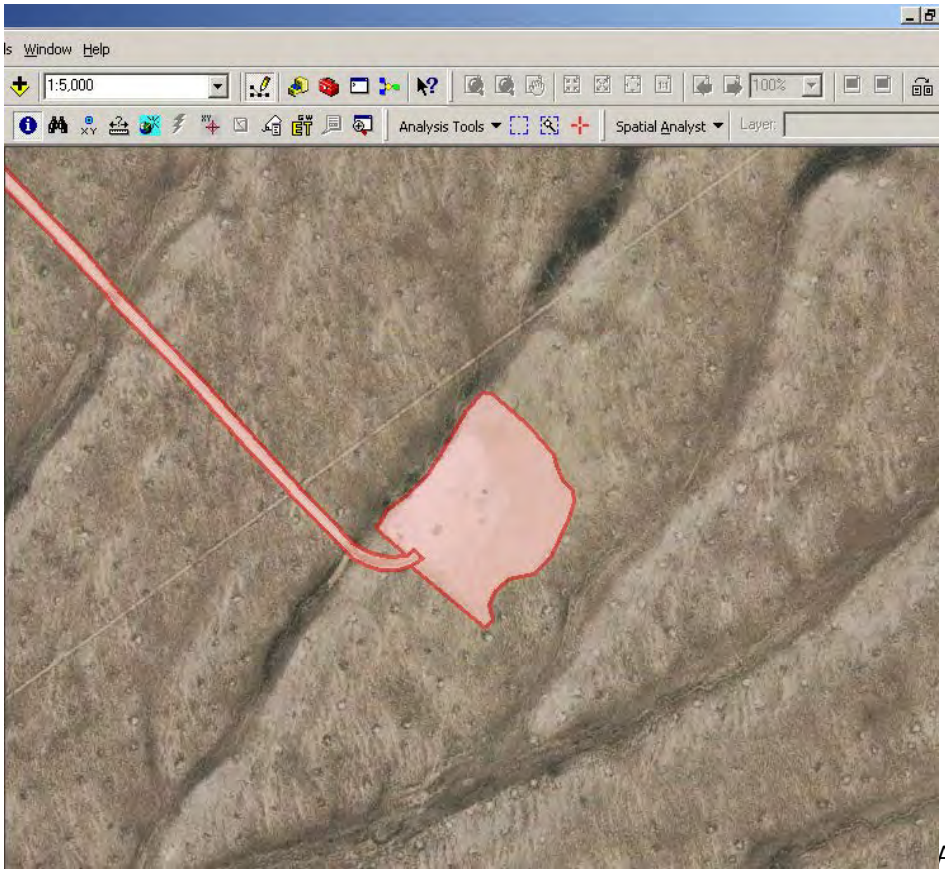
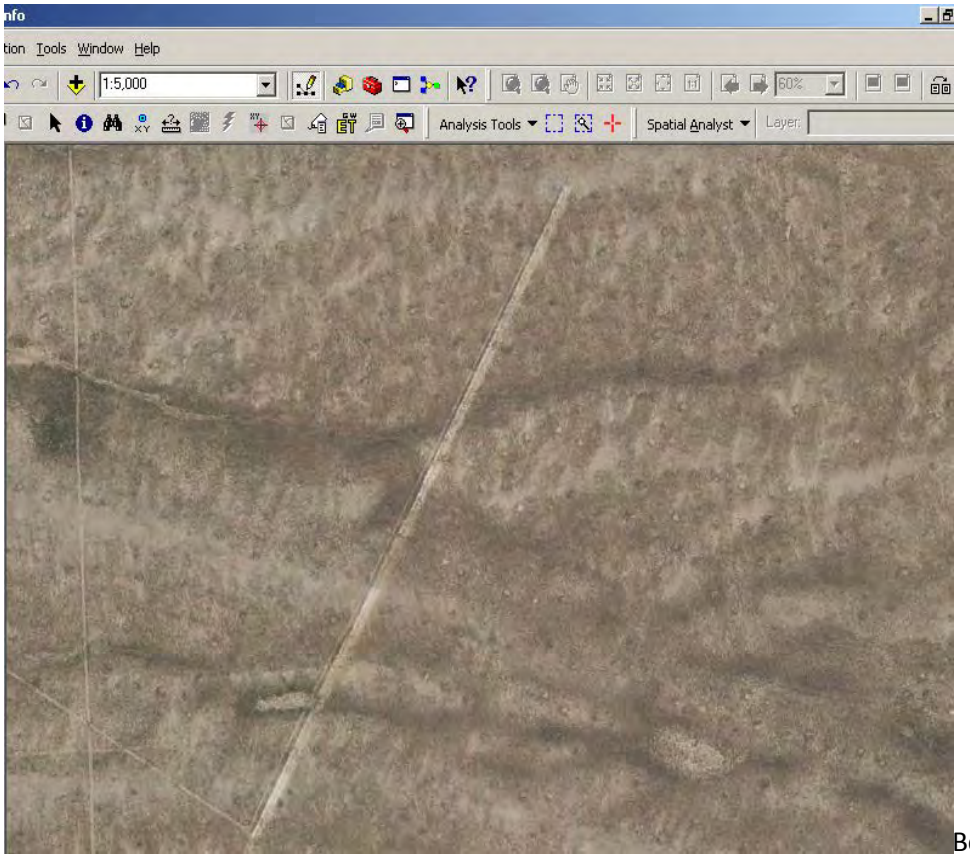
