

## THE RECLAMATION AND MANAGEMENT OF GARBAGE DUMPS AND GRAVEL PITS IN ALBERTA

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### ABSTRACT

Through the development of two Department of Environment programs; namely, the Regional Landfill Program and the H.S.T.F. Land Reclamation Program and the enactment of the Sand and Gravel regulations, Alberta probably leads the rest of Canada in the reclamation of abandoned garbage dumps and gravel pits, plus the proper management of new waste disposal facilities and gravel pits. Over the past 10 years, the practices in the management of waste and extraction of gravel have changed drastically, to a point where Albertans are starting to take a very progressive attitude towards the management of waste and waste disposal facilities and gravel extraction operations. These new attitudes, in turn, will decrease the pressures on our environment.

### GARBAGE DUMPS

A joint study by the Federal and Provincial Government on landfills conducted in 1982 identified 1152 sites in the province; 705 were active and 447 were inactive. Of the inactive sites, over 225 have been reclaimed by the Department of Environment. Reclaiming these sites in many cases is a very difficult and very expensive proposition. In the past, very little thought or reason was given to properly locating or properly operating a dump. Most dumps were located in unusable portions of a land parcel.

In southern Alberta, dumping over a coulee edge was a popular way of disposing of garbage. This method required very little maintenance as the garbage would just tumble down hill. In central and northern Alberta, dumps seemed to be located in out-of-the-way places in a corner of a field which was generally not farmable and usually had other associated problems such as high water table conditions. When undertaking the reclamation of these dumps, a wide variety of methods have been used to reclaim these sites to productive use.

The most common method is trenching and burying using the clean fill generated from trenching as clean capping material. In other instances, clean fill is imported and the levelled garbage is capped. In one instance, an entire garbage dump was excavated and the garbage relocated to a new sanitary landfill. The reclamation of these dumps to specific uses is usually determined in consultation with the municipality which is the owner of the property. Some of the uses that previous dumps have been reclaimed for are

municipal storage yards (Town of Calmar), park purposes (Cardiff), and playgrounds (Okotoks). The majority of the reclaimed dumps are back to some level of agricultural production, i.e., pasture land, cereal or forage production. To safeguard the public against any possible hazard, select reclaimed sites are tested by drilling and monitoring and all sites have caveats placed against the land title controlling the movements of land ownership and land use.

Alberta is slowly progressing towards a system of regional waste management throughout the province. In this system of waste management, two or more municipalities having a combined population of 10 000 or more form a landfill authority and agree to this system of waste disposal. The Department of Environment Soils Branch conducts soils tests to locate an ideal landfill site. The land is then purchased and all capital costs to procure equipment and set up a system of transfer stations and the sanitary landfill itself are provided for by the Department of Environment. The landfill authority then takes over the operation and maintenance of the system and is responsible for the funding of the operation and maintenance by assessing a tax levy to property owners and by charging a fee to private individuals using the facility. These regional landfills are efficient in the amount of land used as each successive trench is properly constructed, properly operated and properly reclaimed when exhausted. These systems also limit the chance for pollution and contamination since minor amounts of recycling take place - pesticide cans, car bodies and other metal, rubber tires, and used oil are segregated and stockpiled for recycling. When the stockpiled amounts warrant, salvage firms are called in and these products are removed for recycle.

The first such system went into operation in the Pincher Creek-Crowsnest Pass area in the mid 1970s. Today, 19 systems exist and 33 others are at some stage of development or planning. Once these 33 systems are in place within the next seven years, the majority rural population in Alberta will be under some form of regional waste disposal.

#### GRAVEL PITS

The reclamation of gravel pits in the province has followed a parallel development to that of garbage dumps and regional landfills. It is estimated that over 2700 gravel pits exist in the province, disturbing over 45 000 acres or two townships of land (see Table).

In the past, gravel was mined without much planning for stripping and salvaging topsoil or overburden or mining the resource in any logical manner. Many pits were highgraded in the times when gravel was plentiful, remined in later years and then abandoned. Usually limited resources in the form of overburden material remains to reclaim these sites.

Reclamation of gravel pits is usually a very straight forward process. All that is usually done by the Reclamation Branch is a recontouring and regrading of the site using all available stripped and waste material to

