Salinity Discharge Mapping for the

Volcanic Plains in the

Glenelg Hopkins CMA Region

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SUMMARY

The objective of this study was to determine the area, severity and location of secondary saline discharge in the Volcanic Plains LMU's and present it in map and database form.

Aerial photos were used for the location of saline sites and an extensive ground truthing program carried out using the Inventory of Soil Conservation Needs techniques (ISCON) for the classification of salt severity.

A total of 8,349.6 hectares was found to be salt affected with sites varying in size from 1.1 m^2 to 264 hectares. The majority of sites were affected by a low level of salinity, although some were moderately or severely saline.

The majority of sites had not been treated. This provides a significant opportunity to achieve both productivity and environmental benefits through the adoption of saline agronomy practices.

CONTENTS

ACKNOWLEDGMENTS

Landholders in the Volcanic Plains were of great assistance, sharing knowledge and allowing access onto properties during the study.

Cathy Wagg (NRE Hamilton) provided GIS support by producing the LMU map of the Glenelg Hopkins CMA Region.

Craig Feuerherdt from Centre for Land Protection Research in Bendigo provided the base data for this report.

1. INTRODUCTION

1.1 The Glenelg Salinity Strategy & Previous Studies

Salinity is one of the most serious forms of land degradation in Victoria and its extent and severity continues to increase. In the Glenelg Hopkins CMA Region there is 27,500 hectares of land affected by salt. The symptoms of salinity cost the Glenelg Regional community over $2 million each year in lost agricultural production (Glenelg Salinity Forum, 1993).

The Glenelg Region Salinity Forum was set up in 1991 to prepare a strategy to combat the problem of dryland salting in the region. Preliminary estimates of salinity were used to help formulate the strategy. Several studies have been carried out in the region in the past that involved the mapping and measurement of salinity, Fisher (1991), Whitworth (1991) and Jerinic & Dahlhaus (1994). These took place in the southwest of Victoria and north of Hamilton respectively. By no means however, did they cover the whole of the region. Due to the subjective nature of some of the salinity discharge data, it was decided in 1993 that a mapping program should begin to improve the accuracy of information. Land management units (LMU's) where the reliability of salinity discharge data was low were to be surveyed first. (Glenelg Salinity Forum, 1993).

In 1999 the Glenelg Hopkins Catchment Management Authority (GHCMA) was formed. The formation of this Authority had little impact on the project except the Glenelg Salinity Region was redefined encompassing a larger area to the north and east. This new region is now referred to as the Glenelg Hopkins CMA Region and can be seen on page 2 of this report.

Salinity discharge mapping reports to date include;
- More, Rosalind (July, 1994) *Salinity Discharge Mapping for the Merino Tablelands in the Glenelg Salinity Region;* DNRE.

- More, Rosalind (November, 1994) *Salinity Discharge Mapping for the Grampians Slopes in the Glenelg Salinity Region;* DNRE.

- Munro, Melinda (May, 1998) *Salinity Discharge Mapping for the South West Sands and Tertiary Gravels and Sands in the Glenelg Salinity Region;* DNRE.

- Munro, Melinda (May, 1998) *Salinity Discharge Mapping for the Dundas Tablelands in the Glenelg Salinity Region;* DNRE.

Information relating to the remaining LMU's in the region is available from the NRE Office at Hamilton.

The Volcanic Plains where chosen to be mapped because of its lack of reliable information and the large proportion of agricultural land thought to be salt affected.

GLENELG SALINITY REGION - LAND MANAGEMENT UNITS
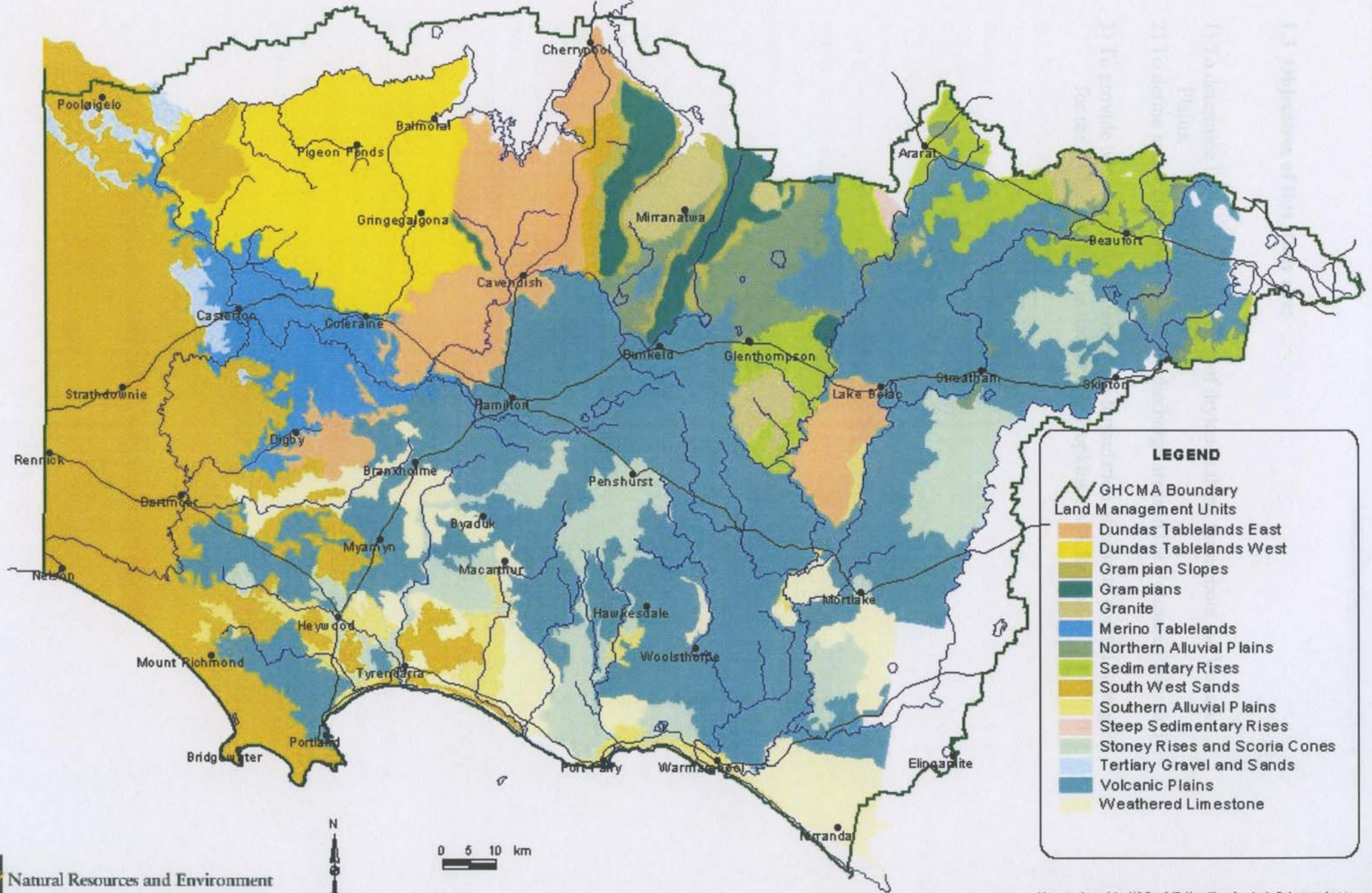
LEGEND