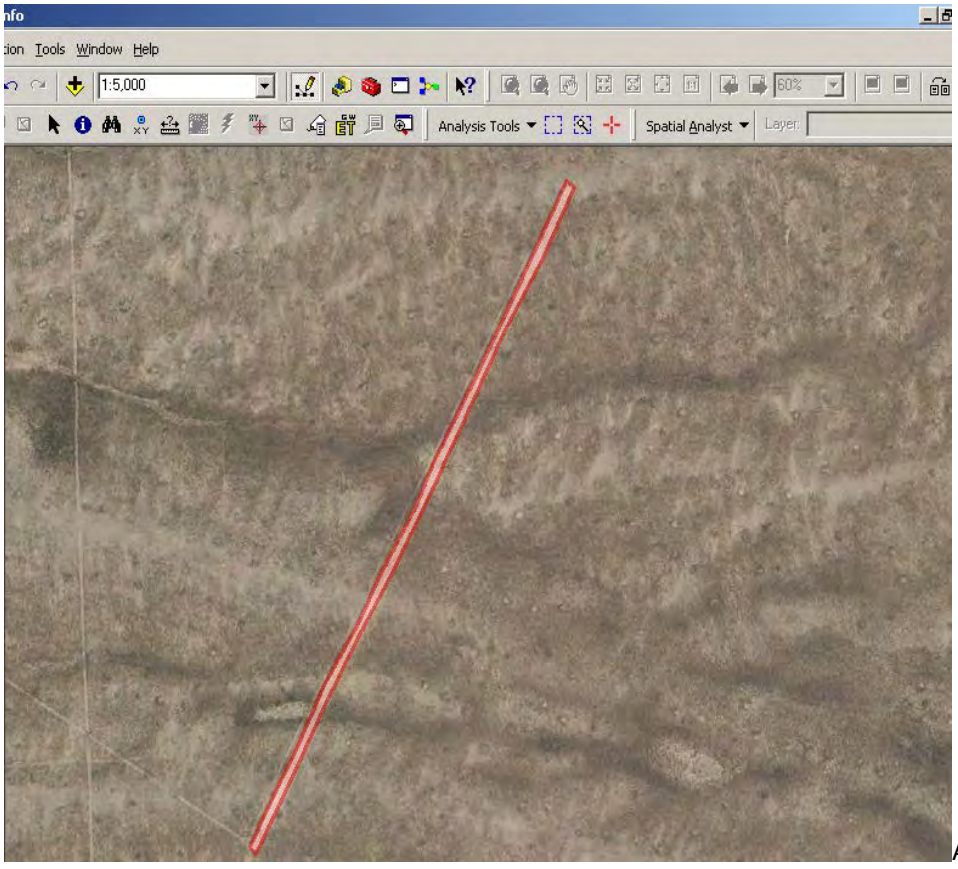