SAND AND GRAVEL DISTURBANCE

( ) number within  
brackets indicate  
number of pits

	Division by Size				Division by Regulation		Division by Activity		Municipal Totals	
	< 5 acres	> 5 acres			Monitored	Regulated	Active	Inactive	No.	Acres
Counties										
1	14 (6)	219 (11)			233 (17)	- 0 -	170	63	17	233
2	18 (5)	188 (11)			132 (10)	74 (6)	66	140	16	206
3	50 (25)	743 (46)			236 (39)	557 (32)	624	169	71	793
4	25 (7)	454 (24)			457 (29)	22 (2)	230	249	31	479
6	40 (17)	785 (48)			653 (53)	172 (12)	317	508	65	825
7	20 (6)	257 (11)			162 (15)	115 (2)	123	154	17	277
8	22 (8)	304 (15)			175 (21)	151 (2)	231	95	23	326
9	5 (3)	479 (24)			291 (15)	193 (12)	217	267	27	484
10	17 (6)	484 (23)			461 (25)	40 (4)	55	446	29	501
11	44 (24)	142 (11)			186 (35)	- 0 -	124	62	35	186
13	89 (40)	339 (17)			403 (56)	25 (1)	210	218	57	428
14	52 (24)	1139 (54)			486 (43)	705 (35)	732	459	78	1191
16	4 (1)	475 (15)			244 (6)	235 (10)	419	60	16	479
17	31 (8)	870 (51)			503 (44)	398 (15)	570	331	59	901
19	25 (9)	551 (35)			397 (32)	179 (12)	253	323	44	576
20	10 (5)	805 (23)			521 (22)	294 (6)	363	452	28	815
21	144 (60)	430 (30)			510 (88)	64 (2)	281	293	90	574
22	65 (26)	878 (45)			476 (39)	467 (32)	511	432	71	943
23	96 (44)	786 (55)			674 (87)	208 (12)	492	390	99	882
24	62 (21)	554 (40)			404 (49)	212 (12)	358	258	61	616
25	19 (8)	735 (48)			460 (46)	294 (10)	361	393	56	754
26	41 (13)	645 (31)			408 (35)	278 (9)	438	248	44	686
27	114 (60)	153 (19)			267 (79)	- 0 -	81	186	79	267
28	40 (14)	1175 (31)			397 (33)	818 (12)	901	314	45	1215
29	11 (5)	94 (8)			45 (8)	60 (5)	75	30	13	105
30	95 (45)	491 (37)			586 (82)	- 0 -	260	326	82	586
31	91 (35)	1043 (56)			665 (64)	469 (27)	593	541	91	1134

# SAND AND GRAVEL DISTURBANCE

( ) number within  
brackets indicate  
number of pits

	Division by Size		Division by Regulation		Division by Activity		Municipal Totals	
	< 5 acres	> 5 acres	Monitored	Regulated	Active	Inactive	No.	Acres
<b>Municipal Districts</b>								
1	18 (7)	702 (26)	360 (17)	360 (16)	360	360	33	720
14	28 (10)	427 (20)	260 (23)	195 (7)	273	182	30	455
26	58 (18)	772 (44)	394 (42)	436 (20)	514	316	62	830
31	31 (9)	1177 (58)	501 (38)	707 (29)	770	438	67	1208
44	39 (15)	1629 (62)	711 (43)	957 (34)	990	678	77	1668
61	8 (3)	334 (15)	133 (10)	209 (8)	219	123	18	342
87	27 (13)	168 (12)	169 (23)	26 (2)	84	111	25	195
90	17 (5)	1517 (34)	556 (25)	978 (14)	1094	440	39	1534
92	35 (10)	858 (35)	787 (42)	106 (3)	168	725	45	893
135	6 (3)	215 (16)	221 (19)	- 0 -	182	39	19	221
<b>Improvement Districts</b>								
8	12 (5)	125 (6)	137 (11)	- 0 -	20	117	11	137
14	45 (21)	510 (28)	421 (40)	134 (9)	235	320	49	555
18	37 (17)	222 (13)	244 (29)	15 (1)	71	188	30	259
<b>Special Areas</b>								
2	27 (9)	736 (31)	642 (30)	121 (10)	304	459	40	763
<b>Cities</b>								
Calgary	2 (1)	1237 (20)	797 (13)	442 (8)	472	767	21	1239
Edmonton	3 (1)	1564 (22)	1073 (13)	494 (10)	824	743	23	1567
<b>TOTAL ACRES</b>	1637	27411	17838	11210	15635	13423		29048
<b>NO. OF PITS</b>	672	1261	1490	433			1927	
<b>AVERAGE PER PIT</b>	2.41	21.74	11.97	25.89				15.07

achieve slope stability and positive drainage. The site is then revegetated. As with garbage dumps most reclaimed pits, of which the Department has done over 100, revert to agriculture use.

You may ask why if there are over 2700 gravel pits in the province we have done only 100 or so versus 225 dumps. Answer - Municipalities are reluctant to abandon their pits. Some may have 1000 or 2000 cubic yards of gravel remaining and with good gravel becoming a fairly scarce resource in certain parts of the province, municipalities do not want to lose what little may be left.

What can be done to reclaim gravel pits? As with garbage dumps, it's what the municipality may want as an alternate land use or what is practically possible. A few abandoned gravel pits within designated urban park areas have been reclaimed to water based park settings.

Today, gravel operations can no longer afford to highgrade a gravel pit and abandon it, for two major reasons:

1. Gravel is a depleting resource; and
2. The Department of Environment now requires operators of gravel pits over five acres to obtain a D & R Approval similar to coal mines. This regulatory requirement is carried out by the Regulated Operations Branch of the Land Reclamation Division. To date, they have done 41 municipalities within the Province and have 31 to go. Of the 1927 pits identified in the 41 municipalities, 1490 are being monitored and 433 have been regulated.