GHCMA Boundary
Land Management Units

Dundas Tablelands East
Dundas Tablelands West
Grampian Slopes
Grampians
Granite
Merino Tablelands
Northern Alluvial Plains
Sedimentary Rises
South West Sands
Southern Alluvial Plains
Steep Sedimentary Rises
Stoney Rises and Scoria Cones
Tertiary Gravel and Sands
Volcanic Plains
Weathered Limestone

N

0 5 10 km

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Map produced by NRE's GIS Hamilton Project, February 2000.

1.3 Objectives of this study are:

1) To determine the extent and severity of dryland salting throughout the Volcanic Plains,

2) To define and accurately map salinity discharge areas in the Volcanic Plains and

3) To provide base data information for the formulation of salinity control strategies for the Volcanic Plains in the Glenelg Hopkins CMA Region.

2. DESCRIPTION OF THE AREA

2.1 Geology and Soils

This LMU comprises pliocene basalt plains overlying Tertiary and Mesozoic sediments. Aquifers form in the fractured rock of the basalt flows and in the underling sediments. Groundwater flows are regional. Soils are mostly dark duplex and gilgaied. Some deep gradational profiles occur and red duplex soils occur on older flows in elevated positions. (Glenelg Salinity Forum, 1993).

2.2 Topography

The dominant landform is a rolling plain. In places, the basalt capping has been eroded, exposing the underlying sediments and forming characteristic U shaped valleys. (Glenelg Salinity Forum, 1993).

2.3 Climate

Rainfall varies from 650-825 mm, north to south. (Bird, Dickmann, Cumming, Jowett and Kearney, 1992). The mean daily maximum temperature is 18.3°C and the highest maximum-recorded temperature is 44°C. The mean daily lowest temperature is 7.2°C and the lowest minimum record temperature is —6.2°C. These temperatures were recorded at Hamilton in the far west of the Volcanic Plains.

2.4 Vegetation

Original vegetation was mainly swamp gum, blackwood, black wattle, drooping she-oak, sweet bursaria and silver banksia. On the stony rises manna gum is often the only tree species, due to the shallow and dense basalt sheet which impedes drainage and root development. Some areas (Dunkeld and Hamilton) are unusual in having river red gum as the dominant tree, perhaps because of a higher proportion of sand in the soil; on basalt this species is usually confined to drainage lines. (Bird, Dickmann, Cumming, Jowett and Kearney, 1992). The poor drainage characteristic of this LMU has lead to the development of extensive wetland systems, many of which have significant environmental values. The original native grasslands and woodlands that were once common on the plains have been substantially cleared. (Glenelg Salinity Forum, 1993).

2.5 Landuse

Sheep grazing is the predominant agricultural land use that is combined with cereal cropping in the dryer northern parts of the LMU. Dairying is relatively more common in the higher rainfall southern parts. (Glenelg Salinity Forum, 1993) Commercial planting's of Eucalyptus globulus are a current trend and in some areas dominating the landscape.

Table 1. Landuse in the Volcanic Plains

Landuse	Volcanic Plains
Total LMU Area (ha)	894,740
Agricultural Area (ha)	841,056
Existing Forest Cover (ha) (Parks, Reserv. etc)	44,737

3. METHODOLOGY

3.1 Aerial Photographs

Coloured aerial photos of the area, taken in 1991-92 at an approximate scale of 1:25,000, were used in the study. Those photos that included sections of the Volcanic Plains were selected. Sites that were possibly saline were marked on plastic overlay material on the photos for field checking.

3.2 Field Assessment

3.2.1 *Location of Possible Saline Sites*

Extensive and detailed ground truthing for the positive identification of possible saline areas was carried out. The farmers who owned the land where each site fell were approached for permission to inspect the area.

3.2.2 *Assessment of sites for Salinity Indicators*

Each site was assessed in accordance with the Inventory of Soil Conservation Needs (ISCON) techniques description in detail by Matters (1987) and Matters & Bozon (1995). In brief, a site was inspected for the presence of three or four salt indicator species and other symptoms of salinity. These included the appearance of bare ground, ground water seepage, salt crystals and scalds, erosion as a result of deterioration in soil structure and deterioration or eventual death of trees. Each site was given a severity rating, low (Class **1),** medium (Class 2) or severe (Class 3), with the presence of the more salt tolerant species and the increasing appearance of bare ground, salt and the other symptoms of salinity indicating a more severely affected area. Where the site was not purely one class, an estimate of the percentage of each class was made and the overall classification given as the one with the greatest percentage. In some cases it was difficult to tell whether the drainage line was salt affected or simply waterlogged. If two or more salt tolerant species were present the site was considered to be saline. (Matters 1987). Indicator species were found and their severity class listed in Appendix 1. The severity classes, Cl, C2 & C3 are described in Table 1 on page 6.