After

Examples of Existing Disturbance: Landing Strip:

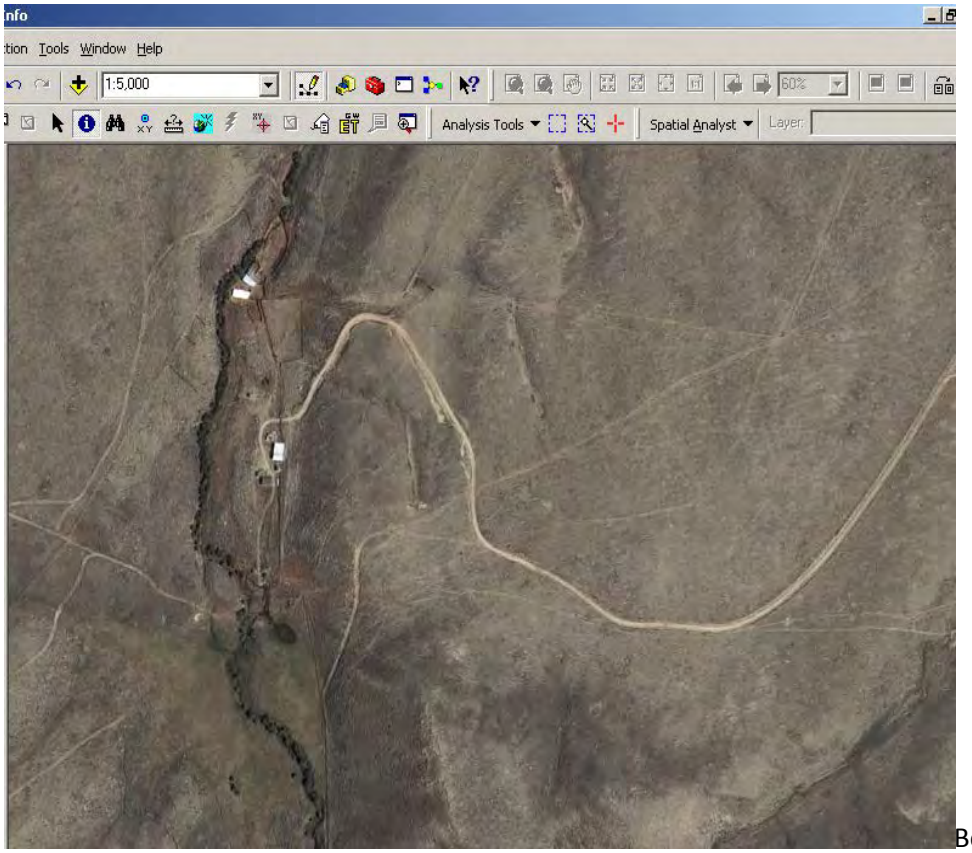


Before

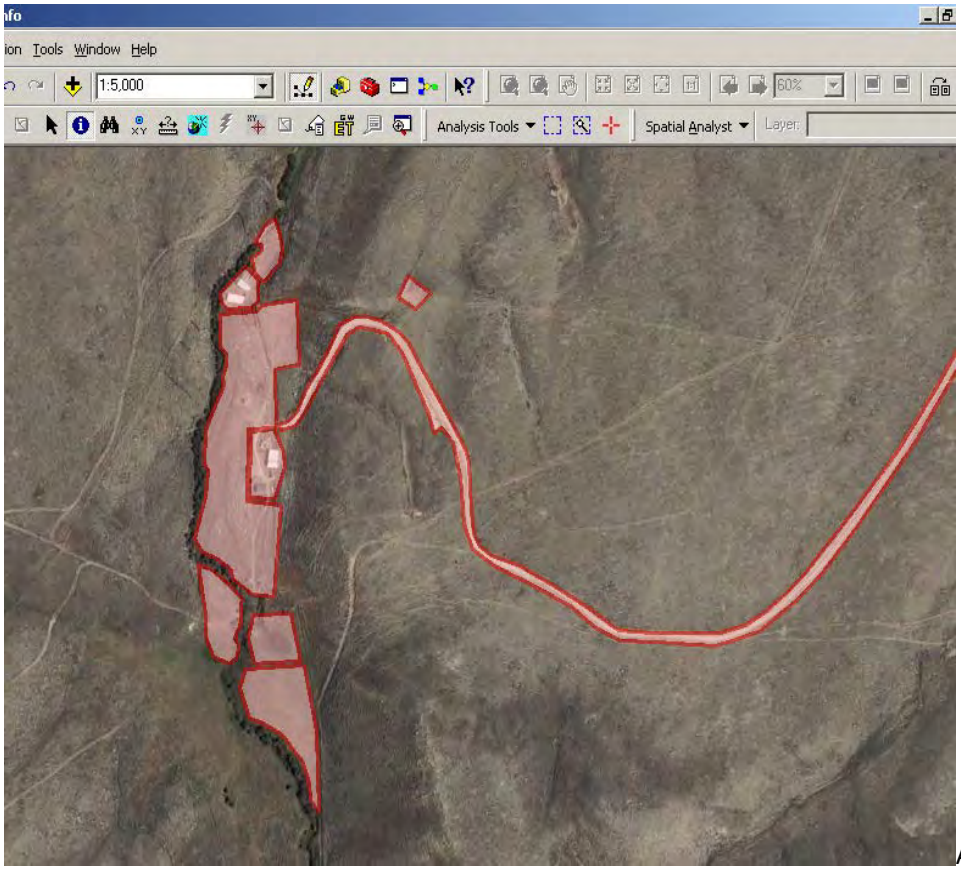


After

