

# POST MINING LAND USE TRENDS IN WV BETWEEN 1998 AND 2008<sup>1</sup>

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**Abstract:** Post Mining Land Use (PMLU) has become an area of interest in recent years, as surface coal mining reclamation practices have become an issue of much debate. This paper documents a study of Post Mining Land Use choices in West Virginia. The data and how it was collected is explained, consisting of all surface mine applications (SMAs) issued from 1998 to 2008 along with the post mining land use of each permit. These permit numbers were broken down by PMLU and compared both yearly and for the total study period. The acreage for each PMLU was calculated and these acreages were compared as well. Since Post Mining Land Uses of individual permits can and do change, the data was analyzed to determine how much change in Post Mining Land Use had occurred in the individual permits within the dataset. This was done to determine if PMLU was being changed after a permit was approved and creating a trend that would not be realized without this type of observation. There were few significant changes in Post Mining Land Use between time of permit approval PMLU and current PMLU. The data indicates that reforestation based PMLUs dominated throughout the timeframe of the study period. Current Post Mining Land Use data was used to calculate the percentages of permit applications in each of the post mining land use categories for each year. Discussions include how the change in percentages relate to which post mining land uses are chosen in each given year. Also included in this discussion is some insight into some of the factors that could have been influencing those post mining land use choices.

**Additional Key Words:** Post Mining Land Use, reclamation, West Virginia

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## **Introduction**

Post Mining Land Use (PMLU) has become an area of interest in recent years, as surface mining reclamation practices have become an issue of much debate. There has been much discussion surrounding Post Mining Land Use choices and which are ideal for a given area or region. One of the first questions would be what PMLUs are being employed in an area. So it seemed a study of Post Mining Land Use choices in West Virginia at this time would be appropriate. It was decided to look at Post Mining Land Use data over an 11 year span from 1998 to 2008 and see if any patterns or trends could be deciphered.

## **Method**

All of the data used in this study came from the West Virginia Department of Environmental Protection's Environmental Resource Information System (ERIS). The data used for this analysis consisted of surface mine applications (SMAs) approved for each year 1998 to 2008. It should be noted that once a SMA is approved it becomes a permit; also a SMA may not be approved for years. There are some other permitting actions which could have been included such as amendments, but are not included due to data collection encumbrances. It was known beforehand and quickly became apparent during the data collection that the PMLU of some permits, changed from what was indicated at the time of the permit approval. This is something that obviously could prove significant in the analysis of the trends in PMLU's over time. Data was collected for each permit to show both the PMLU choice at the time the SMA was approved and the current PMLU. The current PMLU is defined as what was listed as the PMLU at the time the data was retrieved. The data was compiled, then grouped by year and analyzed to see if any patterns or trends were indicated.

The data was retrieved from West Virginia Department of Environmental Protection's Environmental Resource Information System (ERIS), a record keeping and tracking system used by the Division of Mining and Reclamation to maintain a permit database. The information contained in ERIS comes from permits, but it requires the data to be entered into the system and there is the possibility of some data entry error. ERIS is the best available source of information as searching individual permits is time consuming and impractical for the older permits which may now be bond released. There were a total of 624 permits approved over the 11-year period 1998 to 2008. These made up the dataset for this study. As stated earlier, data was collected

only for SMA's, other types of permitting actions or permits have been excluded. The exclusion was deemed necessary, because in many cases, multiple individual permit searches would have been required to gather the needed information. The first step in analyzing the data was to group the permits by year of approval; the permits were then grouped by PMLU. The permits were grouped by PMLU for the entire study period as well. Once the permits were grouped, percentages could be calculated for each PMLU. The percentages were used to rank the PMLU's for each year as well as the complete study period. The PMLU's were listed in order of frequency, highest to lowest, allowing them to be ranked 1, 2, etc. using either percentage and/or the numbers. This provides a basis on which to compare the different PMLU's. There were a small percentage of permits that had more than one PMLU; the PMLU with the highest acreage amount was used as the basis to group these permits.