3.2.3 *Defining and Recording Areas*

Areas were marked directly onto the photo overlays. Where seeps were too small too be seen on the photo (for example 10m square) a point or dotted line was used to mark their position. E.g. Narrow drainage lines were marked with a dotted line onto photos.

Areas were assessed as being primary or secondary salting. Primary salinity is a natural occurrence and is often evident in the form of saline lakes and wetlands. Secondary salinity, on the other hand, is induced as a result of previous agricultural activities such as tree clearing and occurs due to a change in catchment water balance.

Table 2. Salinity Class Characteristics

Class	Severity of salting	Site characteristics
1	Low	- patchy growth in paddock - reduced vigor of crop or pasture - pastures thin or die out, replaced by more salt tolerant species - no salt crystals or bare patches seen
2	Medium	- species of higher salt tolerance replace Cl indicators - salt stress causes change in leaf shape & color - salt stains & scalds may appear - bare areas up to 1 square metre
3	High	- only highly salt tolerant plants present - 2 or 3 species dominant - large areas of bare ground - trees may be dead or dying

Matters & Bozon (1995)

Additional information about position of salinity in the landscape, evidence of salinity and treatment of discharge was noted. Each site was given an individual identification number. One number was used for several areas if they were located close together and had similar severities of salting and class indicator species.

All of the information for each site was recorded onto site assessment sheets. A copy of a typical site assessment sheet can be seen in Appendix 2 on Page 15.

3.3 Maps and Database

Areas were transferred from the aerial photos onto 1:25000 map sheets using a Sketchmaster. Sites that could not be drawn onto the aerial photos because they were too small, and therefore shape not recorded, were marked as dots or dotted lines on the map sheets. Maps where then sent to Bendigo for digitising where area and coordinates were recorded. Additional site information from the site assessment sheets was then entered for inclusion on the statewide database. The database and maps are held at the NRE Office, Hamilton.

3.4 Limitations of the Study

The mapping process, pacifically transferring and digitising of site detail has potential associated errors and should be taken into account when referring to areas quoted in this report.

Salt indicator species were identified though not recorded. The identification was only to identify if the site had a presence of two or more indicator species so as to classify the site as saline. Time constraints prevented a botanical survey from being carried out.

Salinity was not extensively searched for in forested areas. No saline sites were identified from aerial photos in forested areas of the LMU's. A systematic search of the entire forested area would be required to determine if salinity existed. This was not considered feasible given the inaccessibility of most of these areas. It was expected that the hydrology under large blocks of remnant vegetation would not have changed significantly enough to develop sites of secondary salinity.

The complete length of drainage lines was not surveyed, due to limited time. Drainage lines were checked for salinity at as many accessible crossings as possible. If a drainage line was saline along a number of lengths and at a number of checkpoints along its course, the whole drainage line was considered salt affected.

4. RESULTS - VOLCANIC PLAINS

Information about the saline sites identified in this study is shown in a printout of the database in Appendix 3 on page 14.

4.1 Summary Information
The Volcanic Plains Land Management Unit is comprised of 894,740 hectares. Of this 8349.6 hectares are saline, affecting 0.9% of land in the Volcanic Plains.

There were a total of 763 sites with an average of 10.9 ha. Of all the sites, 182 were less than 1 ha and 581 greater than 1 ha. The largest site measured was 264 ha and the smallest site 1.1 m^2.

4.2 Indicators of Salinity
Vegetation and bare ground served as the main indicator of salinity at all sites. Salt encrustations, scalds, tree deterioration and tree death were less common indicators.

Plant species commonly found throughout the study area were Buck's Horn Plantain *(Plantago coronopus),* Strawberry Clover *(Trifolium fragiferum),* Water Buttons *(Cotula coronepifolia),* Annual Beard Grass *(Polypogon monspeliensis),* Sea Barley Grass *(Critesion marinum)* and Spiny Rush *(Juncus acutus).*

4.3 Severity Classes
The results in Table 2 show that most of the area of salt affected land was of a low severity, (Class 1). Less area was affected by moderate salting, (Class 2) and less still by severe salting, (Class 3).

Table 3. Area of Land in Each Severity Class

Severity Class	Area %	Area (hectares)
1	82.3	6871.7
2	16.4	1369.4
3	1.3	108.5

6. DISCUSSION

The Volcanic Plains is the largest Land Management Unit, covering 33.6% of the Glenelg Hopkins CMA Region. Of this 8,349.6 hectares is saline, the majority of these sites are of a low severity and remain untreated. This provides a large opportunity to implement saline agronomy practices for both economic and environmental benefits.

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Appendix 1. Plant species found in saline areas

Salt Indicator Species

Grasses		**Salinity Class**
Sea Barley Grass	*Critesion marinum*	1 - 2
Tall Wheat Grass	*Agropyron elongatum*	1 - 2
Annual Beard Grass	*Polypogon monspeliensis*	1 - 2
Australian Salt Grass	*Distichlis distichiphylla*	2

Small Plants and Shrubs

Buck's Horn Plantain	*Plantago coronopus*	1 - 2
Swamp Weed	*Selliera radicans*	1 - 2
Water Buttons	*Cotula coronopifolia*	2
Strawberry Clover	*Trifolium fragiferum*	2
Creeping Monkey Flower	*Mimulus repens*	2
Round-Leaf Wilsonia	*Wilsonia rotundifolia*	2
Beaded Glasswort	*Sarcocornia quinqueflora*	2 - 3
Rounded Noonflower	*Dishyma crassifolium*	2 - 3

Rushes

Spiny Rush	*Juncus acutus*	1 - 2
Streaked Arrow Grass	*Trilochin striata*	2
Toad Rush	*Juncus bufonius*	1 - 2

from Matters & Bozon (1995)

Salt Tolerant Species

Cumbungi	*Typha orientalis*

GLENELG REGION SALINITY MAPPING - Site Information

Date:

Photo	Run/No	P.S. No.	% Cl	% C2	% C3	Positions	Treated	Method	Type	Site No.	P/S
											•

P.S. No. Site Number given on the aerial photo   % C1, C2, C3: Percentage of salinity classes present   P/S: N-Natural I-Incipient NI-Both C-induced

Treated (has the site been treated): N - Not Treated, F - Fenced, P - Sown with Salt Tolerant Pasture, T - Trees Planted, R - Recharge Control (perennial pasture, trees) **Position** (in the Landscape): S - Slope, BS - Break of Slope, DL - Drainage Line, LM - Lake Margin, L - Lunette, F - Flat, D - Depression, G - Gully, SR - Sandridge/Dune

Method (of Salinity Mapping) 1 - GPS corrected, 2 - GPS uncorrected, 3 - APUFW Aerial and field work, 4 - API no field work, 5 - MAP/FW base map and field work, 6 - MAP base map and no field work, 7 - RS/FW Remote Sen and field work, 8 - RS Remote Sen. no field work, 9 - DERDIG digital data only

Type D – Discharge, W – Waterlogging, DW – Discharge and Waterlogging, U – Unknown, " – Not Recorded

Appendix 3. SALINITY DISCHARGE SITES IN THE VOLCANIC PLAINS

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
030438	0	0	0	0.072	0
030438	0	0	0	3.505	0
030438	0	0	0	0.102	0
030450	0	0	0	12.059	0
030451	0	0	0	0.851	0
030452	0	0	0	3.495	0
030531	0	0	0	0.389	1
030533	0	0	0	0.111	2
030535	0	0	0	0.269	1
030536	0	0	0	1.071	1
030537	0	0	0	22.274	1
030540	0	0	0	0.382	1
030541	0	0	0	1.684	1
030565	0	0	0	0.238	2
030566	0	0	0	1.145	2
030568	0	0	0	0.195	1
030594	0	0	0	6.339	0
030594	0	0	0	3.606	0
030595	0	0	0	1.488	2
030596	0	0	0	2.446	1
030596	0	0	0	0.793	1
030598	0	0	0	0.486	2
030599	0	0	0	2.571	1
030600	0	0	0	1.358	2
030601	0	0	0	1.342	1
030602	0	0	0	9.643	2
030603	0	0	0	0.034	1
030605	0	0	0	3.454	0
030608	0	0	0	9.164	2
030853	0	0	0	4.259	0
030854	0	0	0	19.894	0
030856	0	0	0	264.031	0
030861	0	0	0	8.684	0
030861	0	0	0	22.738	0
030862	0	0	0	1.319	0
030863	0	0	0	1.749	0
030864	0	0	0	8.168	0
030865	0	0	0	52.073	0
030865	0	0	0	2.021	0
030866	0	0	0	38.789	0
030866	0	0	0	8.457	0
030875	0	0	0	5.486	0
030877	0	0	0	0.397	0
030888	0	0	0	39.683	0
030888	0	0	0	2.255	0
030888	0	0	0	1.804	0
030888	0	0	0	3.184	0
030890	0	0	0	2.237	0
030891	0	0	0	0.246	0

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
030892	0	0	0	7.555	0
030895	0	0	0	0.922	0
030897	0	0	0	1.473	0
030898	0	0	0	1.680	0
030899	0	0	0	0.343	0
030900	0	0	0	27.502	0
030901	0	0	0	0.739	0
030902	0	0	0	2.766	0
030903	0	0	0	11.223	0
030904	0	0	0	11.770	0
030905	0	0	0	1.117	0
030906	0	0	0	8.330	0
030907	0	0	0	1.049	0
030908	0	0	0	1.399	0
030908	0	0	0	1.702	0
030908	0	0	0	0.381	0
030908	0	0	0	1.497	0
030909	0	0	0	18.684	0
030911	0	0	0	2.217	0
030914	0	0	0	0.353	0
030917	0	0	0	0.437	0
030919	0	0	0	1.495	0
030919	0	0	0	0.260	0
030920	0	0	0	0.462	0
030935	0	0	0	6.295	0
030940	0	0	0	1.131	0
030977	0	0	0	14.749	0
030977	0	0	0	1.832	0
030979	0	0	0	8.253	0
030980	0	0	0	32.191	0
030981	0	0	0	0.980	0
030984	0	0	0	1.310	0
030987	0	0	0	1.674	0
030989	0	0	0	9.122	0
030990	0	0	0	0.337	0
030991	0	0	0	1.359	0
030992	0	0	0	4.973	0
030996	0	0	0	2.330	0
030997	0	0	0	2.248	0
031031	0	0	0	0.596	0
031402	0	0	0	9.527	0
031402	0	0	0	6.227	0
031402	0	0	0	1.893	0
031403	0	0	0	0.020	0
031405	0	0	0	0.029	0
031413	0	0	0	2.045	0
031457	0	0	0	0.235	0
031458	0	0	0	0.115	0
031506	0	0	0	4.963	0
031506	0	0	0	7.111	0
031508	0	0	0	0.226	0
031508	0	0	0	3.830	0