Examples of Existing Disturbance: Ranch and assorted disturbance:

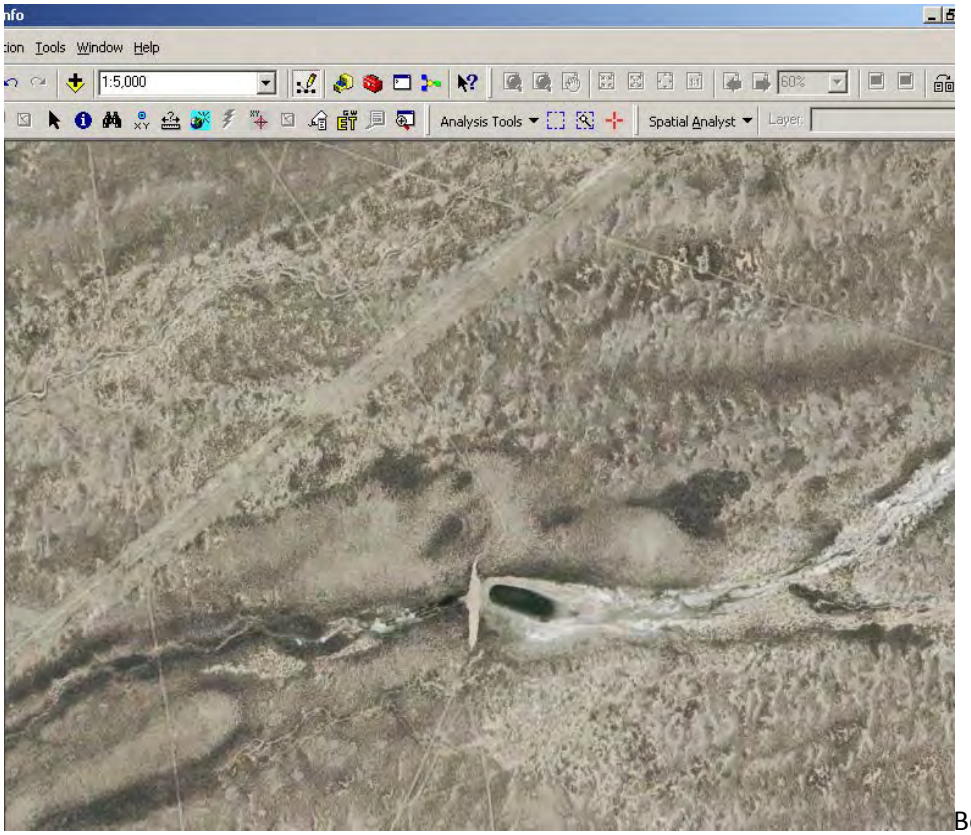


Before



After

Examples of Existing Disturbance: Pipeline and watering hole:



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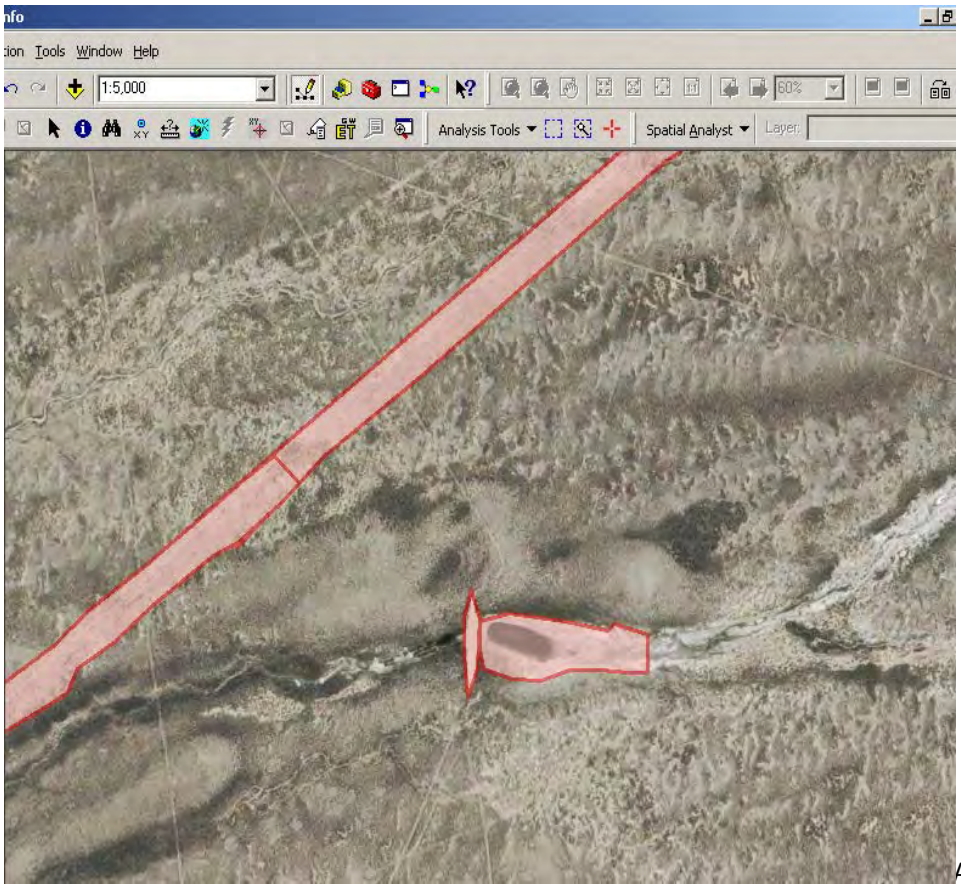
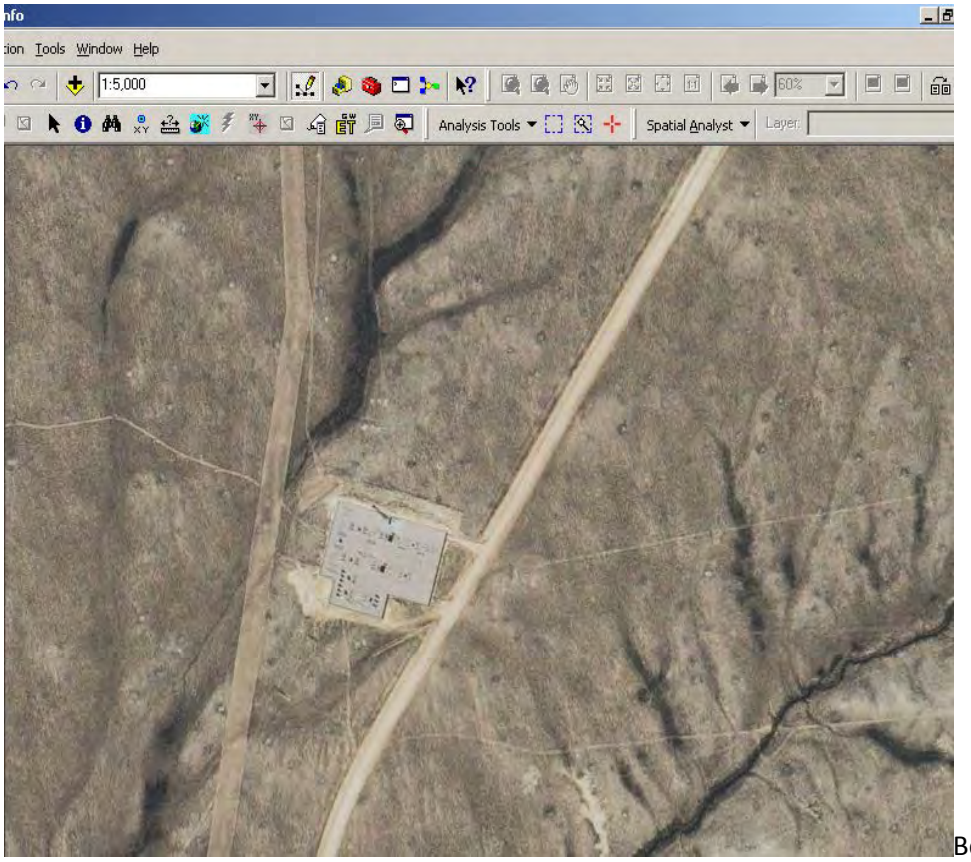