A brief description of each of the PMLU choices that were available during the timeframe of the study seems appropriate. Heavy Industry: industrial sites such as manufacturing facilities, power plants, airports or similar facilities. Light Industry and Commercial Services: office buildings, parking facilities, apartment houses, hotels or similar facilities. Public Services: schools, water treatment facilities, public parks and recreation facilities, major transmission lines, highways, utilities and other public servicing structures and appurtenances. Residential: single and multiple family housing (other than apartment houses) with necessary support facilities. Cropland: land used primarily for the production of cultivated and close-growing crops for harvest alone or in association with sod crops. Bio-fuel Cropland: agricultural production of renewable energy crops through long-term intensive cultivation of close-growing commercial biological oil species for harvest and ultimate production of bio-fuels. Rangeland: includes rangelands and forestlands which support a cover of herbaceous or scrubby vegetation suitable for grazing or browsing use. Hayland or Pasture: land used primarily for the long-term production of adapted, domesticated forage plants to be grazed by livestock or cut and cured for livestock feed. Forestland: land with at least a twenty-five percent (25%) tree canopy or land at least ten percent (10%) stocked by forest trees of any size, including land formerly having had such tree cover and that will be naturally or artificially reforested. Commercial Forestry: where forest cover is managed for commercial production of timber products. Commercial Woodland: where forest cover is managed for commercial production of timbers products. Impoundments of Water: land used for storing water for beneficial uses such as stock ponds, irrigation, fire

protection, recreation or water supply. Fish and wildlife habitat and recreation lands: wetlands, fish and wildlife habitat, and areas managed primarily for fish and wildlife or recreation.

Commercial Forestry was a new PMLU created during the time frame of the study to replace Commercial Woodlands. In 2000 the West Virginia regulations were changed, Commercial Woodlands was removed as a PMLU choice and was replaced by Commercial Forestry. SMAs in the review process that had Commercial Woodlands as PMLU were not required to change their PMLU. They were allowed to continue with Commercial Woodlands as the PMLU. No new SMAs were accepted with Commercial Woodlands as the PMLU. Also the ERIS system did not distinguish between Heavy and Light Industry and Commercial Services, these two PMLUs were combined as Industrial / Commercial.

### Results

It was decided to look at the PMLU changes first and determine if these changes were creating any significant effects. The calculations from the two groups of data, PMLU at time of permit approval and the current PMLU were compared. This was done to determine if a large number of permits had changed their PMLU after they were approved. The individual PMLUs for the entire study period were compared and revealed only slight variation (see Table 1). Also the individual PMLUs for each year were compared to look for changes that had occurred between time of approval PMLU and current PMLU (see Appendix A). The percentages showed that even though change to the PMLU was occurring to some individual permits between time of approval PMLU and current PMLU, these changes were not affecting the rankings.

Table 1 Post Mining Land Uses for the study Period

At PMLU approval	Permits	Percent of Land Use	Current PMLU	Permits	Percent of Land Use
Forestland	389	62.3%	Forestland	389	62.3%
Fish & Wildlife	136	21.8%	Fish & Wildlife	134	21.5%
Hay or Pasture	54	8.7%	Hay or Pasture	56	9.1%
Comm. Forestry	7	1.1%	Comm. Forestry	12	1.9%
Comm. Woodland	12	1.9%	Comm. Woodland	8	1.3%
Indust. / Comm.	15	2.4%	Indust. / Comm.	13	2.0%
Rangeland	7	1.1%	Rangeland	8	1.3%
Residential	4	0.6%	Residential	4	0.6%

The data showed that seven out of the eleven years there were no substantial changes to the percentages between PMLU at approval and current PMLU. One year there were changes in PMLU percentages when compared, but not enough to change the order of frequency. There were only two years in which the data indicates that the PMLU changes caused changes to the order of the PMLU rankings. In none of the instances are any PMLU percentages changed by more than 3%. In 2000 and 2001 the changes that take place occur between Commercial Woodland and Commercial Forestry, since they are essentially the same PMLU, as is discussed earlier, there really is no change. This leaves one year out of eleven years worth of data in which the rankings are affected. The changes occurring between PMLU at approval and current PMLU are having insignificant and negligible effects on the order of the PMLU rankings.

Since it was determined that PMLUs were not being changed over the course of the eleven year study period and skewing the data towards one specific PMLU, the data can be analyzed to look for patterns or trends over the 11-year period. There were a total of 624 permits over the 11-year period 1998 to 2008. There were a total of 8 different post mining land uses found during the analysis of the data. These PMLUs were Forestland, Fish and Wildlife, Hayland or Pasture, Industrial/Commercial, Commercial Forestland, Commercial Woodland, Rangeland and Residential in order of highest frequency.

