

**FRASER RIVER
ACTION PLAN**



**Final Report
On Abatement
Activities
Related To
Agriculture In
The Thompson
Basin And
Cariboo Region
During The
Fraser River
Action Plan**

DOE FRAP 1997-44



Environment
Canada

Environnement
Canada

**Final Report on Abatement Activities Related to Agriculture
in the Thompson Basin and Cariboo Region
During the Fraser River Action Plan**

Prepared by:

Barbara John and George Derksen

DOE FRAP 1997-44

February 1998

DISCLAIMER

This consultant's report was funded by Environment Canada under the Fraser River Action Plan through its Fraser Pollution Abatement Office. Environment Canada is not responsible for the content of this report but has made it available for public distribution.

Any comments regarding this report should be forwarded to:

Technology and Pollution Prevention Section
Environment Canada
224 West Esplanade
North Vancouver, B.C.
V7M 3H7



100% NON-DEINKED PULP

24 lb. writing 60 lb. and 70 lb. text only

100% recycled paper
all post-consumer fibre

100% of the pulp: mushroom, oat, bamboo,
mint, apple blossom and linn only

TABLE OF CONTENTS

	<u>Page</u>
TABLE OF CONTENTS	i
LIST OF TABLES	ii
LIST OF PLATES	ii
SUMMARY	iii
1.0 INTRODUCTION	1
1.1 Producer Questionnaire - 1997	2
1.2 Williams Lake Region and Bridge Creek Tracking	3
2.0 PROGRAM UPDATE AND ACTIVITIES	3
2.1 1994-1997 Summary of Survey Results	3
2.2 Questionnaire Results	4
2.2.1 General Information	4
2.2.2 Operational Changes and Reasons	5
2.2.3 Time and Financial Investment to Making Environmental Changes	5
2.2.4 Environmental, Stewardship Awareness and Site Visits	5
2.2.5 Environmental Concerns and Future Plans	6
2.3 Highlighted Practices	6
2.4 Salmon Arm Status (Okanagan/Shuswap Fall and Winter Manure Management)	6
2.5 Williams Lake/ Bridge Creek Basin Status	11
3.0 DISCUSSION	12
3.1 Regional Code Implementation and Barriers	12
3.2 Peer Advisor Process and Regional Needs	13
3.3 Proactive Initiatives	13
3.4 Water Quality Assessment	14
4.0 RECOMMENDATIONS FOR THOMPSON BASIN AND CARIBOO REGION	14
REFERENCES & ACKNOWLEDGEMENTS	16
APPENDICES	

LIST OF TABLES

		<u>Page</u>
Table 1	Agency Responsibilities Related to Agriculture	2
Table 2	Summary of SAPTB Initiative Site Files	3
Table 3	Phosphorus Delivery Rating Assessments of Bridge Creek Basin Sites - 1996/97	11
Table 4	Summary of Impact Ratings of Non Compliance Sites As Assessed from Aerial Photographs - 1994-96	13

LIST OF PLATES

		<u>Page</u>
Plates 1-2	Before and After Runoff Containment	7
Plates 3-4	Before and After Fence Line Access	7
Plates 5-7	Before and After Site Reconstruction	8
Plates 8-11	Salmon River - Salmon Arm Watershed Winter Manure Spreading	9
Plates 12-15	Salmon River - Salmon Arm Watershed Winter Manure Spreading	10

Summary

The Survey of Agricultural Practices in the Thompson Basin initiative involved coordinating Environment Canada's abatement program under the Fraser River Action Plan with regional Ministry of Environment, Lands and Parks responsibilities for the Agricultural Waste Control Regulation and the associated "Code" of Agricultural Practice. The project focused on agricultural activities primarily related to livestock operations in the Thompson basin but, in the last year also included the Cariboo region.

Helicopter surveys served as the initial means to locate sites and provide a photographic inventory with which to rate potential impacts which were then followed up with one-to-one contact with the producer. Two hundred and four sites were identified and twenty-two percent of them were rated to have a high potential impact.

The study found that contaminated runoff, livestock access to watercourses and non-conforming confined livestock areas were the primary causes of the loading of nutrients and bacteria to local watercourses. Resolution of these concerns by relocation of the sites was not as simple a management option as might be expected and in many cases innovative options were worked out with producers to reduce the risk of pollution.

In order to cover the large geographic area involved and the ongoing need for site assessments, a proactive ministry field program and presence is required. This could be managed using a rotational inspection approach in order to keep environmental awareness a high priority in the Thompson and Cariboo regions of the Fraser basin.

Winter manure spreading on snow and frozen ground by dairy producers in the Salmon River watershed was documented. An information sheet was developed describing the situation and producer responsibilities. The Kamloops-Okanagan Dairy Association is aware that this is an ongoing issue in the region. Developing a non-point source action plan for agriculture in the watershed may help to focus the concerns, identify solutions and set a timeframe to implement changes.