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
031509	0	0	0	7.878	0
031543	0	0	0	0.000	0
031544	0	0	0	0.475	0
031544	0	0	0	0.597	0
031546	0	0	0	1.595	0
031547	0	0	0	22.347	0
031548	0	0	0	9.365	0
031565	0	0	0	0.373	0
031566	0	0	0	0.281	0
031580	0	0	0	2.931	0
031580	0	0	0	1.693	0
031580	0	0	0	3.544	0
031583	0	0	0	18.200	0
031584	0	0	0	0.761	0
031586	0	0	0	0.011	0
031586	0	0	0	2.134	0
031589	0	0	0	7.288	0
031602	0	0	0	0.069	0
031608	0	0	0	0.362	0
031609	0	0	0	0.287	0
031625	0	0	0	64.445	0
031625	0	0	0	135.732	0
031625	0	0	0	23.905	0
031635	0	0	0	0.158	0
031637	0	0	0	1.520	0
031638	0	0	0	15.087	0
031638	0	0	0	0.345	0
031639	0	0	0	150.930	0
031640	0	0	0	17.248	0
031641	0	0	0	21.213	0
031663	0	0	0	7.618	0
031673	50	50	0	0.564	2
031673	0	0	0	1.234	0
031675	0	0	0	0.891	0
031676	0	0	0	3.878	0
031677	0	0	0	2.412	0
031678	0	0	0	0.304	0
031679	0	0	0	2.554	0
031680	0	0	0	0.945	0
031682	0	0	0	6.125	0
031684	0	0	0	0.004	0
031684	0	0	0	7.908	0
031721	0	0	0	1.779	0
031722	0	0	0	1.470	0
031729	0	0	0	0.990	0
031731	0	0	0	0.344	0
031732	0	0	0	8.116	0
031732	0	0	0	1.444	0
031734	0	0	0	0.244	0
031736	0	0	0	0.720	0
031736	0	0	0	1.983	0
031751	0	0	0	0.298	0

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
031752	0	0	0	14.814	0
031752	0	0	0	1.274	0
031753	0	0	0	0.281	0
031753	0	0	0	1.302	0
031766	0	0	0	2.197	0
031784	0	0	0	1.102	0
031785	0	0	0	0.356	0
031787	0	0	0	2.613	0
031789	0	0	0	0.326	0
031792	0	0	0	2.135	0
031793	0	0	0	11.092	0
031795	0	0	0	0.715	0
031796	0	0	0	1.850	0
031797	0	0	0	12.168	0
031798	0	0	0	4.852	0
031799	0	0	0	6.427	0
031801	0	0	0	2.317	0
031802	0	0	0	0.729	0
031803	0	0	0	4.845	0
031804	0	0	0	12.614	0
031804	0	0	0	0.022	0
031805	0	0	0	4.380	0
031806	0	0	0	5.305	0
031807	0	0	0	0.159	0
031807	0	0	0	25.407	0
031808	0	0	0	6.484	0
031809	0	0	0	53.422	0
031810	0	0	0	8.573	0
031811	0	0	0	118.406	0
031812	0	0	0	4.578	0
031813	0	0	0	0.754	0
031814	0	0	0	1.119	0
031815	0	0	0	5.390	0
031816	0	0	0	9.052	0
031817	0	0	0	18.037	0
031818	0	0	0	20.811	0
031820	0	0	0	8.202	0
031821	0	0	0	27.102	0
031822	0	0	0	0.223	0
031824	0	0	0	0.381	0
031825	0	0	0	22.373	0
031826	0	0	0	1.322	0
031827	0	0	0	0.462	0
031831	0	0	0	0.322	0
031833	0	0	0	2.746	0
031834	0	0	0	0.620	0
031835	0	0	0	0.278	0
031837	0	0	0	0.249	0
031839	0	0	0	1.869	0
031840	0	0	0	1.971	0
031842	0	0	0	2.232	0
031843	0	0	0	6.278	0

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
031844	0	0	0	8.412	0
031846	0	0	0	0.360	0
031848	0	0	0	6.659	0
031849	0	100	0	1.349	2
031850	100	0	0	1.925	1
031850	100	0	0	0.000	1
031850	0	0	0	3.251	0
031855	0	0	0	0.238	0
031864	100	0	0	1.727	1
031868	0	100	0	5.667	2
031869	100	0	0	8.175	1
031870	0	0	0	0.868	0
031871	0	0	0	0.635	0
031871	0	0	0	0.456	0
031880	0	0	0	0.251	0
032287	0	0	0	1.528	1
032723	0	0	0	13.793	0
032724	0	0	0	1.475	0
032725	0	0	0	46.118	0
032727	0	0	0	4.542	0
032728	0	0	0	52.016	0
032729	0	0	0	15.676	0
032730	0	0	0	4.261	0
032731	0	0	0	4.401	0
032732	0	0	0	7.931	0
032733	0	0	0	0.646	0
032734	0	0	0	0.583	0
032735	0	0	0	13.594	0
032736	0	0	0	9.291	0
032737	0	0	0	10.175	0
032738	0	0	0	3.696	0
032738	0	0	0	4.524	0
032739	0	0	0	4.604	0
032740	0	0	0	24.144	0
032741	0	0	0	1.009	0
032742	0	0	0	3.007	0
032743	0	0	0	0.694	0
032744	0	0	0	37.291	0
032745	0	0	0	11.091	0
032746	0	0	0	17.639	0
032747	0	0	0	9.201	0
032748	0	0	0	4.862	0
032750	0	0	0	6.201	0
032751	0	0	0	37.606	0
032752	0	0	0	22.803	0
032753	0	0	0	10.122	0
032754	0	0	0	21.671	0
032755	0	0	0	1.879	0
032756	0	0	0	13.569	0
032758	0	0	0	15.910	0
032759	0	0	0	7.761	0
032760	0	0	0	0.210	0

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
032762	0	0	0	0.485	0
032764	0	0	0	15.060	0
032765	0	0	0	56.064	0
032766	0	0	0	6.458	0
032766	0	0	0	17.169	0
032767	0	0	0	11.034	0
032767	0	0	0	1.196	0
032768	0	0	0	32.412	0
032768	0	0	0	3.045	0
032768	0	0	0	4.001	0
032769	0	0	0	105.251	0
032770	0	0	0	0.645	0
032771	0	0	0	0.777	0
032772	0	0	0	2.436	0
032773	0	0	0	0.547	0
032774	0	0	0	11.353	0
032775	0	0	0	8.621	0
032777	0	0	0	15.317	0
032778	0	0	0	59.244	0
032779	0	0	0	7.846	0
032780	0	0	0	1.278	0
032781	0	0	0	1.111	0
032782	0	0	0	6.021	0
032783	0	0	0	0.087	0
032783	0	0	0	1.996	0
032785	0	0	0	6.310	0
032786	0	0	0	2.132	0
032787	0	0	0	1.894	0
032788	0	0	0	5.136	0
032789	0	0	0	1.941	0
032790	0	0	0	2.207	0
032791	0	0	0	0.138	0
032792	0	0	0	0.168	0
032793	0	0	0	0.204	0
032794	0	0	0	23.313	0
032795	0	0	0	16.016	0
032796	0	0	0	4.813	0
032797	0	0	0	5.640	0
032798	0	0	0	2.585	0
032799	0	0	0	19.246	0
032800	0	0	0	9.009	0
032801	0	0	0	31.120	0
032802	0	0	0	49.399	0
032803	0	0	0	0.174	0
032804	0	0	0	0.355	0
032805	0	0	0	0.293	0
032806	0	0	0	0.668	0
032807	0	0	0	19.746	0
032808	0	0	0	3.447	0
032809	0	0	0	0.813	0
032810	0	0	0	0.533	0
032811	0	0	0	14.013	0