The Environmental Resource Information System (ERIS) provides data which includes all the permits approved for a given year. ERIS also provides the current PMLU and current permit acreage. Total numbers for PMLUs and total acreages can easily be calculated from this data. These numbers and acreages were calculated on a yearly basis and for the total study period. The data was then compared to indicate trends or patterns. The use of permit numbers by PMLU and acreage by PMLU allow for a complete and thorough analysis of the data.

The PMLU number data was compared and is discussed first. This data is contained in Table 1 and Table 2. Forestland dominates the PMLU choices over the 11-year period. Forestland making up 62.3% of the permits approved during the 11-year period. As well as being the most popular PMLU choice for the entire study period it was the most popular each year. Over the course of this study it has increased its percentage indicating it is being selected more frequently. Fish and Wildlife makes up 21.5% of the permits approved during the 11-year period. Fish and Wildlife PMLU comes in a strong second more than double the next most

frequent PMLU. There was only one year in which was not ranked second and that year it was third. Over the course of the study it has seen its percentage decrease. Hayland and Pasture at 9.1% is the third most popular choice. It has seen its percentage decrease over the course of the study as well. It should be noted each of the remaining PMLUs, that there are years when they were not chosen as a PMLU for a single permit. Commercial Forestry; Commercial Woodlands at 3.2% is Fourth. Over the course of the study they have decreased, not appearing at all in since 2004. Industrial/ Commercial is fifth on the list at 2%. Over the course of the study its percentage has increased. It has appeared more frequently over the second half of the study period. Rangeland at 1.3% is sixth and has seen its percentage decrease over the course of the study. It has appeared less frequently over the second half of the study period. Residential is seventh at 0.6% and its percentage has stayed the same over the course of the study. It has seen its frequency increase over the course of the study. (See Table 2)

When the numbers and percentages are compared these are some of the trends or patterns that are indicated: The number of PMLU being utilized in a given year has, in general, been decreasing during the study period. This could be attributed to the continuing unsettled regulatory climate of time period of this study. There are many factors affecting the mining industry and reclamation during the timeframe of this study, litigation sparked a total review of the regulatory process. The regulatory agencies had to respond to tremendous criticism and many changes to the permit and review processes were developed. These changes and the litigation are discussed in more detail later in this document. The number of PMLUs being utilized seems to have stabilized and it is doubtful that it would decrease much more, only four out of the possible eleven choices are being used presently.

<b>Table 2 Post Mining Land uses By Year</b>											
<b>PMLU's</b>	<b>Years</b>										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Forestland	47%	52%	51%	67%	57%	69%	61%	71%	72%	63%	67%
Fish & Wildlife	21.5%	35.5%	30.5%	13%	26%	18%	27%	12%	20%	19%	16%
Hayland & Pasture	24%	10.5%	8.5%	5%	9%	4%	4%	12%	6%	10%	7%
Industrial/ Commercial	1.5%	0%	5%	0%	3%	1.5%	2%	2.5%	0%	6%	10%
Commercial Forestry	1.5%	0%	5%	3%	0%	6%	4%	0%	0%	0%	0%
Commercial Woodlands	1.5%	0%	0%	8%	2%	1.5%	0%	0%	0%	0%	0%
Rangeland	3%	2%	0%	2%	3%	0%	0%	0%	2%	0%	0%
Residential	0%	0%	0%	2%	0%	0%	2%	2.5%	0%	2%	0%
<b># of permits</b>	68	48	59	61	58	68	52	41	59	52	60
<b># of PMLUs</b>	7	4	5	7	6	6	6	4	4	4	4

The permit data were also analyzed using acreage data as opposed to numbers of permits. It is important to analyze using acreage because all permits do not have the same acreage. The acreage varies between permits and permit numbers alone do not reflect this difference in acreage. The potential for acreage to tell a completely different story than the number of permits is obvious and analysis of both gives a complete analysis. The acreage data used is the current acreage obtained from ERIS. The current acreage is used, because it is more likely to reflect what is on the ground in the field. Acreages were determined for each of the PMLUs, along with a total acreage and percentages were calculated on a yearly basis between the years 1998 and 2008. Table 3 shows the percentage of total acreage for each year, for each PMLU. Table 4 shows the acreage for each PMLU, for each year and a total acreage for each year.