A survey of producers in the final year indicated that they rated themselves as having a high environmental awareness and which had increased over the last 3-years. The detail of monitoring which would have been required prohibited any real attempt to demonstrate the success of the project through documented improvements in water quality.

1.0 INTRODUCTION

The livestock industry is a major component of the agricultural activity in the Thompson River basin. Broersma et al., 1995 reported that of the 330,000 cattle distributed among the six Forest Regions of British Columbia, close to 75% (247,500) of the beef cattle were accounted for in the Kamloops and Cariboo Forest Regions. An earlier pre-planning study which included three sub-basins reported that of the 98,300 beef cattle in an study area, approximately 51,200 were in the Thompson sub-basin, 38,000 in the South Thompson-Shuswap sub-basin and 9,100 in the North Thompson sub-basin (which also included the Bridge Lake area of the Cariboo region). The study area did not include the Nicola River sub-basin (Task Force, 1981). The dairy industry was focused primarily in the South Thompson-Shuswap sub-basin with approximately 10,400 of the study area's 10,900 dairy cows in the one sub-basin.

The Task Force reported that livestock operations, feedlots, over-wintering of cattle near streams and removal of vegetation from stream banks were causing numerous water quality and stream degradation problems throughout the basin. At the time, it was recommended that a study was needed to resolve intensive agricultural related problems and that guidelines be developed in cooperation with the local farming community to minimize the adverse impact of intensive agricultural activities.

While a basin study was not initiated, since 1981, the provincial government proclaimed the Agricultural Waste Control Regulation (B.C. Reg. 131/92) and the associated *Code of Agricultural Practice for Waste Management, April 1, 1992* ("Code") in 1992. Environmental Guidelines for beef and dairy have also been published and describe generally accepted farming practices which can be referred to when evaluating on-farm management practices (MAFF, 1992; MAFF, 1993).

The Fraser River Action Plan (FRAP), a federal multi-year program, was to be developed in consultation with other federal and provincial departments and stakeholders to address environmental problems in the Fraser River basin (FRAP, 1992). One of the FRAP goals was to implement a strategy to reduce the loading of nutrients, bacteria and agrochemicals from agricultural operations to ground and surface waters to meet environmental quality objectives. As part of the strategy, in 1994, a Memorandum of Understanding (MoU) between Environment Canada's Fraser Pollution Abatement Office and the Kamloops regional office of the Ministry of Environment, Lands and Parks (MELP) was initiated and enabled both parties to development and deliver of a multi-year program aimed at addressing agricultural concerns within the Thompson Basin. The MoU provided funding to the Kamloops office to engage a full time agricultural impact officer. In 1996, this MoU was extended to include areas the Cariboo region. This resulted in a coordinated approach and provided the agricultural industry some consistency when addressing environmental problems, a proactive education and awareness resource contact and the regional MELP offices with an inspection and enforcement capability. The roles of some of the main agencies involved in agriculture are summarized in Table 1.

Results of the first two years of the initiative have been reported previously (John & Geier, 1995; John, 1996). This report is a culmination of the efforts that have been ongoing since the initiation of the project but focus on the third and fourth years of the Survey of Agricultural Practices in the Thompson Basin (SAPTB).

Table 1: Agency Responsibilities Related to Agriculture

<p><i><u>Ministry of Environment, Lands and Parks</u> is responsible for enforcement of the Agricultural Waste Control Regulation and “Code” to prevent pollution on private deeded land which includes over wintering sites.</i></p> <p><i><u>Ministry of Forestry</u> enforces the Forest Practices Code which, for agriculture, deals mainly with grazing on Crown Land.</i></p> <p><i><u>Environment Canada</u> - is jointly responsible with DFO for the general prohibitions of the Fisheries Act -Section 36.3 - deleterious substances and could include contaminated runoff.</i></p> <p><i><u>Department of Fisheries and Oceans (DFO)</u> is responsible for Section 35 of the Fisheries Act dealing with habitat/ riparian destruction. This is a concern with seasonal feeding areas or grazing areas that allow access to a watercourse under the “Code” although riparian areas could be impacted. DFO also jointly enforces Section 36.3.</i></p> <p><i><u>Ministry of Agriculture, Fisheries and Food (MAFF)</u> provides technical advice to help correct environmental concerns but has no enforcement capabilities under the agricultural “Code”. MAFF is also responsible for the Farm Protection Practices Act (FPPA) that deals with noise, dust, odour and other disturbances.</i></p> <p><i><u>Peer Advisory Referral System</u> volunteer producers advise fellow producers regarding environmental concerns when the pollution risk is low (e.g. BC Cattlemen’s Association EnvirAlert Program).</i></p>
--

