

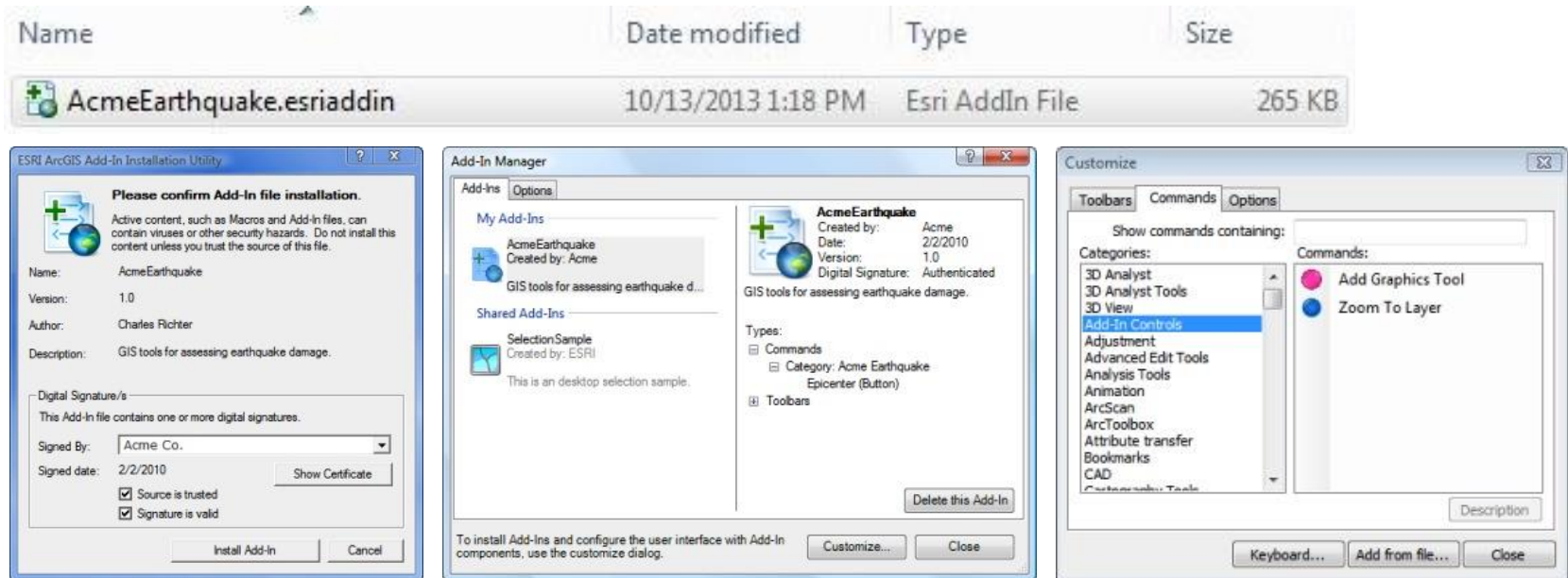
Using .NET for ArcGIS Map & Data Development

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What Are Add-Ins?

- Add-ins provide a means of extending ArcGIS functionality
- Available as a development option beginning with ArcGIS 10.0
- Small .esriaddin file is easily distributed and installed



- Can be built using .NET (C# & VB.NET), Java or Python

Quite often, add-ins can pay for themselves many times over

Presentation Goal

- Demonstrate the value of using .NET with ArcMap via examples from four different projects:



Forester Mapping Tools – upgraded VB.NET custom tools to support forest management



Bookmark Tools – C# upgrade of tools originally built using VBA to allow exporting of maps en masse



Map Series Development Tools – new C# tools to support custom map creation and export



Species Protection Area Tools – new C# tools to support data development

- Discuss development considerations

Acknowledgements



Luke Boggess, Charlie Riddle & Pete Hardcastle at R&M Consultants, Inc., Anchorage, Alaska, for permission to present their map series development tool



*A Division of Hancock Timber Resource Group,
A Manulife Asset Management Company*

Steve Dodson at Hancock Forest Management, La Grande, Oregon for permission to present their Forester Mapping Tools



Mike McGuire at Ascent GIS, Inc., Spokane, Washington for his role in securing the Hancock project

Example 1

Forester Mapping Tools

Forester Mapping Tools

Forester Mapping Tools ✕

Filter **FEE LOGGING CONTRACT MAP** Query **<Show all Items>** Job **EBO** Criteria **<None>** AreaCalc Scale **1:15,840** Print Color **<None>** Set Config File

Hancock Forest Management
NE Oregon Region
1804 27th Street
Le Grand, OR 97550
541.282.2045

EXHIBIT A

FEE LOGGING CONTRACT MAP



**Hancock
Forest
Management**

Job Name: EBO **Plan Year:** 2013 **Map Date:** 10/14/2013

Compartment: Linton Mtn. **Start Date:** 10/15/2014 **Forester:** Bob Smith

Township, Range, and Section(s): 4N37E Sec(s). 14, 15, 22, 23 **Finish Date:** -----

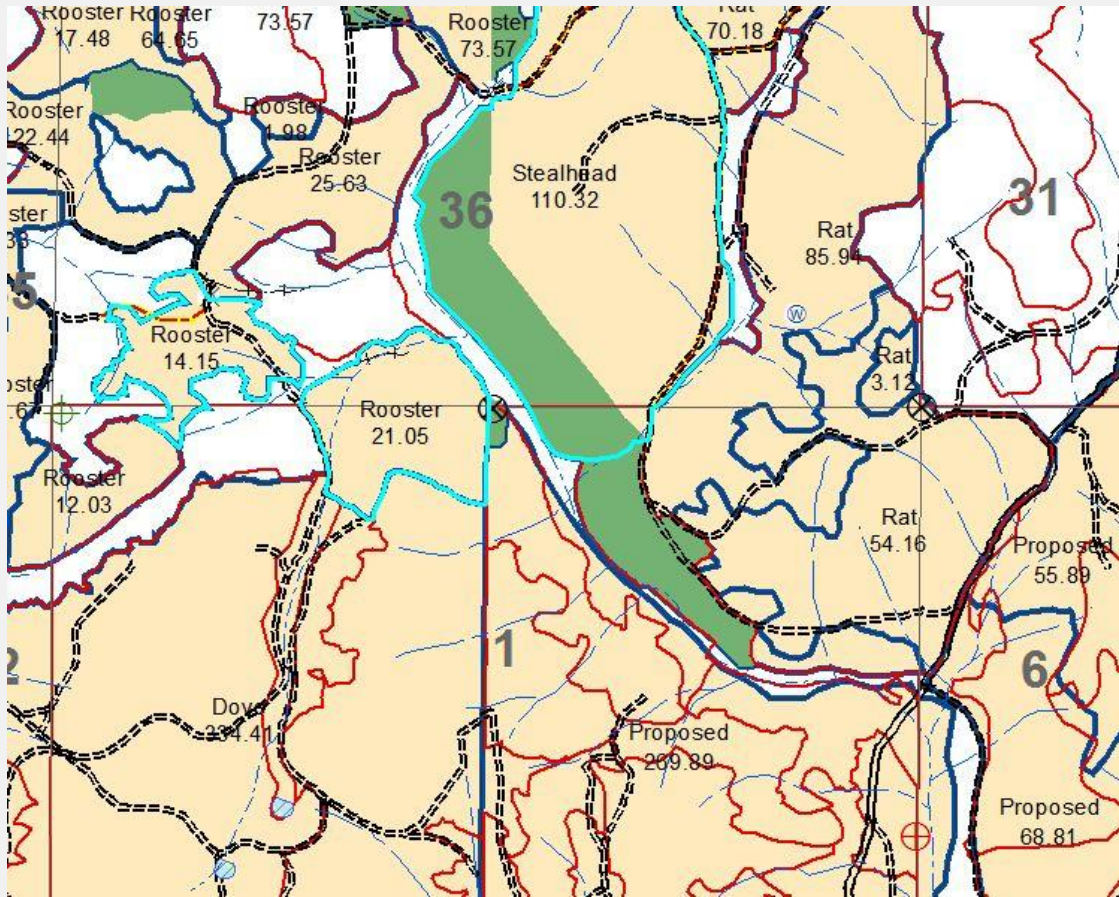
Center of Map Area (Latitude, Longitude): 45 48 51.68, -118 10 16.97

NAD Contract Map - May 2013

	Streams	Roads	TriStar Ownership	SettingID	Acres	Property
General Information SettingID ■ BLL054 ■ SML054 ■ Reserve Areas ■ Significant Wetlands ■ Other Wetlands	--- Large Non-Bearing E Large Fish Bearing --- Medium Non-Bearing F Medium Fish Bearing --- Small Non-Bearing f Small Fish Bearing --- Small Unclassified E Unclassified Fish Bearing	== All Weather ==: Work Road -+ Close Out == Highways == City, County	■ Series D Tristar NE Oregon Timberlands LLC ■ Series B Tristar NE Oregon Timberlands LLC ■ Series G Tristar NE Oregon Timberlands LLC ■ Garnet Ridge ■ Series F Tristar NE Oregon Timberlands LLC ■ Series E Tristar NE Oregon Timberlands LLC ■ Series C Tristar NE Oregon Timberlands LLC ■ Series A Tristar NE Oregon Timberlands LLC ■ Series H Tristar NE Oregon Timberlands LLC	BLL054 - - - - - - SML054 -	71.88 - - - - - - 234.74 -	Blue Creek Colville Crystal Falls Garnet Ridge Lewiston Long Canyon Sandpoint Silver Mountain Spokane
	Other Features (W) Pond (O) Spring Bridge Carda Guard Culvert Gate Gravel Pit Pipeline Powerline	Total Gross Acres: 306.62				