The purpose of this study is to determine and show trends related to PMLU, and the same ones that were observed earlier looking at permit numbers, hold true here looking at permit acreage. This analysis of PMLU acreages gives a slightly different version of the same story as the analysis of PMLU by numbers. The percentages are different but the trends remain the same. The acreages tend to reflect the numbers in the overall conclusion, although certain types of PMLUs tend to have larger acreages. This is reflected in the comparison of Tables 2 and 3. Table 2 indicates percentage by numbers and Table 3 indicates percentage by acreage. Therefore, for a given PMLU a higher percentage in Table 2 than Table 3 indicates more permits with lower acreage. The opposite is true for a given PMLU a lower percentage in Table 2 than Table 3 indicates fewer permits with higher acreage. The rankings are slightly different as the top PMLU under acreage starts out as Fish and Wildlife but is soon overtaken by Forestland. There are a few other differences which can be observed by comparing Table 2 with Table 3. Forestland increases over the timeframe of the study and becomes the dominant PMLU. Fish and Wildlife is second in terms of acreage and decreases over the study period. Hayland or Pasture third in terms of acreage also decreased during the study period. Commercial Forestry and Commercial Woodlands increase and peak in the middle of the first half of the study period. They continue their decline and become nonexistent in the second half of the study period. Industrial/Commercial PMLU has a very small amount of acreage and has not been used very much. Rangeland and Residential make up minute amounts of the acreage. Rangeland was more popular in the first half of the study period with Residential being chosen more in the second half. The comparison of the two tables gives indication on PMLU and acreage or size of a permit.

Table 3 Percentage of Post-Mining Land Uses (PMLUs) acreages for approved West Virginia Surface Coal Mine Applications (SMAs).

PMLUs	Years										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Forestland	31.1%	36%	35.1%	54.5%	47.3%	48.6%	48.4%	77.5%	55.6%	69.7%	72%
Fish and Wildlife	42.7%	53.5%	11%	10.3%	28.3%	21.5%	28.8%	12%	42.2%	23.6%	26.8%
Hayland or Pasture	10.3%	7.8%	2.3%	1.4%	7%	.6%	.6%	9.1%	1.4%	5.9%	1.1%
Industrial / Commercial	.2%	0	3.4%	0	5.4%	3.2%	.4%	1.2%	0	.8%	.1%
Commercial Forestry	2.6%	0	48.2%	11.5%	0	23.5%	21.8%	0	0	0	0
Commercial Woodland	12.1%	0	0	20.7%	9%	2.6%	0	0	0	0	0
Rangeland	1%	2.7%	0	.3%	3%	0	0	0	.8%	0	0
Residential	0	0	0	1.3%	0	0	.01%	.2%	0	.05%	0
reforestation based PMLUs*	45.8%	36%	83.3%	86.5%	56.3%	74.7%	70.2%	77.5%	55.6%	69.7%	72%

\*This entry is a combination of Forestry, Commercial Forestry and Commercial Woodlands PMLU permits. They are combined because each has requirements related to tree planting and are intended, in due time, to establish a forested condition on the permitted area.

Table 4 The following table shows acreage by PMLU per year.

PMLUs	Years										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Forestland	3002.28	2176.88	3391.52	7712.03	3348.63	10164.30	6673.82	3814.47	5660.60	6140.76	8322.59
Fish and Wildlife	4124.42	3230.39	1056.73	1462.14	2004.88	4492.69	3976.49	592.65	4294.07	2079.29	3094.34
Hayland or Pasture	993.86	467.75	225.38	198.78	503.08	124.40	80.35	444.17	137.76	517	131.77
Industrial / Commercial	17.00	0	329.91	0	384.06	666.50	51.50	60.78	0	73.07	18.50
Commercial Forestry	251.00	0	4650.80	1617.16	0	4939.37	3015.31	0	0	0	0
Commercial Woodland	1174.84	0	0	2927.58	634.41	543.74	0	0	0	0	0
Rangeland	92.70	165.56	0	43	211	0	0	0	86.59	0	0
Residential	0	0	0	181	0	0	1.77	7.55	0	5	0
Total acreage	9656.10	6040.58	9654.34	14141.69	7086.06	20931	13799.24	4919.62	10179.02	8815.12	11567.20

Forestland, Fish and Wildlife, Commercial Woodlands and Commercial Forestry tend to be larger permits. Hayland or Pasture, Industrial/Commercial, Rangeland, and Residential tend to be smaller permits. The comparison indicates that Forestland permits have increased a little over the study period in size. Fish and Wildlife permits have decreased a little in size over the study period. There is no indication of any acreage change in the other PMLUs.

