

## Problems with large datasets consisting of numerous useless polygons?

### Consider the PMT

The Polygon Manipulation Tool PMT is an Arc/Info extension designed to manipulate polygon coverages, employing form menus. The PMT is specifically designed to process and compact complex datasets, such as a 'resultant' dataset that are typically prepared for further analysis such as wildlife habitat modeling, timber supply and resource modeling, watershed and terrain stability assessments and ecosystem classification and mapping.

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=====
AREA RANGE REPORT
02-08-28.10:51:59.Wed
This file is based on data located on FORUM7
OUTPUT FILE = d:\promo_material\pmt2test.ran
=====

Record  area_range  pa_range frequency  tot_area perc_no perc_area
1  0-0.0001  >1.0      169      0.00   9.2    0.0
2  0.0001-0.001  >1.0      104      0.05   5.6    0.0
3  0.001-0.01    0.0-0.6   15       0.12   0.8    0.0
4  0.001-0.01    0.6-1.0   47       0.28   2.6    0.0
5  0.001-0.01    >1.0      174      0.59   9.4    0.0
6  0.01-0.1      0.0-0.6  388     17.85  21.1   1.2
7  0.01-0.1      0.6-1.0   60       1.17   3.3    0.1
8  0.01-0.1      >1.0      60       1.80   3.3    0.1
      Subtotal    1017     21.86  55.3   1.4

9  0.1-0.3      0.0-0.6  295     53.95  16.0   3.5
10 0.3-0.5      0.0-0.6  106     42.13   5.8   2.8
11 0.5-1.0      0.0-0.6  123     88.35   6.7   5.8
12 1.0-5.0      0.0-0.6  219    530.48  11.9  34.9
13 5.0-10.0     0.0-0.6   55    375.07   3.0  24.7
14 10.0-20.0    0.0-0.6   25    361.13   1.4  23.8
15 20.0-30.0    0.0-0.6   2     46.74   0.1   3.1
16 n/a         n/a     1842   1519.70 100.0 100.0

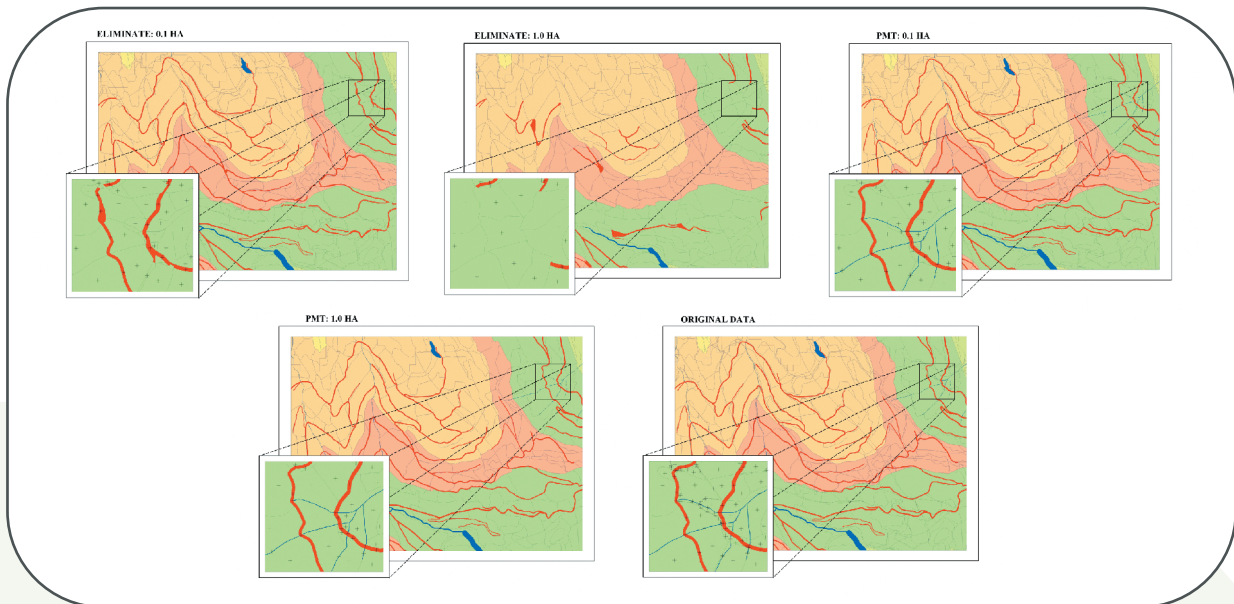
=====
At a minimum area criterion of 0.1ha, 55.3% of polygons represent 1.4%
of the area.

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The number of polygons in a resultant dataset resultant polygons is largely a function of the size of the analysis area, the number of input coverages overlaid and the level of inventory detail within the input coverages. For large tracts of land that provide multiple and often overlapping functions, such as wildlife habitat requirements, recreational uses and watershed areas, the number of resultant polygons might readily exceed 1 million units. However, analysis of the resultant database shows that a significant number of resultant polygons are very small, and a more detailed look indicates that their removal will have very little impact on the overall results of the analysis.