# Proceedings of a Symposium

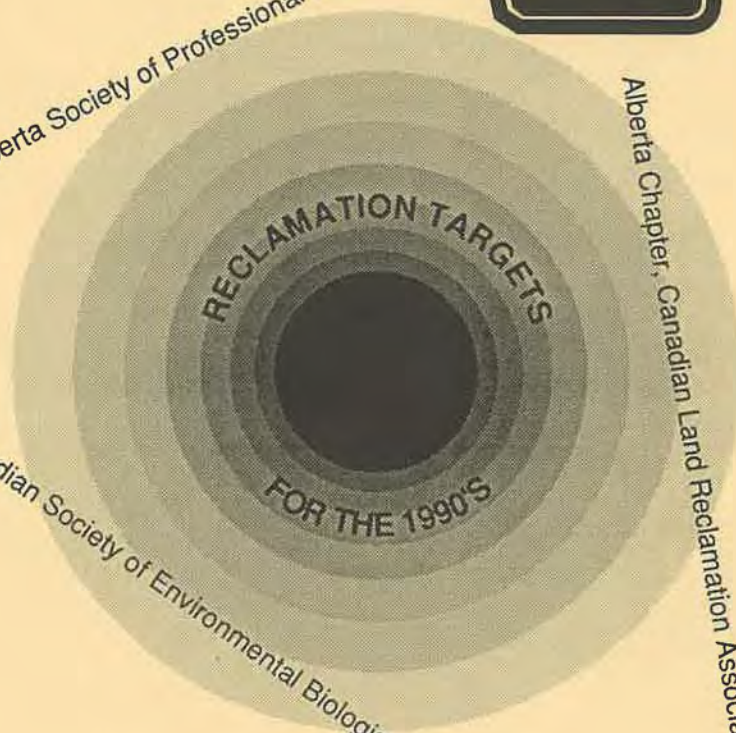


The Alberta Society of Professional Biologists



The Canadian Society of Environmental Biologists, Alberta Chapter

Alberta Chapter, Canadian Land Reclamation Association



Held May 4 & 5, 1987  
Edmonton, Alberta

RECLAMATION TARGETS FOR THE 1990s

PROCEEDINGS OF A SYMPOSIUM SPONSORED BY

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WESTIN HOTEL  
EDMONTON, ALBERTA  
MAY 4 & 5, 1987

C.B. POWTER, EDITOR

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## ACKNOWLEDGEMENTS

The Symposium was organized by Mr. David Reid (Alberta Society of Professional Biologists), Mr. Chris Powter (Alberta Chapter, Canadian Land Reclamation Association), and Mr. Brian Free (Canadian Society of Environmental Biologists - Alberta Chapter). This event marked the first time these three organizations had joined together in a common effort to address an important issue of the day. By all accounts the effort was a success and will serve as a model for future joint efforts.

The Organizing Committee would like to thank:

Mr. J. Green, Mr. B. Free, Ms. N. Ross and Mr. C. Powter: Session Chairmen

Mr. D. Reid and Ms. N. Ross: Corporate donations

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Mr. C. Powter: Hotel, Brochure, Proceedings, Mailing, Registration

Ms. L. Allen: Mailing, Registration

Ms. M. Canafranca and Ms. S. Inn: Typing of the Proceedings

Mr. D. Walker: Cover design

The Organizing Committee would also like to thank the following sponsors, without whom the Symposium could not have been a success:

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PROCEEDINGS

Alberta Environment, Research Management Division

And a special thank you to our two guest speakers:

Dr. David Samuel, University of West Virginia who spoke on Reclamation to Wildlife Habitat in the United States

Dr. Larry Holbrook, Biotechnica International of Canada, Calgary, Alberta who spoke on Biotechnology and Biologists

- and -

to the Hon. Ken Kowalski, Minister of Environment, for delivering the opening address.

## MESSAGE FROM THE ORGANIZING COMMITTEE

Reclamation practitioners and researchers have gone a long way to solving the problems posed by such disturbances as mining, drilling and pipeline construction. The future challenge for reclamation lies in applying our expertise in other areas such as industrial site decommissioning, habitat creation and restoration, and urban design.

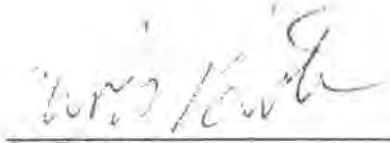
The Symposium was designed to expose participants to a wide variety of "new" areas where reclamation science could be applied. These were the "targets" referred to in the Symposium title. The speakers did an excellent job in meeting this goal. Some of the participants felt the Symposium had not provided enough information on new methods to be employed in reclaiming these new disturbance types. While this was not the goal of the Symposium it remains a valid concern that should be addressed in a future symposium.

Finally, the Hon. Ken Kowalski, Minister of Environment, encouraged all participants to get out and preach the need for, and successes of, reclamation, and indeed all environmental programs. Telling ourselves in conferences how wonderful we are is preaching to the converted. We need to let those who benefit from our labours, that amorphous group known as the public, know what we have done for them. This, too, should be the topic of a future symposium.

The papers in this proceedings have been edited and retyped into a common format. The contents of the papers are essentially unchanged from the submitted manuscripts of the authors.



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