1:15,840
1 inch = 0.25 miles
UTM Zone 11N; NAD83

Forester Mapping Tools – Area Calculations



Area Calculations

Clip Layer - (1 Feature(s) Selected) Name Field
Harvest JobName

Source Layer - (Layer to be Clipped)
Settings

Buffer Layer - (Optional)
Wetlands

Field Function
Acres Average

Add All Add --> <-- Remove

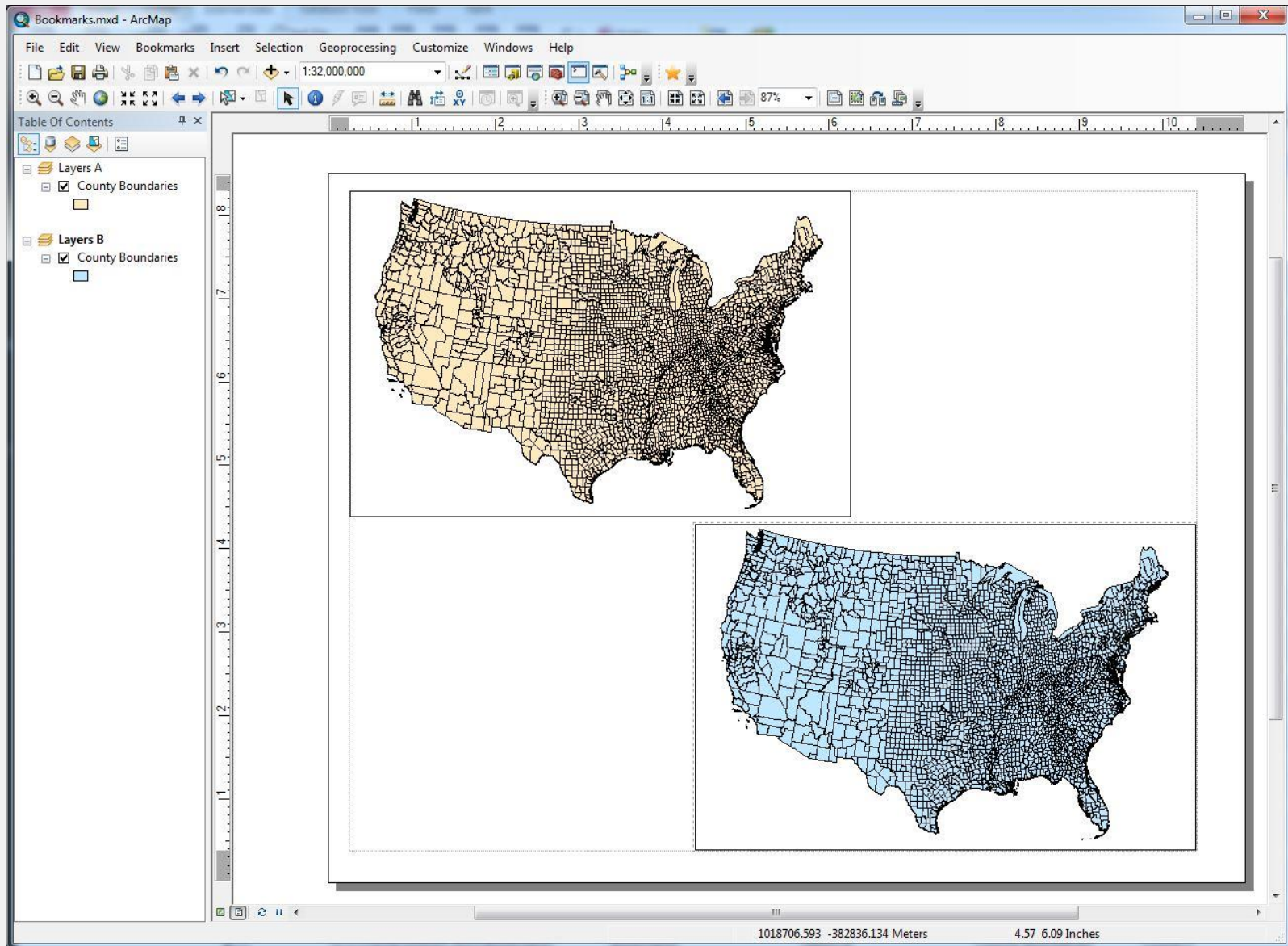
Fields to Calculate
Acres - Average

OK Cancel

Example 2

Bookmark Tools

Bookmark Tools



Bookmark Tools – Input Feature Records

S_FeatureID	U_FolderPath	U_DocumentName	U_DataFrameName	U_LayerName	U_SelectionFieldName	U_SelectionValue	U_Type	U_GroupName	US_BookmarkName	US_ZoomFactor
1	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Adams County	I			
2	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Asotin County	I			
3	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Benton County	I			
4	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Chelan County	I			
5	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Clallam County	I			
6	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Clark County	I			
7	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Columbia County	I			
8	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Cowlitz County	I			
9	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Douglas County	I			
10	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Ferry County	I			
11	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Franklin County	I			
12	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Garfield County	I			
13	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Grant County	I			
14	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Grays Harbor County	I			
15	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Island County	I			
16	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Jefferson County	I			
17	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	King County	G	Puget Sound		
18	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Kitsap County	I			
19	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Kittitas County	G	Puget Sound		
20	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Klickitat County	I			
21	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Lewis County	I			
22	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Lincoln County	I			
23	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Mason County	I			
24	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Okanogan County	I			
25	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Pacific County	I			
26	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Pend Oreille County	I			
27	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Pierce County	G	Puget Sound		
28	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	San Juan County	I			
29	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Skagit County	I			
30	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Skamania County	I			
31	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Snohomish County	G	Puget Sound		
32	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Spokane County	I			
33	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Stevens County	I			
34	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Thurston County	I			
35	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Wahkiakum County	I			
36	C:\Temp\NWGIS 2013\Bookmarks	Bookmarks	Layers A	County Boundaries	COUNTY	Walla Walla County	I			

Bookmark Tools – Initial Feature Record Load

Bookmark Tools

Database Path: C:\Temp\NW\GIS 2013\Bookmarks\Bookmarks.mdb Set Path

Data Frame: Layers A Layer: County Boundaries

Feature Bookmark Records Load from Database Default Zoom Factor (10-99): 80 Filter Term: Select Column Apply Reset

#	ID	Selection Field	Selection Value	Type	Group	Bookmark Name	Zoom Factor	Alert	Select	Final Bookmark Name
1	1	COUNTY	Adams County	I					<input checked="" type="checkbox"/>	
2	2	COUNTY	Asotin County	I					<input checked="" type="checkbox"/>	
3	3	COUNTY	Benton County	I					<input checked="" type="checkbox"/>	
4	4	COUNTY	Chelan County	I					<input checked="" type="checkbox"/>	
5	5	COUNTY	Clallam County	I					<input checked="" type="checkbox"/>	
6	6	COUNTY	Clark County	I					<input checked="" type="checkbox"/>	
7	7	COUNTY	Columbia County	I					<input checked="" type="checkbox"/>	
8	8	COUNTY	Cowlitz County	I					<input checked="" type="checkbox"/>	

Select All Unselect All Complete Group Selection Store Selection Check Records Create Bookmark(s) Remove Bookmark(s) Save to Database < >

Bookmark Records

#	Bookmark Name	Alert	Select
4	County Boundaries_COUNTY_Chelan County_080		<input type="checkbox"/>
5	County Boundaries_COUNTY_Clallam County_080		<input type="checkbox"/>
6	County Boundaries_COUNTY_Clark County_080		<input type="checkbox"/>
7	County Boundaries_COUNTY_Columbia County_080		<input type="checkbox"/>

Filter Term: Select Column Apply Reset
Load from Database Select All Unselect All
Zoom to Bookmark Select Features for Bookmark
Remove Bookmark(s) Clear Feature Selection

Clear Messages and Alert Column Reset Form

Messages

Bookmark Tools – Bookmark Creation

Bookmark Tools

Database Path: C:\Temp\NW\GIS 2013\Bookmarks\Bookmarks.mdb Set Path

Data Frame: Layers A Layer: County Boundaries

Feature Bookmark Records Load from Database Default Zoom Factor (10-99): 80 Filter Term: Select Column Apply Reset

#	ID	Selection Field	Selection Value	Type	Group	Bookmark Name	Zoom Factor	Alert	Select	Final Bookmark Name
1	1	COUNTY	Adams County	I			80		<input checked="" type="checkbox"/>	County Boundaries_COUNTY_Adams County_080
2	2	COUNTY	Asotin County	I			80		<input checked="" type="checkbox"/>	County Boundaries_COUNTY_Asotin County_080
3	3	COUNTY	Benton County	I			80		<input checked="" type="checkbox"/>	County Boundaries_COUNTY_Benton County_080
4	4	COUNTY	Chelan County	I			80		<input checked="" type="checkbox"/>	County Boundaries_COUNTY_Chelan County_080
5	5	COUNTY	Clallam County	I			80		<input checked="" type="checkbox"/>	County Boundaries_COUNTY_Clallam County_080
6	6	COUNTY	Clark County	I			80		<input checked="" type="checkbox"/>	County Boundaries_COUNTY_Clark County_080
7	7	COUNTY	Columbia County	I			80		<input checked="" type="checkbox"/>	County Boundaries_COUNTY_Columbia County_080
8	8	COUNTY	Cowlitz County	I			80		<input checked="" type="checkbox"/>	County Boundaries_COUNTY_Cowlitz County_080

Select All Unselect All Complete Group Selection Store Selection Check Records Create Bookmark(s) Remove Bookmark(s) Save to Database < >

Bookmark Records

#	Bookmark Name	Alert	Select
1	County Boundaries_COUNTY_Adams County_080		<input type="checkbox"/>
2	County Boundaries_COUNTY_Asotin County_080		<input type="checkbox"/>
3	County Boundaries_COUNTY_Benton County_080		<input type="checkbox"/>
4	County Boundaries_COUNTY_Chelan County_080		<input type="checkbox"/>

Filter Term: Select Column Apply Reset

Load from Database Select All Unselect All

Zoom to Bookmark Select Features for Bookmark

Remove Bookmark(s) Clear Feature Selection

Clear Messages and A...

Messages

10/13/2013 10:40:23 PM Enter Zoom Factor
Please enter a value between 10 and 99.

Bookmarks Manager

Name

- County Boundaries_COUNTY_Adams County_080
- County Boundaries_COUNTY_Asotin County_080
- County Boundaries_COUNTY_Benton County_080
- County Boundaries_COUNTY_Chelan County_080
- County Boundaries_COUNTY_Clallam County_080
- County Boundaries_COUNTY_Clark County_080
- County Boundaries_COUNTY_Columbia County_080
- County Boundaries_COUNTY_Cowlitz County_080
- County Boundaries_COUNTY_Douglas County_080
- County Boundaries_COUNTY_Ferry County_080
- County Boundaries_COUNTY_Garfield County_080
- County Boundaries_COUNTY_Grant County_080
- County Boundaries_COUNTY_Grays Harbor County_080
- County Boundaries_COUNTY_Island County_080
- County Boundaries_COUNTY_Jefferson County_080
- County Boundaries_G_Puget Sound_080
- County Boundaries_COUNTY_Kitsao County_080

Zoom To Pan To Create... Remove Remove All Load... Save Close

Bookmark Tools – Map Export Record Creation

The screenshot shows the 'Bookmark Tools' application window. At the top, the title bar reads 'Bookmark Tools'. Below the title bar, there are several icons: a folder, a green tree icon, a square, and an information icon. The 'Database Path' is displayed as 'C:\Temp\NW\GIS 2013\Bookmarks\Bookmarks.mdb', with a 'Set Path' button to its right. Below the path, there are 'Edit' and 'View' tabs. The main area contains a table with the following data:

#	Map ID	Map Name	Pair ID	Data Frame Name	Bookmark Name
1	-1	C Map	-1	Layers A	County Boundaries_COUNTY_Chelan County_080
2			-2	Layers B	County Boundaries_COUNTY_Cowlitz County_020

Below the table, there are several buttons: 'Load from Database', 'Refresh', 'Add Map Record', 'Save to Database', 'Select All Map Records', 'Unselect All Map Records', 'Remove Map Record(s)', 'Select All Pairs', 'Unselect All Pairs', and 'Remove Pair(s)'. At the bottom right, there are 'Clear Messages' and 'Reset Form' buttons. A 'Messages' section is visible at the bottom left, but it is currently empty.