After

Examples of Existing Disturbance: Pipeline, road, and electrical infrastructure:



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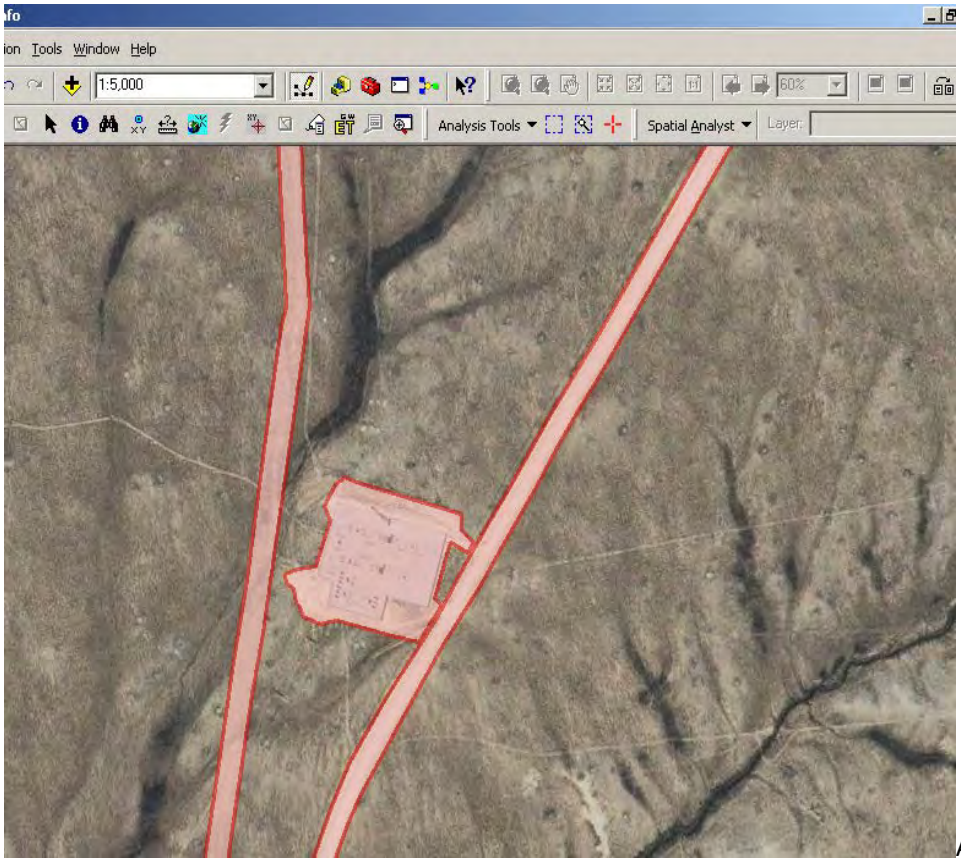

After