### **Discussion**

In 1998 there was a lawsuit filed against the Army Corp of Engineers and the WVDEP “Bragg vs Robertson” more commonly known as the Mountaintop mining lawsuit. This had a very pronounced effect on surface coal mining and the permitting process within the state of West Virginia. It sparked a political climate that is very critical of the coal mining process and that criticism continues today, even though the lawsuit has long since been settled. Reforestation of mined sites became one of many areas where it was thought efforts were insufficient. The improvement of the methods and the interest to increase success of the efforts became a focus of industry and regulatory agencies. The federal Office of Surface Mining (OSM) developed the Appalachian Regional Reforestation Initiative (ARRI) and the Forestry Reclamation Approach (FRA). The West Virginia Department of Environmental Protection (WVDEP) developed the Commercial Forestry regulations and made changes to Forestland, and Fish and Wildlife regulations adopting the FRA requirements into their requirements for these PMLUs during the study period.

Rangeland, Commercial Forestry and Commercial Woodlands were selected sparingly at the beginning of the study and are not being selected at all now. The increased scrutiny of permitting during the early part of this study caused Rangeland to become a less desirable PMLU option. The lack of trees and forest developing from this type of reclamation has made this an undesirable PMLU. For a period of time Commercial Forestry and Commercial Woodlands were desirable because they were intended to develop a forest and they met the requirement of constituting an equal or better use of the affected land, as compared with pre-mining use for any permits seeking an Approximate Original Contour (AOC) variance. A limited number of PMLU are deemed to meet the strict requirements to obtain an AOC variance. They are Industrial/Commercial, Commercial Forestry, Agricultural, Residential and Public Facility. The requirements of these PMLUs have made it clear it is more feasible to restore AOC and choose a

less demanding PMLU. When AOC is chosen, the equal or better land use requirements does not apply and the other PMLUs can be chosen.

Forestland is and has been the most frequent PMLU; it is also increasing in its frequency. Since West Virginia is one of the top five states when it comes to forest cover, forestland should be the most frequent PMLU. The increased scrutiny of permitting during the early part of this study caused Forestland to become a more desirable PMLU, especially in the more heavily forested southern coal region of the state. Forestland was the most frequently chosen PMLU throughout the study period and at the top when looking at acreage. This would suggest that the WVDEP supported and encouraged Forestland as a PMLU even prior to the study period. When OSM developed the ARRI and FRA this focused even more attention on Forestland as a PMLU. The combinations of all these influences are responsible for the increase in Forestland as a PMLU.

Hayland and Pasture declined over the early part of this study period, but in the second half it regained a portion of that decline and seemed to stabilize. The differences between the two recognized coal regions of West Virginia apply here. During the early part of this study, mining was predominately occurring in the southern region of the state which is more heavily forested and rugged topographically. The increased scrutiny along with the factors listed as contributing to the increase in Forestland PMLU led to a decrease in this PMLU in the area. Over the second half of this study mining activity has increased in the northern region of the state which is less forested and has a more gentle topography making itself more suited to this PMLU.

Commercial Forestry increased as Commercial Woodlands decreased over the study period. Commercial Forestry was created as a new and improved version of Commercial Woodlands with the intention of replacing it. It did what it what it was supposed to. Commercial Woodlands is no longer a PMLU choice and they only exist within the same year, because a permit in the review process was allowed to continue with Commercial Woodlands as a PMLU. It must be understood that these two PMLUs allowed a company to obtain an AOC variance. Since AOC variances are not as desired as they once were, this PMLU is not as desirable.

Fish and wildlife in general declined over the study period, it maintained its ranking dominance and seems to have stabilized. There seems to be a correlation between Forestland PMLU numbers and Fish and Wildlife PMLU numbers. Most years show when one goes up the

other comes down. It seems that many times the final decision on which PMLU is a choice between these two. The emphasis on re-establishing the forest has had an effect. The development of ARRI and the continued support of WVDEP towards forestland led to the decrease in this PMLU.

Industrial/Commercial and Residential have both seen an increase over the course of the study period. The second half of the study period has seen the bulk of this increase. This increase though is more prevalent when looking at numbers. The acreages show that these are very small permits and make up a tiny portion of the acreage permitted.

The Rangeland PMLU is more applicable to the western U.S. and thus did not make up a very high percentage of the permits or acreage at any time during the study period.