The PMT will allow the user to establish the appropriate minimum resolution required by the project. If a resolution is established without restrictions, eliminating all polygons smaller than the minimum would have a very significant impact on the data integrity of the resultant dataset, and hence on the overall quality of the analysis. This is because some of the input coverages are what we term 'data processing sensitive'. In general, 'data processing sensitive' coverages are coverages that are based on buffers of linear features, such as roads and riparian reserve/management zones, and of course coverages that contain very detailed inventory such as wildlife habitat areas. Differences between the 'eliminate' and the PMT become more pronounced if a larger area criterion is chosen.



The PMT allows the GIS analyst to condense a large resultant dataset along well defined criteria. The set of criteria evaluated includes 'elimination' criteria, such as a minimum area, and 'non elimination' criteria, such as identifying arcs that may not be deleted for example, the arcs that delineate the road network.

The PMT has allowed users to reduce the number of resultant polygons within a resultant dataset by over 80% without making changes to any data attribute within a minimum defined deviation from the non compacted version. In cases where an initial deviation of more than 5% is reported, the original area for this database attribute is usually very small, representing only a fraction of a percent of the total area. However, if those areas are a concern, such data can be locked in along with road buffers, ownership classes, or any other critical class or subclass of data.

The overall result of the PMT data manipulation is a compacted version of the resultant dataset that is, both spatially and non spatially, easier to understand than the non compacted version. In addition, the reduced number of resultant polygons focuses available computing resources, resulting in very significant savings in modeling time and ultimately money.

SUMMARY TABLE  
Showing changes in number of polygons and area using ELIMINATE vs PMT

| UNIT      | ORIGINAL DATA<br># POLYGONS AREA (HA) | ELIMINATE ( 0.1 HA )<br># POLYGONS AREA (HA) | PMT ( 0.1 HA )<br># POLYGONS AREA (HA) | ELIMINATE ( 1.0 HA )<br># POLYGONS AREA (HA) | PMT ( 1.0 HA )<br># POLYGONS AREA (HA) |
|-----------|---------------------------------------|--|--|--|--|
| BEC Unit  |                                       |  |  |  |  |
| ESSFwo 1  | 494 347.2                             | 210 347.4                                    | 199 333.9                              | 93 340.4                                     | 91 337.0                               |
| ESSFwo 4  | 590 627.4                             | 340 627.3                                    | 252 614.8                              | 100 625.7                                    | 140 642.6                              |
| ESSFwopt  | 90 4.1                                | 9 4.1  | 11 4.3                                 | 5 3.6  | 2 4.0                                  |
| ICH dw    | 29 8.3                                | 20 8.3                                       | 10 13.2                                | 17 9.2                                       | 4 7.2                                  |
| ICH msw 2 | 762 532.8                             | 297 532.4                                    | 295 553.2                              | 147 532.4                                    | 165 530.0                              |
| Total     | 1942 1,519.7                          | 885 1,519.7                                  | 752 1,519.7                            | 431 1,519.7                                  | 388 1,519.7                            |
| Riparian  | 170 9.0                               | 26 8.9                                       | 46 9.0                                 | 14 4.4                                       | 46 9.0                                 |
| Roads     | 519 63.0                              | 100 60.3                                     | 43 63.6                                | 26 22.5                                      | 43 63.6                                |

| UNIT      | ORIGINAL DATA<br>%POLYGONS AREA (%) | ELIMINATE ( 0.1 HA )<br>%POLYGONS AREA (%) | PMT ( 0.1 HA )<br>%POLYGONS AREA (%) | ELIMINATE ( 1.0 HA )<br>%POLYGONS AREA (%) | PMT ( 1.0 HA )<br>%POLYGONS AREA (%) |
|-----------|-------------------------------------|--|--------------------------------------|--|--------------------------------------|
| BEC Unit  |                                     |  |                                      |  |                                      |
| ESSFwo 1  | 100.0% 100.0%                       | 46.3% 100.1%                               | 35.2% 99.2%                          | 20.0% 100.0%                               | 19.6% 97.0%                          |
| ESSFwo 4  | 100.0% 100.0%                       | 59.2% 100.0%                               | 40.5% 98.0%                          | 25.5% 99.7%                                | 24.7% 102.4%                         |
| ESSFwopt  | 100.0% 100.0%                       | 30.0% 100.0%                               | 11.0% 103.3%                         | 60.0% 95.0%                                | 20.0% 95.4%                          |
| ICH dw    | 100.0% 100.0%                       | 76.0% 99.9%                                | 61.5% 162.1%                         | 65.4% 98.0%                                | 15.4% 86.4%                          |
| ICH msw 2 | 100.0% 100.0%                       | 39.5% 100.0%                               | 35.2% 103.9%                         | 19.6% 100.0%                               | 20.6% 99.3%                          |
| Total     | 100.0% 100.0%                       | 48.0% 100.0%                               | 40.8% 100.0%                         | 23.4% 100.0%                               | 21.6% 100.0%                         |
| Riparian  | 100.0% 100.0%                       | 15.3% 76.6%                                | 25.6% 100.0%                         | 8.2% 48.3%                                 | 25.5% 100.0%                         |
| Roads     | 100.0% 100.0%                       | 30.0% 94.6%                                | 8.3% 100.0%                          | 5.0% 35.5%                                 | 8.3% 100.0%                          |

For further information on the PMT and licensing options, please contact Franz Feigl at Forest Ecosystem Solutions Ltd.