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
032812	0	0	0	0.817	0
032813	0	0	0	1.439	0
032814	0	0	0	12.266	0
032815	0	0	0	18.492	0
032816	0	0	0	11.203	0
032817	0	0	0	0.310	0
032818	0	0	0	0.389	0
032819	0	0	0	0.896	0
032820	0	0	0	0.554	0
032821	0	0	0	4.435	0
032822	0	0	0	12.172	0
032823	0	0	0	6.562	0
032824	0	0	0	1.747	0
032825	0	0	0	57.264	0
032826	0	0	0	46.479	0
032827	0	0	0	2.186	0
032828	0	0	0	0.866	0
032829	0	0	0	3.193	0
032830	0	0	0	4.046	0
032831	0	0	0	46.118	0
032832	0	0	0	1.261	0
032833	0	0	0	0.485	0
032834	0	0	0	1.047	0
032836	0	0	0	1.926	0
032838	0	0	0	0.289	0
032839	0	0	0	4.013	0
032840	0	0	0	1.476	0
032841	0	0	0	3.544	0
032844	0	0	0	0.916	0
032845	0	0	0	17.236	0
032846	0	0	0	0.899	0
032847	0	0	0	10.359	0
032847	0	0	0	109.619	0
032848	0	0	0	0.791	0
032849	0	0	0	3.577	0
032850	0	0	0	2.241	0
032851	0	0	0	0.374	0
032852	0	0	0	16.402	0
032853	0	0	0	6.897	0
032855	0	0	0	2.099	0
032856	0	0	0	3.725	0
032857	0	0	0	2.638	0
032857	0	0	0	7.447	0
032859	0	0	0	2.346	0
033101	0	0	0	25.917	0
033102	0	0	0	14.843	0
033102	0	0	0	4.012	0
033103	0	0	0	4.229	0
033106	0 %	0 %	0 %	1.137	Severity
033106	0	0	0	6.856	0
033112	0	0	0	5.645	0
033112	0	0	0	2.914	0

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
033113	0	0	0	2.823	0
033115	0	0	0	14.847	0
033116	0	0	0	4.009	0
033117	0	0	0	0.623	0
033119	0	0	0	22.303	0
033119	0	0	0	0.279	0
033119	0	0	0	1.366	0
033120	0	0	0	4.252	0
033121	0	0	0	11.122	0
033122	0	0	0	8.559	0
033123	0	0	0	5.765	0
033124	0	0	0	19.353	0
033125	0	0	0	45.912	0
033126	0	0	0	45.167	0
033127	0	0	0	8.770	0
033128	0	0	0	19.246	0
033129	0	0	0	30.183	0
033130	0	0	0	6.427	0
033131	0	0	0	23.164	0
033132	0	0	0	5.475	0
033133	0	0	0	24.750	0
033134	0	0	0	14.044	0
033135	0	0	0	4.502	0
033135	0	0	0	1.622	0
033136	0	0	0	62.267	0
033137	0	0	0	8.254	0
033137	0	0	0	2.001	0
033137	0	0	0	0.686	0
033138	0	0	0	6.647	0
033139	0	0	0	47.727	0
033141	0	0	0	4.389	0
033141	0	0	0	1.935	0
033142	0	0	0	27.131	0
033142	0	0	0	0.946	0
033142	0	0	0	2.999	0
033142	0	0	0	0.638	0
033142	0	0	0	39.495	0
033142	0	0	0	2.642	0
033142	0	0	0	11.135	0
033142	0	0	0	3.808	0
033142	0	0	0	0.471	0
033142	0	0	0	28.456	0
033143	0	0	0	2.228	0
033144	0	0	0	28.821	0
033146	0	0	0	16.673	0
033147	0	0	0	16.368	0
033148	0	0	0	5.831	0
033150	0	0	0	3.351	0
033151	0	0	0	114.433	0
033152	0	0	0	0.570	0
033153	100	0	0	1.481	1
033154	100	0	0	5.838	1

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
033156	70	30	0	18.517	1
033157	90	10	0	24.323	1
033158	50	45	5	8.354	1
033158	50	45	5	2.790	1
033160	100	0	0	43.074	1
033161	50	50	0	4.962	2
033162	100	0	0	27.463	1
033163	80	20	0	28.984	1
033163	80	20	0	0.461	1
033164	70	30	0	5.955	1
033165	80	20	0	11.232	1
033166	100	0	0	23.750	1
033167	100	0	0	33.938	1
033168	100	0	0	5.703	1
033170	100	0	0	11.407	1
033171	100	0	0	1.079	1
033171	100	0	0	11.419	1
033172	100	0	0	9.031	1
033173	100	0	0	1.387	1
033174	30	70	0	11.082	2
033175	70	30	0	28.916	1
033176	100	0	0	2.182	1
033177	100	0	0	10.801	1
033178	90	10	0	18.995	1
033179	20	80	0	8.190	2
033180	80	20	0	4.779	1
033181	0	0	0	20.375	1
033182	100	0	0	3.682	1
033183	40	60	0	17.481	2
033184	70	30	0	92.125	1
033185	90	10	0	1.888	1
033186	100	0	0	5.650	1
033188	0	100	0	4.152	2
033189	50	50	0	2.066	2
033190	30	70	0	3.352	2
033191	100	0	0	12.376	1
033192	100	0	0	3.803	1
033194	100	0	0	2.395	1
033195	80	20	0	8.288	1
033196	100	0	0	2.633	1
033197	100	0	0	4.971	1
033205	100	0	0	21.904	1
033206	50	50	0	1.182	2
033206	50	50	0	7.080	2
033207	100	0	0	0.500	1
033207	100	0	0	1.879	1
033207	100	0	0	11.612	1
033208	100	0	0	8.297	1
033209	100	0	0	7.403	1
033210	100	0	0	1.597	1
033211	100	0	0	0.955	1
033212	100	0	0	0.623	1