Bookmark Tools – Map Export

Bookmark Tools

Database Path: C:\Temp\NWGIS 2013\Bookmarks\Bookmarks.mdb Set Path

Edit View

Output Folder Path: C:\Temp\NWGIS 2013\Bookmarks\Maps Set Path Load Map Records

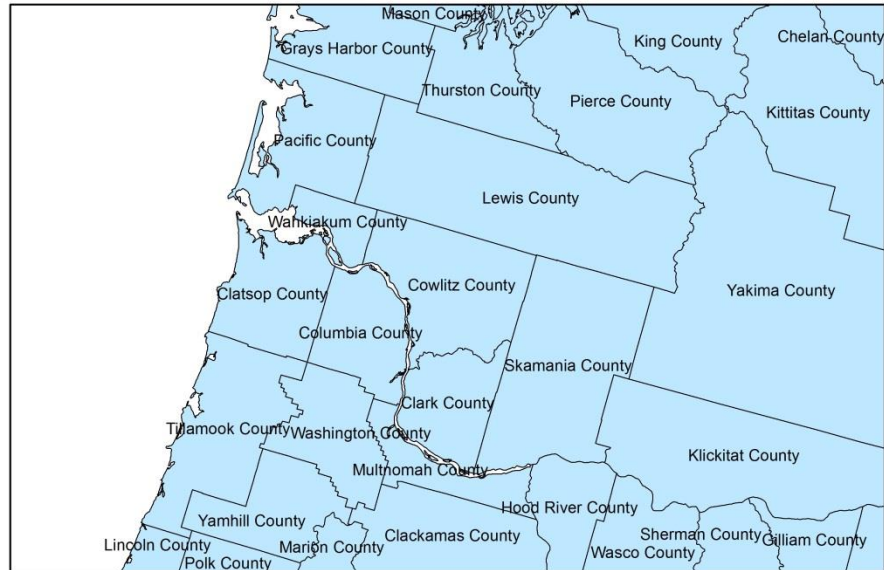
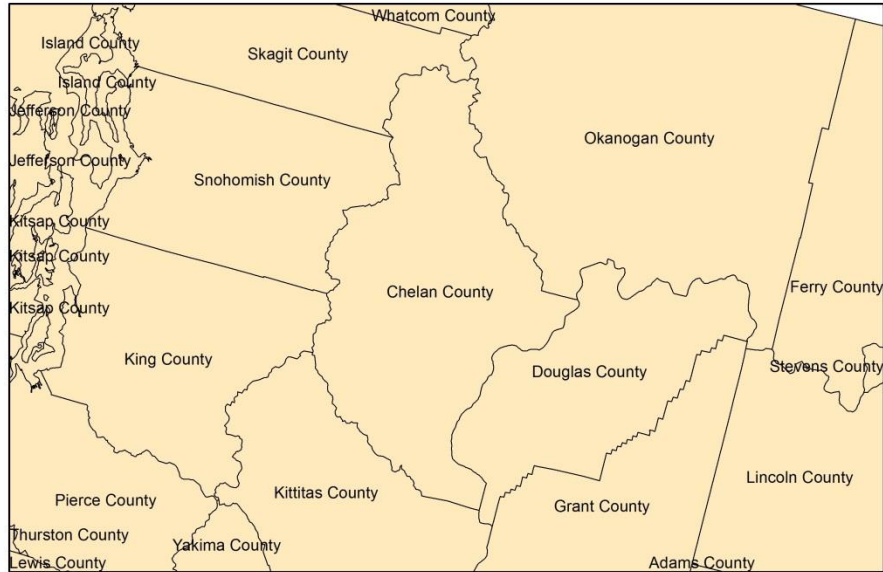
#	Exported	Select	Map ID	Map Name	Layers A	Layers B
▶ 1	*	<input checked="" type="checkbox"/>	-1	C Map	County Boundaries_COUNTY_Chelan County_080	County Boundaries_COUNTY_Cowlitz County_020

Select All Map Record Unselect All Map Records Type: JPEG Overwrite existing map document?

Select Columns for Display Apply Reset Resolution: 600 Export Map(s) Progress Bar Reset Exported Column

Messages Clear Messages Reset Form

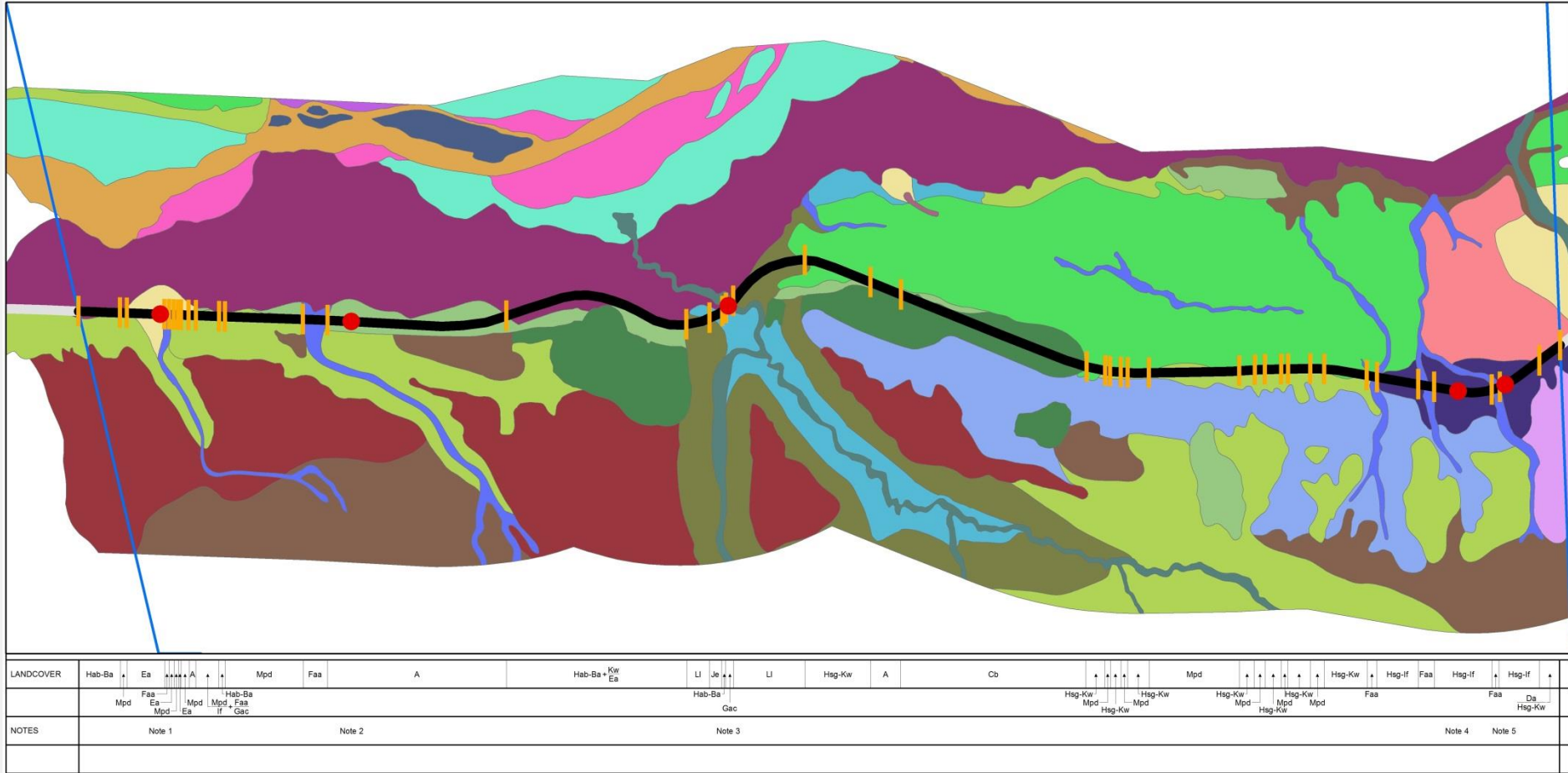
Bookmark Tools – Output



Example 3

Map Series Development Tools

Map Series Development Tools – Goal

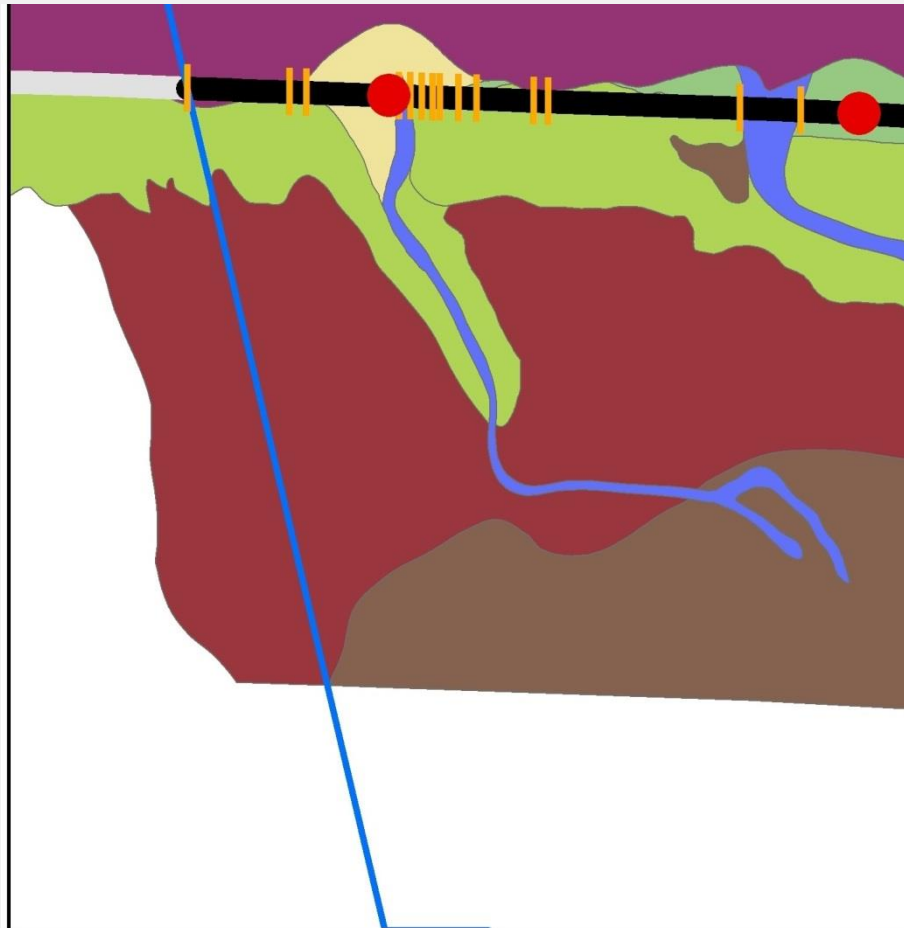


Generate a series of maps for the full length of a route

For each map

- Build the required data bands
- Adjust the label positions
- Save the map configuration (analogous to having multiple layouts)

Map Series Development Tools – Data Band Creation



LANDCOVER	Hab-Ba	Ea	A	Mpd	Faa
	Mpd	Faa Ea Mpd	Ea	Mpd	Mpd, Faa If + Gac
NOTES	Note 1				Note 2

Map Series Development Tools

Setup

Setup file path: C:\Temp\Map Series Dev Inputs.bt Select

Setup values:

Map document - C:\Temp\Demo\Demo.mxd
 Map data file geodatabase - C:\Temp\Demo\Demo.gdb
 Index layer - index_polygon
 Index layer group ID - 1
 Land cover route layer - landcover_alignment Update