Commercial Forestry and Commercial Woodlands are the same PMLU basically. They are closely related to Forestland since the basic requirements are similar and they are intended to establish a forested condition on the permitted area. These three PMLUs are reforestation based and to some extent can be considered together as one PMLU. This study confirms that efforts toward reforestation were being encouraged and applied at the beginning of this study period. This study also confirms that during the course of this study period that efforts toward reforestation are being expanded and improved by the efforts of the both of the major regulatory agencies involved the OSM and the WVDEP.

## Appendix A Post Mining Land Uses

### PMLU at Approval

1998	66 permits
Forestland	48%
Fish and Wildlife	23%
Hayland or Pasture	23%
Rangeland	3%
Industrial/ Commercial	1.5%
Commercial Forestry	1.5%

1999	48 permits
Forestland	54%
Fish and Wildlife	35.5%
Hayland or Pasture	8.5%
Rangeland	2%

2000	59 permits
Forestland	51%
Fish and Wildlife	30.5%
Hayland or Pasture	8.5%
Commercial Woodlands	5%
Industrial/ Commercial	5%

### Current PMLU

1998	66 permits
Forestland	47%
Hayland or Pasture	24%
Fish and Wildlife	21.5%
Rangeland	3%
Industrial/ Commercial	1.5%
Commercial Forestry	1.5%
Commercial Woodlands	1.5%

1999	48 permits
Forestland	52%
Fish and Wildlife	35.5%
Hayland or Pasture	10.5%
Rangeland	2%

2000	59 permits
Forestland	51%
Fish and Wildlife	30.5%
Hayland or Pasture	8.5%
Commercial Forestry	5%
Industrial/ Commercial	5%

Appendix A Continued

2001	61 permits	2001	61 permits
Forestland	67%	Forestland	67%
Fish and Wildlife	13%	Fish & Wildlife	13%
Commercial Woodlands	11%	Commercial Woodlands	8%
Hayland or Pasture	5%	Hayland & Pasture	5%
Residential	2%	Commercial Forestry	3%
Rangeland	2%	Residential	2%
		Rangeland	2%
2002	58 permits	2002	58 permits
Forestland	57%	Forestry	57%
Fish & Wildlife	26%	Fish and Wildlife	26%
Hayland & Pasture	9%	Hayland or Pasture	9%
Rangeland	3%	Rangeland	3%
Industrial/ Commercial	3%	Industrial/ Commercial	3%
Commercial Woodlands	2%	Commercial Woodlands	2%
2003	68 permits	2003	68 permits
Forestland	69%	Forestland	69%
Fish & Wildlife	18%	Fish and Wildlife	18%
Commercial Forestry	6%	Commercial Forestry	6%
Hayland & Pasture	4%	Hayland or Pasture	4%
Commercial Woodlands	1.5%	Commercial Woodlands	1.5%
Industrial/ Commercial	1.5%	Industrial/ Commercial	1.5%

Appendix A Continued

2004	52 permits	2004	52 permits
Forestland	61%	Forestland	61%
Fish & Wildlife	27%	Fish & Wildlife	27%
Hayland & Pasture	4%	Hayland or Pasture	4%
Commercial Forestry	4%	Commercial Forestry	4%
Industrial/ Commercial	2%	Industrial/ Commercial	2%
Residential	2%	Residential	2%

2005	41 permits	2005	41 Permits
Forestland	71%	Forestland	71%
Fish & Wildlife	12%	Fish & Wildlife	12%
Hayland & Pasture	12%	Hayland or Pasture	12%
Residential	2.5%	Residential	2.5%
Industrial/ Commercial	2.5%	Industrial/ Commercial	2.5%

2006	59 permits	2006	59 permits
Forestland	72%	Forestland	72%
Fish & Wildlife	20%	Fish & Wildlife	20%
Hayland or Pasture	6%	Hayland or Pasture	6%
Rangeland	2%	Rangeland	2%

Appendix A Continued

2007	52 permits	2007	52 permits
Forestland	63%	Forestland	63%
Fish & Wildlife	19%	Fish & Wildlife	19%
Hayland & Pasture	10%	Hayland or Pasture	10%
Industrial/ Commercial	6%	Industrial/ Commercial	6%
Residential	2%	Residential	2%

  

2008	60 permits	2008	60 permits
Forestland	67%	Forestland	67%
Fish & Wildlife	16%	Fish and Wildlife	16%
Industrial/ Commercial	10%	Industrial/ Commercial	10%
Hayland & Pasture	7%	Hayland & Pasture	7%