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
033213	100	0	0	4.249	1
033214	100	0	0	11.924	1
033215	100	0	0	3.635	1
033216	100	0	0	0.501	1
033217	100	0	0	3.934	1
033218	100	0	0	0.770	1
033218	100	0	0	0.342	1
033218	100	0	0	0.886	1
033219	100	0	0	14.082	1
033220	50	50	0	0.360	2
033221	100	0	0	25.100	1
033222	100	0	0	0.562	1
033222	100	0	0	1.224	1
033223	100	0	0	126.763	1
033224	100	0	0	16.468	1
033226	100	0	0	0.873	1
033227	100	0	0	16.374	1
033228	100	0	0	7.488	1
033229	100	0	0	5.992	1
033231	100	0	0	12.922	1
033232	100	0	0	3.342	1
033233	100	0	0	2.261	1
033233	100	0	0	0.361	1
033234	100	0	0	3.935	I
033244	100	0	0	50.565	1
033245	100	0	0	44.326	I
033246	50	50	0	0.495	2
033246	50	50	0	0.131	2
033246	50	50	0	0.329	2
033247	50	50	0	0.641	2
033247	50	50	0	6.856	2
033248	100	0	0	25.476	1
033249	50	50	0	1.732	2
033250	50	50	0	8.902	2
033251	40	60	0	12.697	2
033251	40	60	0	11.527	2
033252	50	50	0	0.227	2
033252	50	50	0	0.266	2
033252	50	50	0	13.524	2
033253	100	0	0	50.832	1
033254	100	0	0	85.407	1
033255	50	50	0	5.556	2
033255	50	50	0	4.453	2
033256	100	0	0	1.113	1
033256	100	0	0	1.081	1
033256	100	0	0	1.532	1
033256	100	0	0	3.912	1
033256	100	0	0	3.630	1
033257	50	50	0	15.166	2
033257	50	50	0	7.527	2
033258	60	40	0	10.145	1
033260	100	0	0	13.374	1

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
033261	60	40	0	11.057	1
033262	100	0	0	12.264	1
033263	100	0	0	56.806	1
033264	100	0	0	206.968	1
033265	100	0	0	39.442	1
033266	100	0	0	47.428	1
033267	70	30	0	14.153	1
033267	70	30	0	11.125	1
033267	70	30	0	3.312	1
033268	60	40	0	0.598	1
033268	60	40	0	1.113	1
033268	60	40	0	0.869	1
033268	60	40	0	26.323	1
033269	50	50	0	14.188	2
033269	50	50	0	7.245	2
033271	60	40	0	6.581	1
033272	100	0	0	15.995	1
033273	100	0	0	44.341	1
033276	100	0	0	1.264	1
033277	50	50	0	9.729	2
033278	70	30	0	28.163	1
033279	50	50	0	0.480	2
033280	100	0	0	9.146	1
033280	100	0	0	1.388	1
033280	100	0	0	4.992	1
033281	0	0	0	3.481	0
033283	0	0	0	7.015	0
033284	0	0	0	0.028	0
033284	0	0	0	6.750	0
033284	0	0	0	3.012	0
033284	0	0	0	2.278	0
033287	0	100	0	4.586	2
033288	100	0	0	2.685	1
033288	100	0	0	2.423	1
033291	100	0	0	0.095	1
033291	100	0	0	0.206	1
033291	100	0	0	1.086	1
033292	33	34	33	25.553	2
033297	100	0	0	3.143	1
033297	100	0	0	0.465	1
033297	100	0	0	0.851	1
033297	100	0	0	1.086	1
033297	100	0	0	1.289	1
033297	100	0	0	2.361	1
033297	100	0	0	3.948	1
033298	100	0	0	0.341	1
033298	100	0	0	0.790	1
033300	100	0	0	7.697	1
033300	100	0	0	0.046	1
033301	50	50	0	4.269	2
033303	0	100	0	8.755	2
033304	100	0	0	7.395	1

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
033305	0	100	0	33.718	2
033308	100	0	0	0.587	1
033308	100	0	0	7.075	1
033308	100	0	0	0.006	1
033310	90	10	0	19.833	1
033311	100	0	0	0.799	1
033311	100	0	0	8.574	1
033311	100	0	0	12.358	1
033312	100	0	0	5.997	1
033312	100	0	0	9.751	1
033312	100	0	0	2.494	1
033313	100	0	0	1.320	1
033314	60	40	0	0.556	1
033314	60	40	0	6.097	1
033315	100	0	0	54.588	1
033316	100	0	0	1.067	1
033317	30	70	0	0.231	2
033319	100	0	0	2.982	1
033319	100	0	0	0.762	1
033320	40	60	0	19.224	2
033321	50	50	0	8.658	2
033323	90	10	0	2.408	1
033324	80	20	0	49.087	1
033325	100	0	0	14.661	1
033326	100	0	0	13.641	
033327	100	0	0	8.025	1
033328	100	0	0	2.622	1
033329	95	5	0	1.285	1
033330	90	10	0	4.207	1
033331	70	30	0	0.226	1
033331	70	30	0	0.293	1
033331	70	30	0	0.083	1
033332	80	20	0	0.826	1
033333	85	15	0	10.421	1
033334	100	0	0	0.684	1
033334	100	0	0	3.415	1
033334	100	0	0	0.765	1
033335	100	0	0	0.363	1
033336	100	0	0	1.575	1
033348	0	100	0	2.024	2
033348	0	100	0	1.342	2
033349	100	0	0	1.720	1
033349	100	0	0	0.122	1
033351	50	50	0	2.921	2
033351	50	50	0	1.009	2
033351	50	50	0	13.114	2
033351	50	50	0	1.985	2
033351	50	50	0	64.107	2
033352	0	100	0	9.618	2
033353	100	0	0	5.494	1
033353	100	0	0	25.289	1
033354	0	100	0	41.832	2