Element Definition

Map: < > Update index only Current index: 21 Update Extent Set Map Index

Databand type: Land Cover Apply to all Build Load Delete

Adjust label position: Get Element Selected element name: <None selected>

Relative position: X adjustment factor: 1.00 Update
 Y adjustment factor: 1.00

Element definition: Clear Save Dynamic text: Update Custom map center: Set Reset

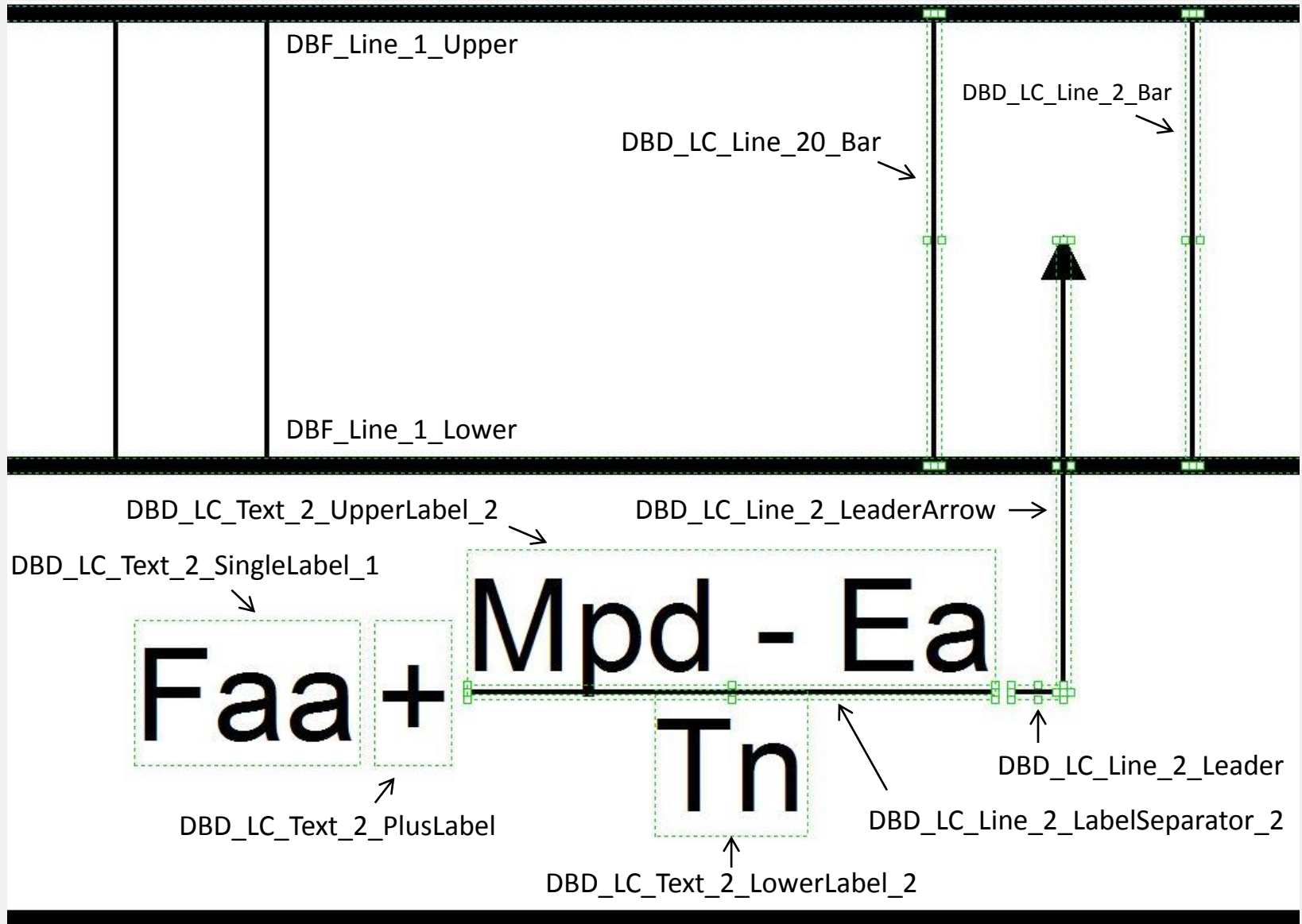
Map Export

Start Index: End Index: Set Current Map Output type: PDF Resolution: 300

Overwrite existing file Load data bands? Export Map(s) Reset

Messages Show Info Clear Messages Reset Form

Map Series Development Tools – Element Name as Storage Unit



Map Series Development Tools – Element Definition Storage

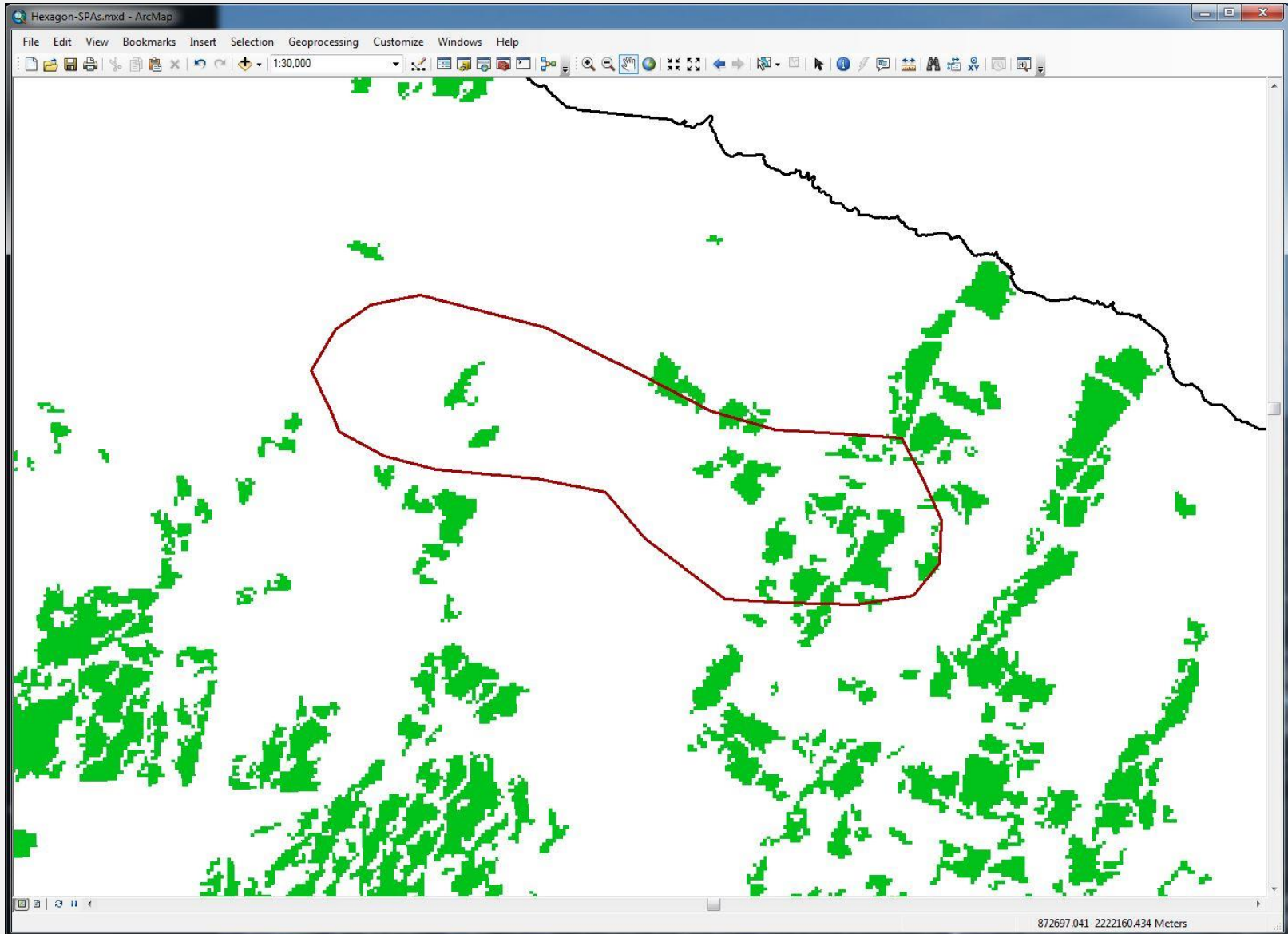
OBJECTID *	MapDocumentPath	IndexGroupID	IndexSeqID	ElementType	ElementName	PropertyName	PropertyValue	CreationDate
21313	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_LowerLabel_2	Text	Tn	5/2/2013 10:09:34 PM
21314	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_LowerLabel_2	ColorRGB	33554432	5/2/2013 10:09:34 PM
21315	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_LowerLabel_2	Size	6	5/2/2013 10:09:34 PM
21316	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_LowerLabel_2	PtX	14.9635999999991	5/2/2013 10:09:34 PM
21317	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_LowerLabel_2	PtY	3.5581000000002	5/2/2013 10:09:34 PM
21318	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_LowerLabel_2	HorizontalAlignment	esriTHACenter	5/2/2013 10:09:34 PM
21319	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_LowerLabel_2	VerticalAlignment	esriTVACenter	5/2/2013 10:09:34 PM
21320	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_LowerLabel_2	AnchorPoint	esriTopMidPoint	5/2/2013 10:09:34 PM
21321	C:\Temp\Demo\Demo.mxd	1	21	Line	DBD_LC_Line_2_LabelSeparator_2	ColorRGB	33554432	5/2/2013 10:09:34 PM
21322	C:\Temp\Demo\Demo.mxd	1	21	Line	DBD_LC_Line_2_LabelSeparator_2	Width	0.25	5/2/2013 10:09:34 PM
21323	C:\Temp\Demo\Demo.mxd	1	21	Line	DBD_LC_Line_2_LabelSeparator_2	FromPtX	14.7945999999993	5/2/2013 10:09:34 PM
21324	C:\Temp\Demo\Demo.mxd	1	21	Line	DBD_LC_Line_2_LabelSeparator_2	FromPtY	3.60310000000027	5/2/2013 10:09:34 PM
21325	C:\Temp\Demo\Demo.mxd	1	21	Line	DBD_LC_Line_2_LabelSeparator_2	ToPtX	15.1327000000001	5/2/2013 10:09:34 PM
21326	C:\Temp\Demo\Demo.mxd	1	21	Line	DBD_LC_Line_2_LabelSeparator_2	ToPtY	3.60310000000027	5/2/2013 10:09:34 PM
21327	C:\Temp\Demo\Demo.mxd	1	21	Line	DBD_LC_Line_2_LabelSeparator_2	AnchorPoint	esriCenterPoint	5/2/2013 10:09:34 PM
21328	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_UpperLabel_2	Text	Mpd - Ea	5/2/2013 10:09:34 PM
21329	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_UpperLabel_2	ColorRGB	33554432	5/2/2013 10:09:34 PM
21330	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_UpperLabel_2	Size	6	5/2/2013 10:09:34 PM
21331	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_UpperLabel_2	PtX	14.9635999999991	5/2/2013 10:09:34 PM
21332	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_UpperLabel_2	PtY	3.64810000000034	5/2/2013 10:09:34 PM
21333	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_UpperLabel_2	HorizontalAlignment	esriTHACenter	5/2/2013 10:09:34 PM
21334	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_UpperLabel_2	VerticalAlignment	esriTVACenter	5/2/2013 10:09:34 PM
21335	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_UpperLabel_2	AnchorPoint	esriBottomMidPoint	5/2/2013 10:09:34 PM
21336	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_SingleLabel_1	Text	Faa	5/2/2013 10:09:34 PM
21337	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_SingleLabel_1	ColorRGB	33554432	5/2/2013 10:09:34 PM
21338	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_SingleLabel_1	Size	6	5/2/2013 10:09:34 PM
21339	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_SingleLabel_1	PtX	14.6540999999997	5/2/2013 10:09:34 PM
21340	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_SingleLabel_1	PtY	3.60310000000027	5/2/2013 10:09:34 PM
21341	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_SingleLabel_1	HorizontalAlignment	esriTHACenter	5/2/2013 10:09:34 PM
21342	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_SingleLabel_1	VerticalAlignment	esriTVACenter	5/2/2013 10:09:34 PM
21343	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_SingleLabel_1	AnchorPoint	esriCenterPoint	5/2/2013 10:09:34 PM
21344	C:\Temp\Demo\Demo.mxd	1	21	Text	DBD_LC_Text_2_PlusLabel	Text	+	5/2/2013 10:09:34 PM

1 (0 out of 1095 Selected)

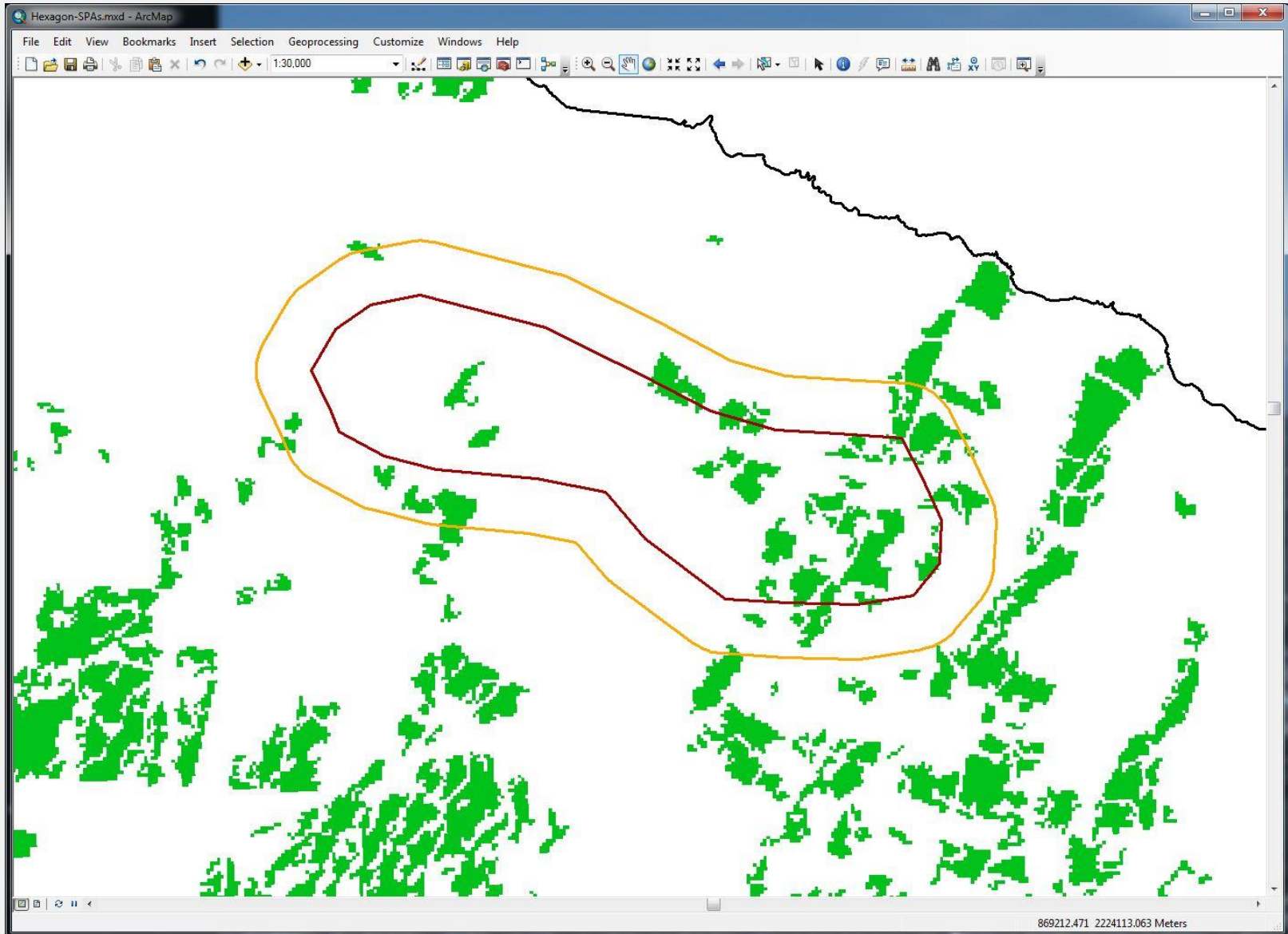
Example 4

Species Protection Area Tools

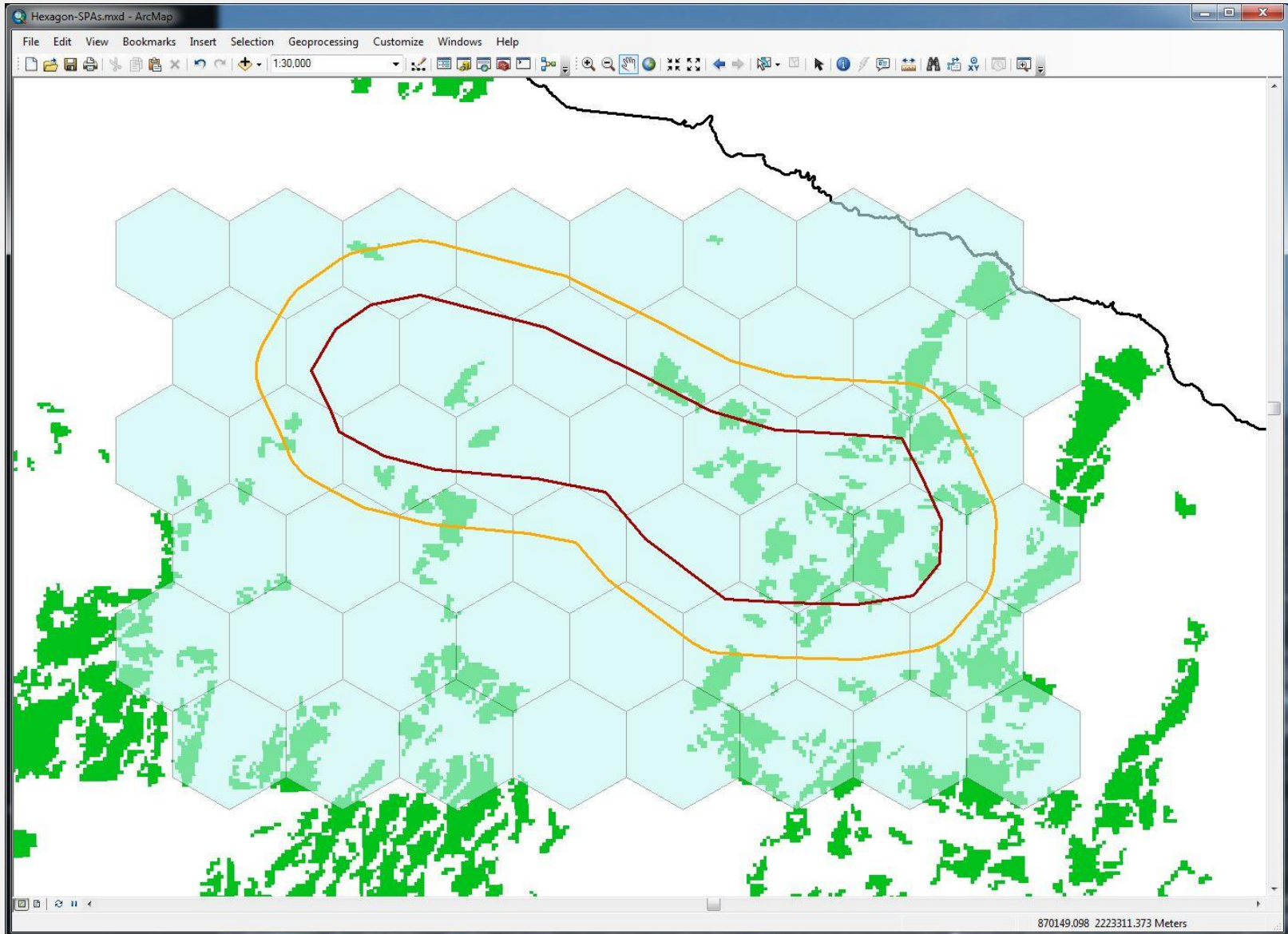
Species Protection Area Example



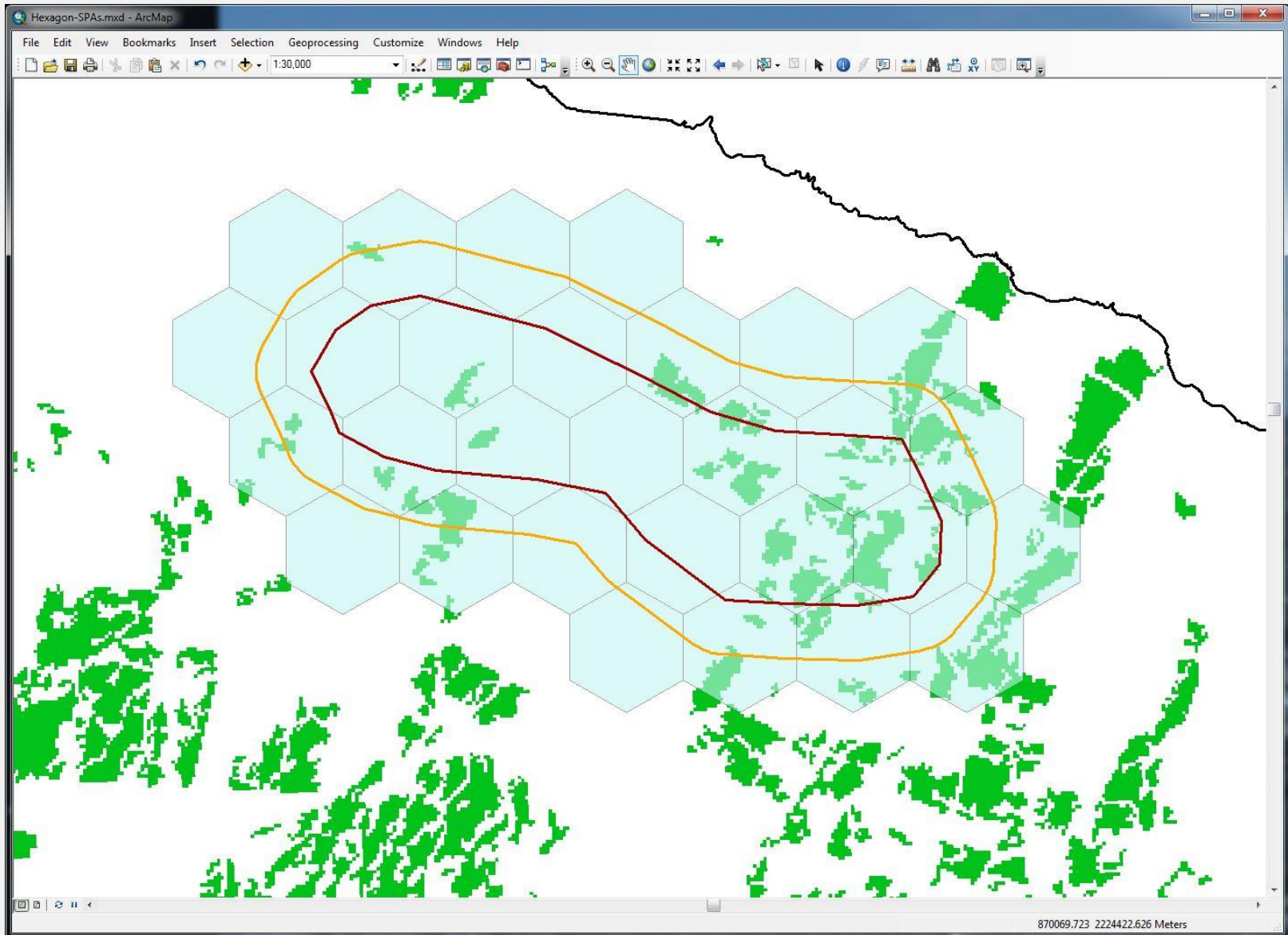
Species Protection Area Example



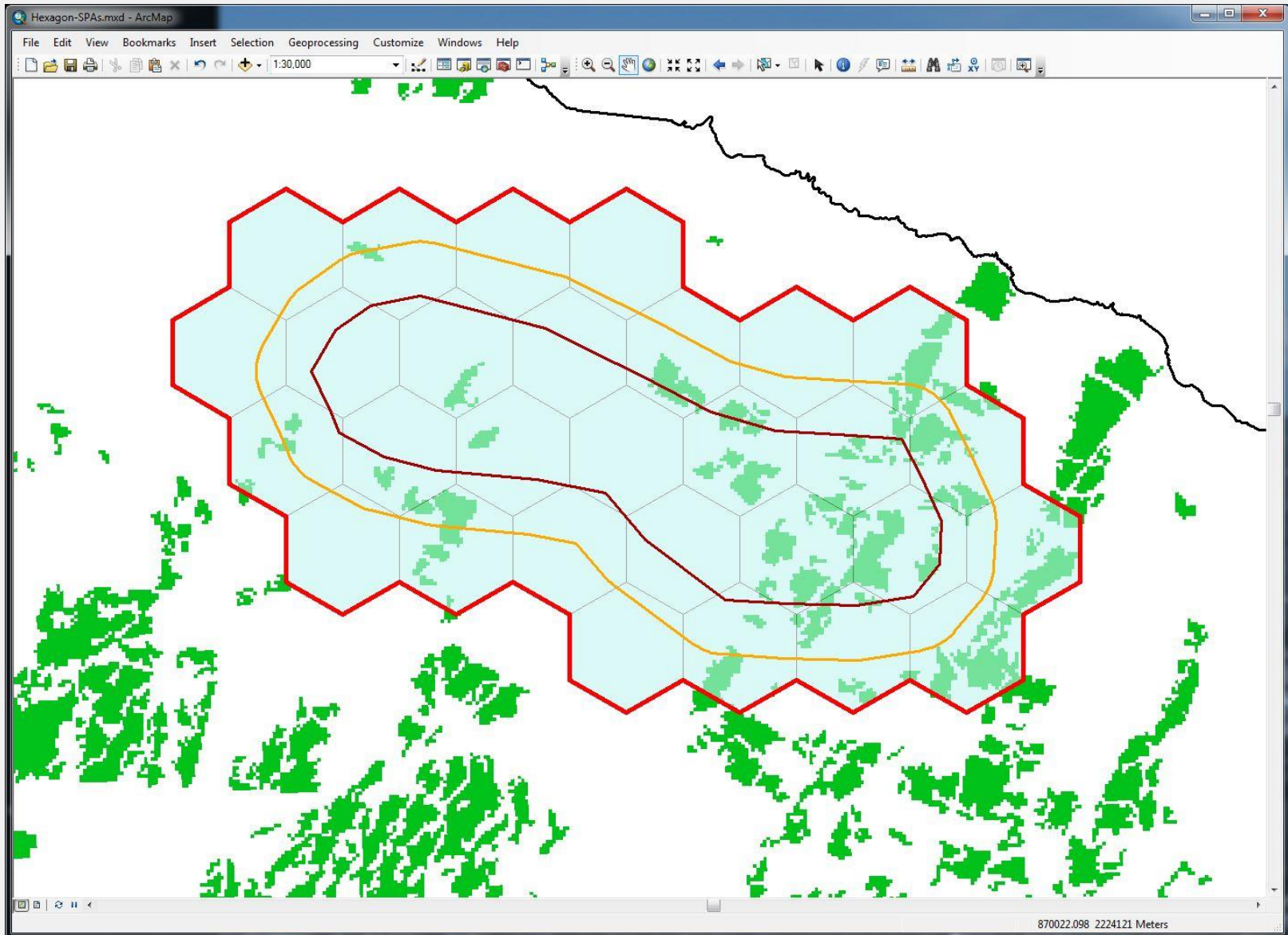
Species Protection Area Example



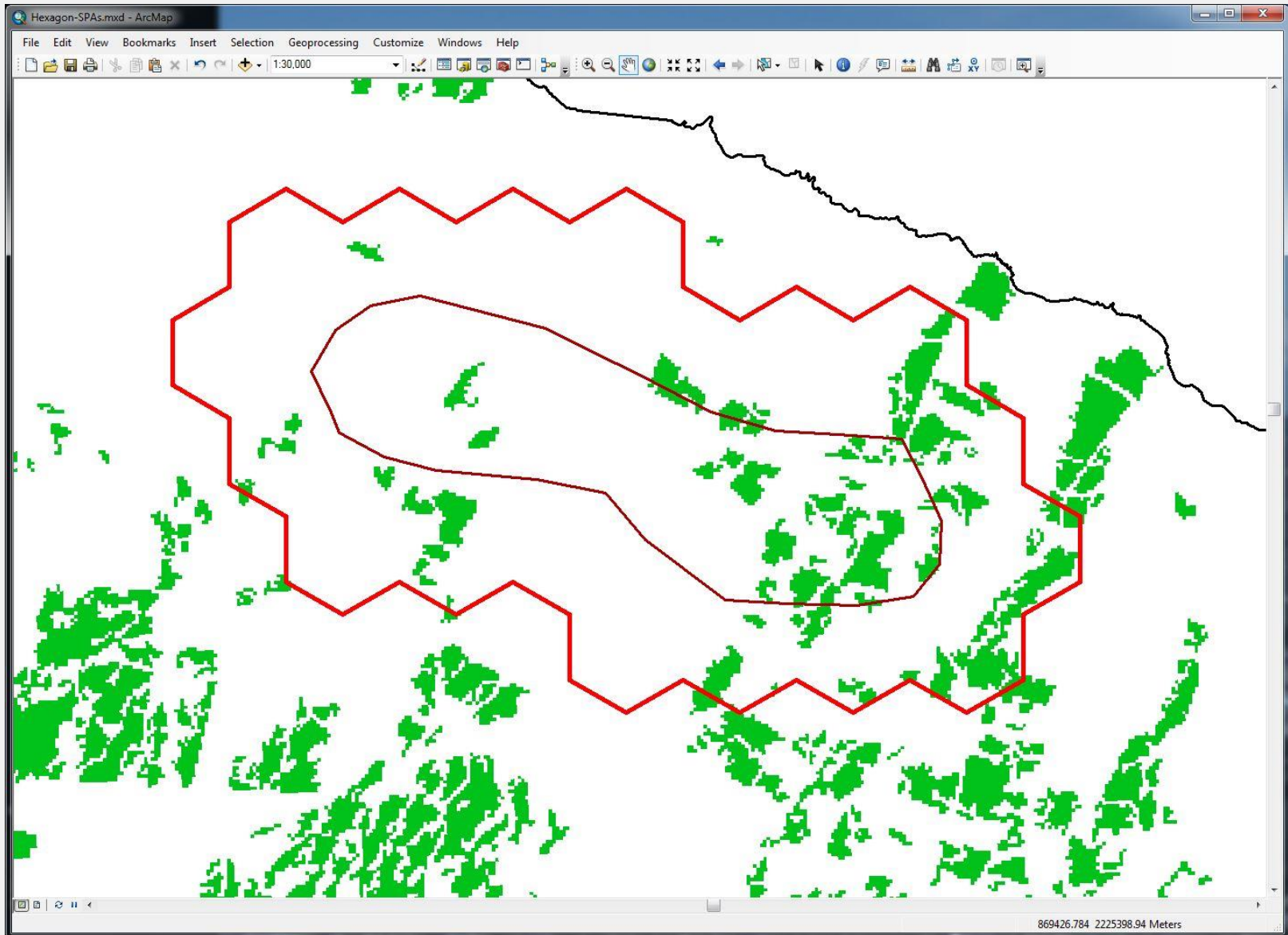
Species Protection Area Example



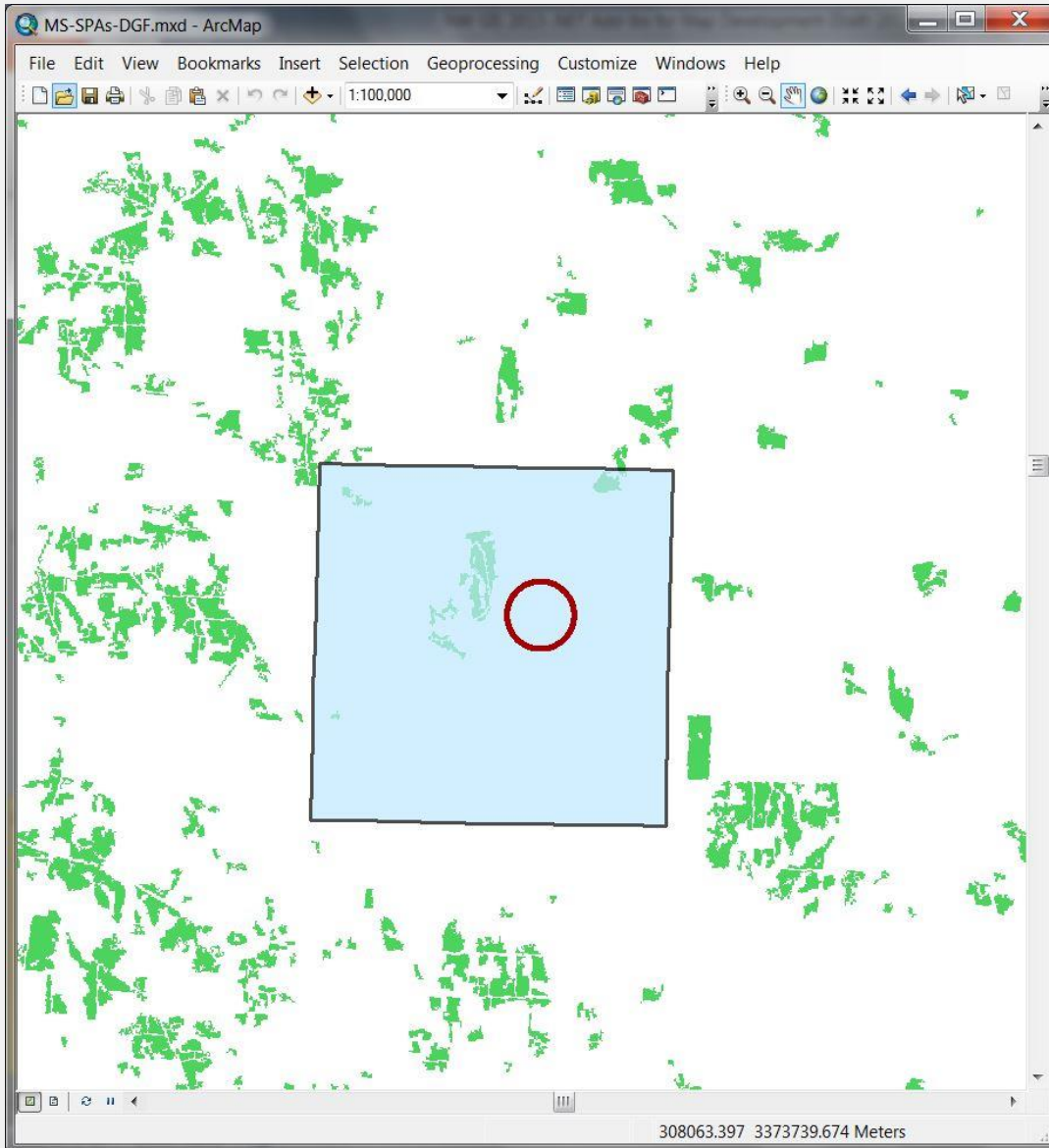
Species Protection Area Example



Species Protection Area Example



Species Protection Area Tools – Primary Area



SPA Tools

State: MS

Units: < > Load Filter: None

Current: 1 Count: 13 w/SPAs: 9

SPAs:

QC Status: 0

Start Point:

Sel. pt at X: 8 Y: 8 Use Outside %:

Shift Limit X: Y: Use Allowable spill %: 0.001 Use

Sel. pt adj. factor X: 1.00 Y: 1.00 Use

Sel. pts rotation angle: 0 Use

Sections Buffer Distance:

Position: SW

#	Unit ID	SPAs Created	Primary SPA Found	QC Status
1	1	1	1	0
2	2	1	1	0
3	3	1	1	0
4	4	1	1	0
5	5	1	1	0
6	6	1	1	0
7	8	0	0	0
8	9	0	0	0
9	10	0	0	0
10	11	1	1	0
11	13	1	1	0

Primary: 6

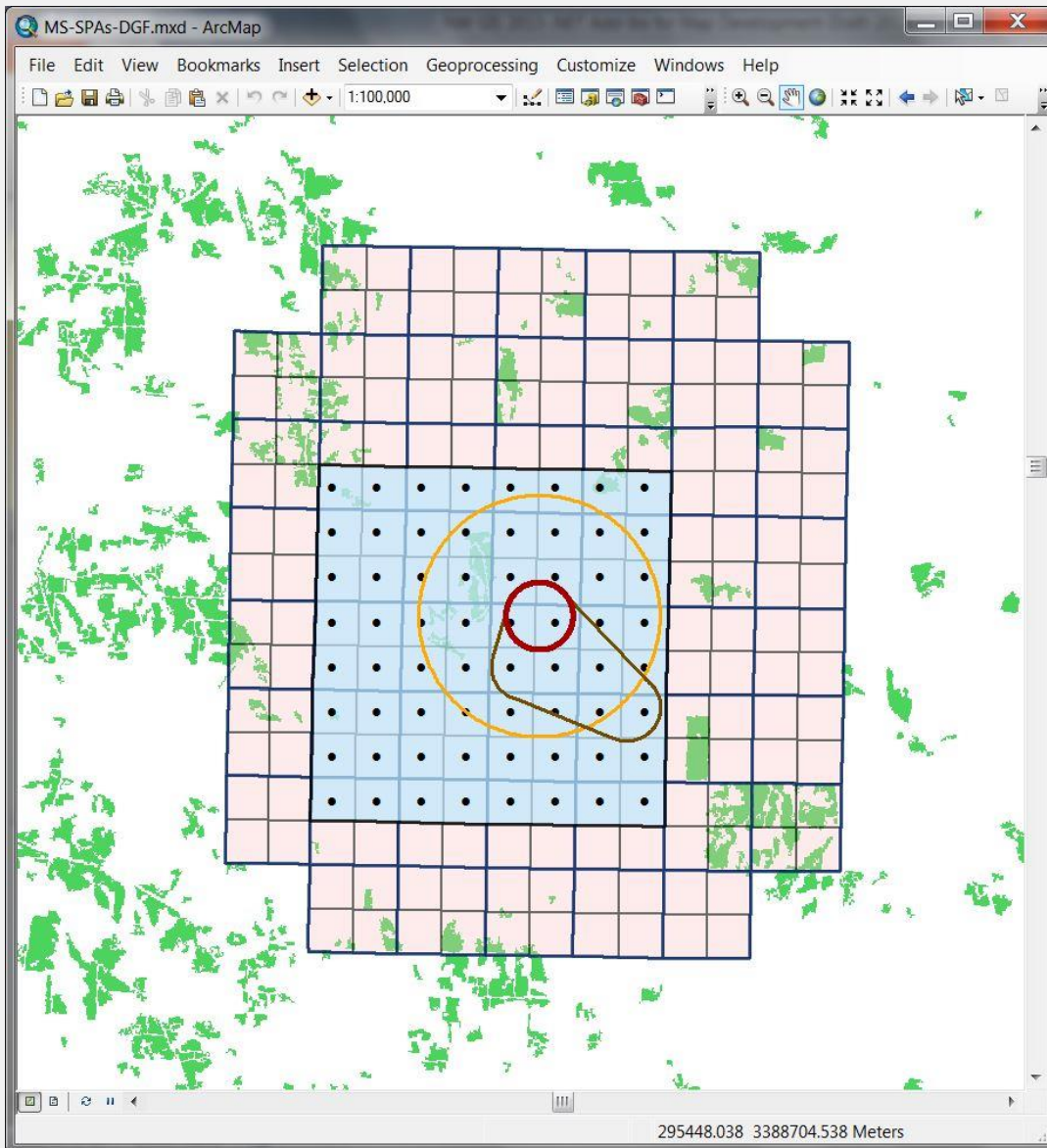
#	ID	Manual Primary	Auto Primary	Unit Count	C81 Area	C82 Area	C81 + C82 Area	Rejected	Rejection Reasons
5	5	0	0	2	1095300	67500	1162800	False	
6	6	1	1	2	827100	67500	894600	False	
7	101	-1	-1	2	-1	-1	-1	True	Unit buffer spill; Unit buffer spill - Y
8	102	-1	-1	2	-1	-1	-1	True	Unit buffer spill; Unit buffer spill - X
9	103	-1	-1	2	-1	-1	-1	True	Unit buffer spill; Unit buffer spill - X

Messages

Quarter section example:

- U.S. Fish and Wildlife Service Critical Habitat (CH) locations for Dusky Gopher Frog in Mississippi
- Polygon of defined maximum size positioned such that
 - number of overlapping CH locations is maximized
 - area of agricultural land cover is minimized
- Polygons based on aggregation of selected quarter sections

Species Protection Area Tools – Area Construction



SPA Tools

State: MS

Units: < > Load Filter: None

Current: 1 Count: 13 w/SPAs: 9

SPAs:

QC Status: 0

Start Point: Use point

Sel. pt at X: 8 Y: 8 Use Outside %:

Shift Limit X: Y: Use Allowable spill %: 0.001

Sel. pt adj. factor X: 1.00 Y: 1.00 Use

Sel. pts rotation angle: 0 Use

Sections Buffer Distance:

Position: SW

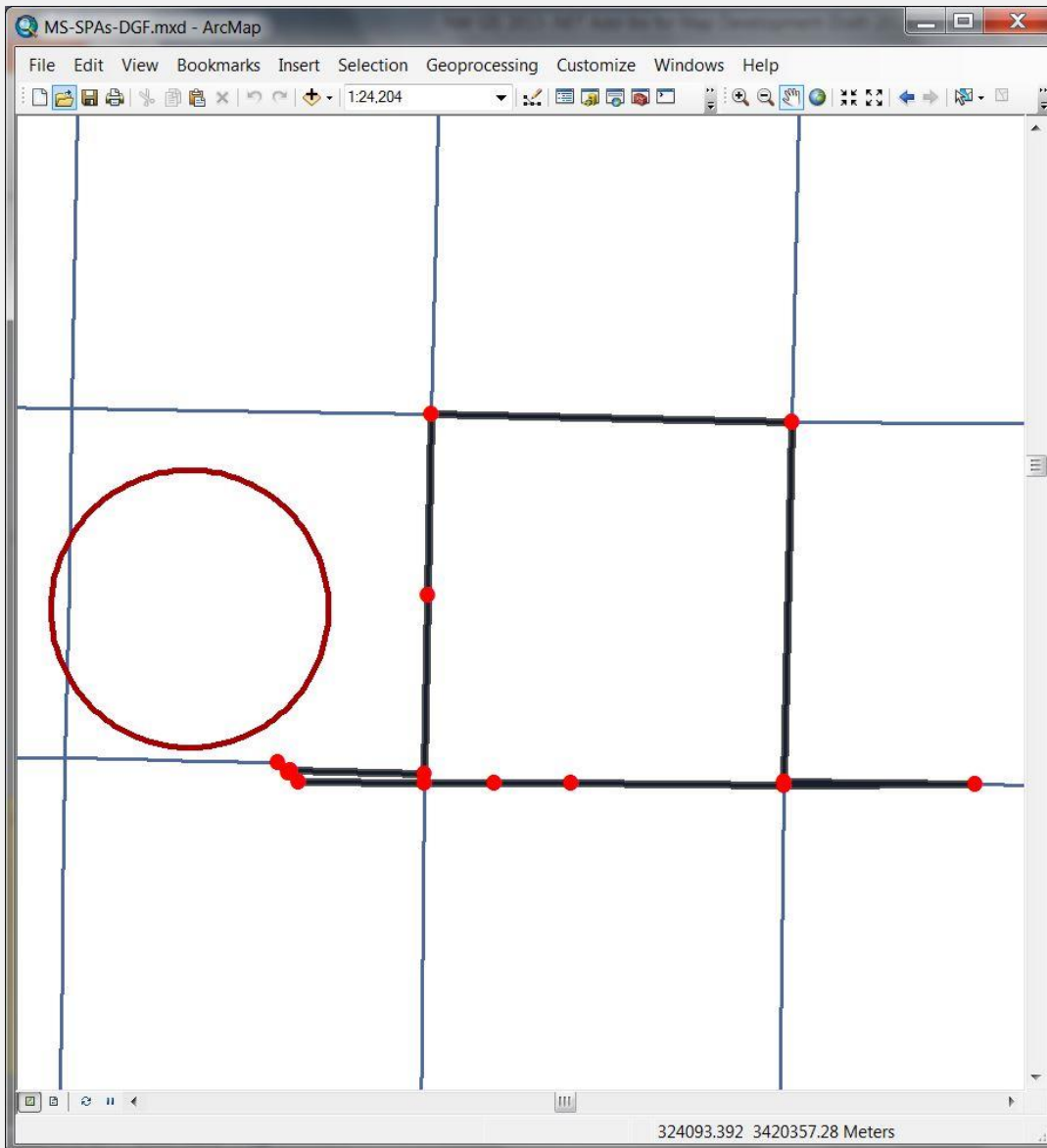
#	ID	Manual Primary	Auto Primary	Unit Count	C81 Area	C82 Area	C81 + C82 Area	Rejected	Rejection Reasons
5	5	0	0	2	1095300	67500	1162800	False	
6	6	1	1	2	827100	67500	894600	False	
7	101	-1	-1	2	-1	-1	-1	True	Unit buffer spill; Unit buffer spill - Y
8	102	-1	-1	2	-1	-1	-1	True	Unit buffer spill; Unit buffer spill - X
9	103	-1	-1	2	-1	-1	-1	True	Unit buffer spill; Unit buffer spill - X

Messages

Key datasets:

- Public Land Survey Sections
- Derived quarter sections
- Critical Habitat locations
- Buffered Critical Habitat locations
- Selection points
- 2006 National Land Cover Data (NLCD)

Species Protection Area Tools – Challenges



SPA Tools

SPA Development

#	Unit ID	SPAs Created	Primary SPA Found	QC Status
4	4	1	1	0
5	5	1	1	0
6	6	1	1	0
7	8	0	0	0
8	9	0	0	0
9	10	0	0	0
10	11	1	1	0
11	13	1	1	0
12	14	0	0	0
13	15	1	1	0

State: MS

Units: < > Load Filter: None

Current: 9 Count: 13 w/SPAs: 9

SPAs: Apply to all

QC Status: 0 Create NLCD tables

Start Point: Use point

Sel. pt at X: Y: Use Outside %:

Shift Limit X: Y: Use Allowable spill %:

Sel. pt adj. factor X: 1.00 Y: 1.00 Use

Sel. pts rotation angle: Use

Sections Buffer Distance:

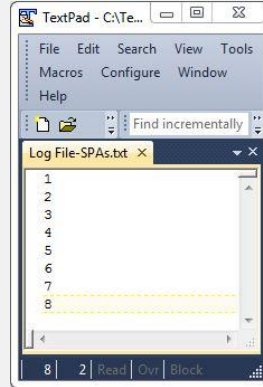
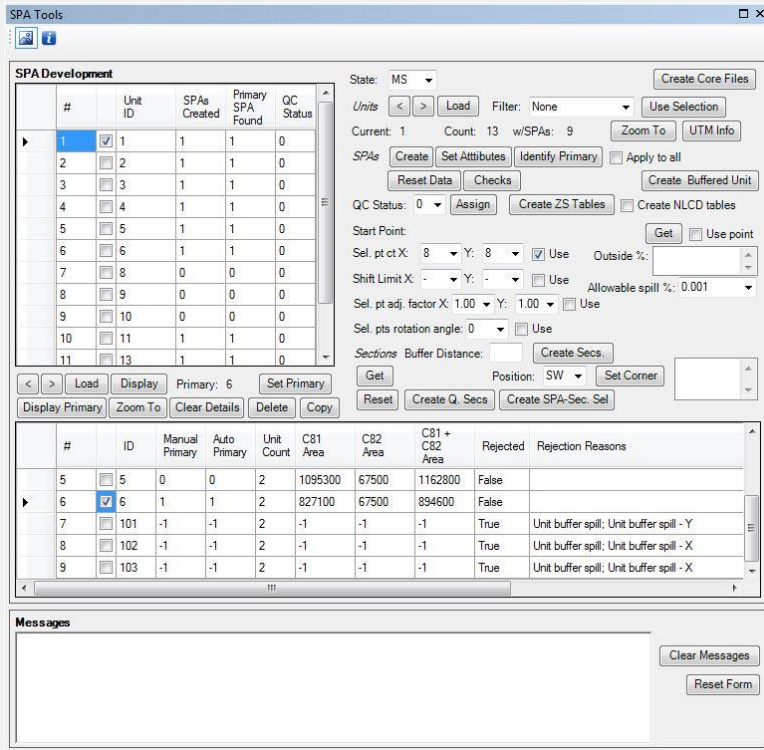
Position: SW

#	ID	Manual Primary	Auto Primary	Unit Count	C81 Area	C82 Area	C81 + C82 Area	Rejected	Rejection Reasons
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Messages

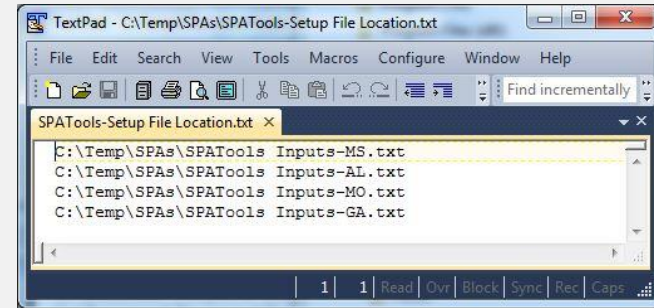
- Quarter section creation problem due to inability to automatically find corners
- Manually define corners and pass to procedure

Species Protection Area Tools – Operation

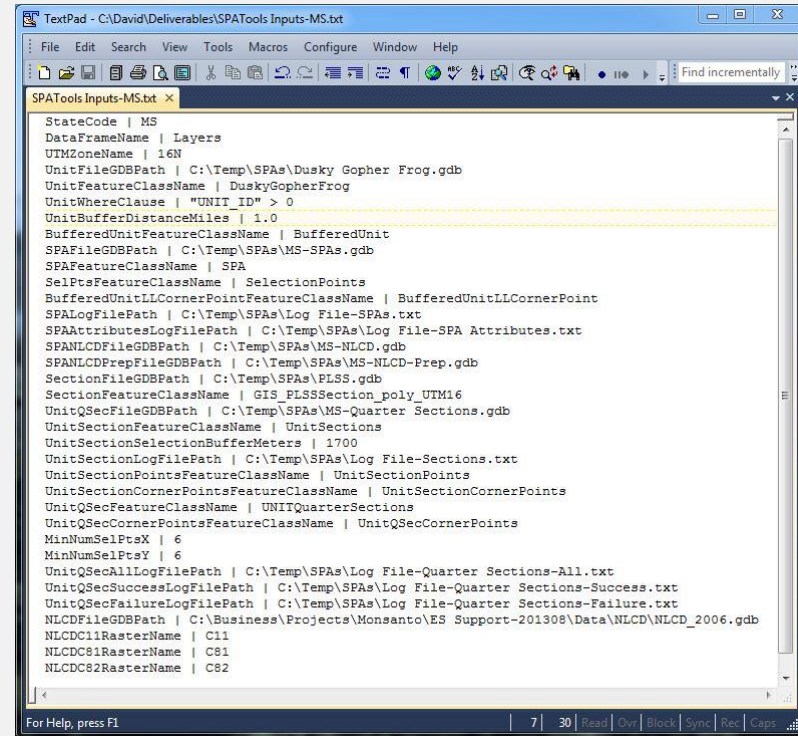


Log file

Setup file location file



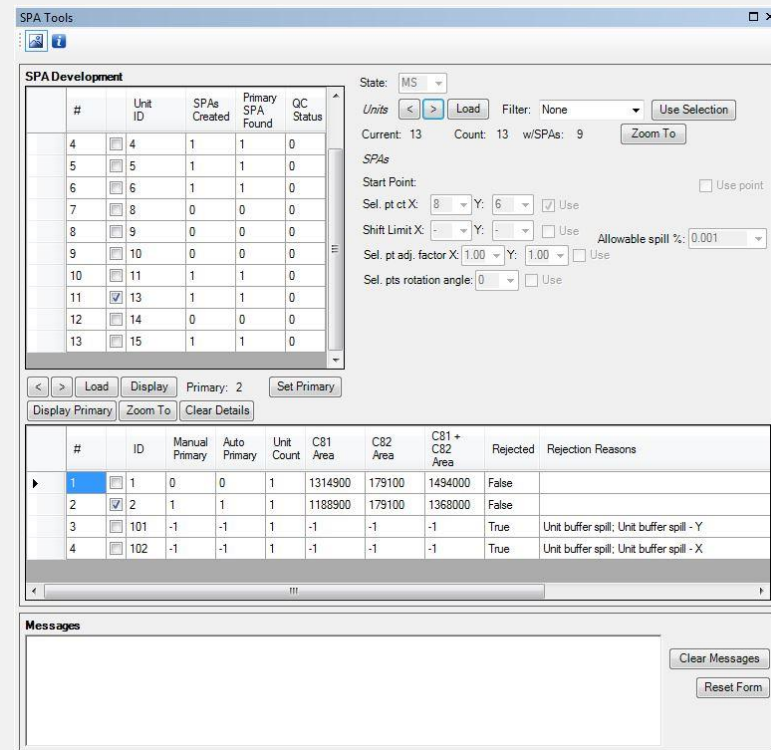
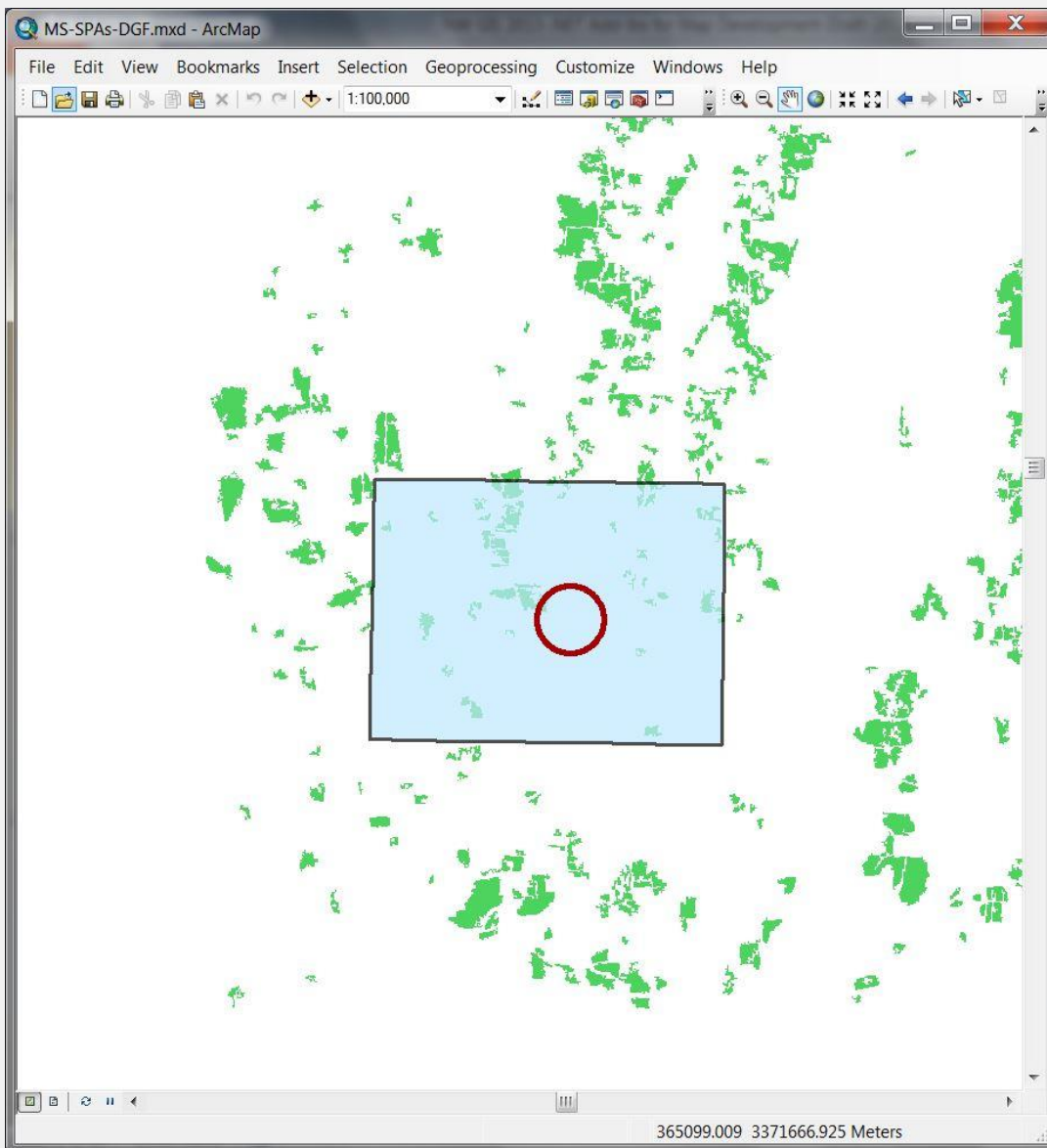
Setup file



Deliverables

Name	Date modified	Type	Size
Code	10/13/2013 2:17 PM	File folder	
MS-Quarter Sections.gdb	10/13/2013 2:25 PM	File folder	
MS-SPAs.gdb	10/13/2013 2:25 PM	File folder	
MS-SPAs-DGF.mxd	10/13/2013 1:18 PM	ArcGIS ArcMap Document	2,439 KB
SPAs-MS-DGF-20131013-1420.zip	10/13/2013 2:20 PM	Compressed (zipped) Folder	1,078 KB
SPATools Inputs-MS.txt	10/13/2013 2:11 PM	TXT File	2 KB
SPATools-20131013-1415.esriaddin	10/13/2013 1:18 PM	Esri AddIn File	265 KB

Species Protection Area Tools – Deliverable



- Read-only version of tools (functionality hidden as required)
- Tools appearance is a low priority
- Main priority is output data

Development Considerations

- Core Construction
 - Allow for continual expansion
 - Create re-usable code and share between add-in and standalone processes
 - Code neatly and descriptively and comment well
- Approaches used here are generally applicable to a wider variety of automation procedures
 - Storing/accessing setup parameters
 - Log file usage
 - Process control

It's always in your interests to generate high quality products that are simple to maintain

Closing Remarks

- Developing customized procedures yourself or with assistance from someone else can allow you to reap tremendous returns on what can be a sizeable investment in a product such as ArcGIS for Desktop
- Despite the current heavy emphasis on cloud functionality, the benefits of desktop functionality are likely to remain strong for many years to come

Streamlined approaches can often pay for themselves many times over



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