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
033355	100	0	0	22.826	1
033356	100	0	0	31.029	1
033357	50	50	0	3.934	2
033358	90	10	0	3.342	1
033401	0	40	60	3.869	3
033402	0	30	70	4.062	3
033412	0	10	90	0.651	3
033414	0	10	90	5.020	3
033415	0	10	90	10.237	3
033415	0	10	90	3.449	3
034001	0	0	0	1.377	0
034024	0	0	0	4.411	0
034025	0	0	0	14.439	0
034026	0	0	0	10.344	0
034027	0	0	0	5.349	0
034028	0	0	0	22.412	0
034030	0	0	0	1.926	0
034031	0	0	0	94.658	0
034032	0	0	0	1.814	0
034078	0	0	0	8.204	0
034304	0	0	0	9.504	0
034305	0	0	0	27.213	0
034306	0	0	0	0.465	0
034307	0	0	0	2.726	0
034308	0	0	0	1.556	0
034310	0	0	0	28.183	0
034311	0	0	0	129.400	0
034313	0	0	0	0.601	0
035166	0	0	0	2.639	0
035167	0	0	0	1.500	0
035168	0	0	0	0.334	0
035253	0	0	0	1.950	0
035254	0	0	0	6.360	0
035255	0	0	0	0.151	0
035255	0	0	0	3.561	0
035275	0	0	0	4.480	0
035284	0	0	0	5.698	0
035284	0	0	0	35.533	0
035285	0	0	0	8.042	0
035286	0	0	0	1.125	0
035480	0	0	0	4.650	0
035492	0	0	0	5.872	0
035493	0	0	0	6.838	0
035501	0	0	0	57.979	0
035501	0	0	0	5.818	0
035502	0	0	0	3.066	0
035504	0	0	0	6.299	0
035504	0	0	0	0.844	0
035504	0	0	0	0.133	0
035504	0	0	0	11.035	0
035504	0	0	0	0.185	0
035519	0	0	0	2.872	0

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
035522	0	0	0	2.191	0
035523	0	0	0	0.535	0
035523	0	0	0	6.304	0
035526	0	0	0	117.289	0
035527	0	0	0	10.201	0
035528	0	0	0	0.196	0
035540	0	0	0	4.206	0
035547	0	0	0	77.040	0
035548	0	0	0	13.186	0
035548	0	0	0	33.612	0
035549	0	0	0	0.404	0
035553	0	0	0	10.364	0
035553	0	0	0	33.953	0
035554	0	0	0	2.916	0
035555	0	0	0	20.033	0
035557	0	0	0	4.404	0
035558	0	0	0	16.661	0
035559	0	0	0	0.019	0
035565	0	0	0	7.929	0
035566	0	0	0	20.130	0
035577	0	0	0	1.903	0
035577	0	0	0	0.358	0
035577	0	0	0	13.880	0
035577	0	0	0	4.356	0
035579	0	0	0	2.315	0
035580	0	0	0	0.094	0
035581	0	0	0	9.540	0
035582	0	0	0	0.661	0
035583	0	0	0	0.689	0
035584	0	0	0	6.117	0
035585	0	0	0	1.136	0
035585	6	0	0	6.385	0
035585	0	0	0	5.811	0
035585	0	0	0	0.053	0
035586	0	0	0	7.550	0
035587	0	0	0	12.401	0
035588	0	0	0	75.920	0
035589	0	0	0	18.355	4
035591	0	0	0	1.576	0
035592	0	0	0	1.293	0
035594	0	0	0	5.245	0
035596	0	0	0	0.267	0
035597	0	0	0	0.995	0
035598	0	0	0	6.187	0
035599	0	0	0	2.539	0
035600	0	0	0	16.087	0
035600	0	0	0	0.337	0
035601	0	0	0	16.384	0
035602	0	0	0	13.711	0
035603	0	0	0	0.348	0
035604	0	0	0	1.113	0
035605	0	0	0	0.431	0

Site Number	Class 1 %	Class 2 %	Class 3 %	Total Area (ha)	Severity
035606	0	0	0	1.848	0
035607	0	0	0	3.255	0
035608	0	0	0	2.424	0
035609	0	0	0	5.303	0
035610	0	0	0	1.478	0
035613	0	0	0	4.565	0
035615	0	0	0	138.945	0
035669	0	0	0	97.166	0
035670	0	0	0	0.375	0
035671	0	0	0	8.651	0
035672	0	0	0	1.286	0
035673	0	0	0	10.526	0
035674	0	0	0	7.854	0
035674	0	0	0	11.366	0
035675	0	0	0	22.076	0
035676	0	0	0	22.590	0
035676	0	0	0	7.492	0
035678	0	0	0	4.133	0
035680	0	0	0	3.013	0
035681	0	0	0	15.183	0
035682	0	0	0	15.608	0
035684	0	0	0	1.240	0
035685	0	0	0	17.824	0
035686	0	0	0	3.132	0
035687	0	0	0	5.201	0
035688	0	0	0	3.348	0
035689	0	0	0	81.528	0
035695	0	0	0	10.476	0
035696	0	0	0	0.757	0
035697	0	0	0	2.021	0
035698	0	0	0	2.127	0
035699	0	0	0	3.032	0
035700	0	0	0	0.327	0
035701	0	0	0	0.917	0
035702	0	0	0	0.313	0
035703	0	0	0	2.333	0
035784	0	0	0	1.744	0
035904	0	0	0	10.518	0

Grand Total: **8349.578**