1.1 Producer Questionnaire - 1997

In July 1997, a questionnaire with a covering letter and self-addressed stamped envelope, was mailed to 92 producers in the Kamloops and Cariboo regions (e.g. Appendix 1). These producers were selected randomly from an inventory of producers already on file from the 1994-96 SAPTB helicopter flights and from previous work in the Bridge Creek area. The intent of the questionnaire was to get feedback and some perspective from producers on activities that had occurred throughout the four year period from 1994-1997. SAPTB provided staff continuity and availability to the agriculture industry in the region and the questionnaire was intended, in part, to determine if producers valued this service. A broad range of questions were included, ranging from the number and the reasons for site inspections, the time and financial investments made to address environmental issues and future plans. A comparable survey had not been conducted prior to SAPTB, so it was not possible to compare changes related to any of the questions.

1.2 Cariboo Region and Bridge Creek Tracking

In 1996, the MoU was amended, enabling MELP staff in Kamloops to provide similar agricultural education and enforcement services in the Cariboo region. This allowed for the follow-up of work previously initiated by a contractor in the Bridge Creek basin.

An awareness and education approach initiated by MELP in the Cariboo region in 1993-94 and again in 1996 assessed the potential risk of livestock wintering areas on water quality in the Bridge Creek basin (Hart, 1996). The second assessment included making site recommendations which were to be undertaken to reduce the phosphorus delivery potential from a feeding area to a watercourse. Sites rated as moderate to high risk were required to lower their rating to low-moderate (or better) by the next planned inspection. This approach was intended to allow agricultural operations some time and flexibility to take the initiative to reduce the risks of impacts on local watercourses before enforcement action by MELP was considered.

Follow-up site inspections occurred during 1996-97 at those sites where the phosphorus delivery rating remained at a moderate or higher rating and results are reported herein (see Section 2.5).

2.0 PROGRAM UPDATE AND ACTIVITIES

2.1 1994-1997 Summary of Survey Results

Eight helicopter fly-overs between 1994 and 1996 resulted in the identification of two hundred and four potential impact sites (Table 2). Excluded from these numbers is the Salmon River fly-over which focused on runoff related primarily to the dairy commodity and is discussed in Section 2.4.

Table 2: Summary of SAPTB Initiative Site Files

Year	Helicopter Fly-overs	Sites Identified *	Sites Rated as Moderate Impact (3 Scores)	Sites Rated as Higher Impact (4-5 Scores)	Public Complaints	Orders Issued
1994	4	103	13	18	-	1
1995	3	70	28	16	33	2
1996	1	32	10	10	33	3
1997	0	-	-	-	20**	1**
Totals	7	204	51	44	86	7

* Sites identified from helicopter as having a potential “Code” environmental problem.

** 1997 Public complaints and Orders issued represent 8 months.

In 1996, MELP responded to a total of thirty-three unrelated public complaints. This is equivalent to the same number of public complaints handled during the first two years of SAPTB. In the first eight months of 1997, twenty complaints were registered and responded to.

No helicopter fly-overs were conducted in 1997. Staff continuity maintained the necessary regional knowledge such that the majority of local ranches and their respective problems were understood and annual fly-overs were not required. The majority of sites identified in the past four years have required repeated site visits to properly address the numerous issues that may arise on a large land holding. For example, Douglas Lake ranch manages \$18,000,000 worth of livestock on 66,397 deeded hectares (164,000 acres), 80,972 Crown leased hectares (200,000 acres) and 161,943 grazing licensed hectares (400,000 acres). There are four major over-wintering sites that require several inspections annually as potential impacts are identified and remediation works are completed according to priority.

Since the initiation of SAPTB, seven Pollution Abatement / Prevention Orders have been issued (Table 2). Two of the Orders were related to problems initially identified by helicopter fly-overs and five Orders were related to problems identified through public complaints. Charges were laid related to the first Order issued and resulted in a guilty plea for the introduction of a deleterious substance under Section 36 (3) of the Fisheries Act and a \$10,000 fine being imposed. Charges are expected to be laid in relation to two other Orders. A \$500 fine for the discharge of a business waste to the environment was issued against one of the Orders.

2.2 Questionnaire Results

Three of the 92 questionnaires posted were returned undelivered and the overall response was 39% (35 of 89 questionnaires). Three respondents did not answer the second page of the questionnaire.

2.2.1 General Information

All of the respondents indicated that they had had contact with either MELP, MAFF, DFO, a contractor or a peer advisor related to environmental concerns between 1994 and 1997. Eighty percent had been visited and/or inspected by MELP, 14% by MAFF and 9% by a peer advisor. The estimated total number of visits per respondent varied widely between one to greater than twelve (in the analysis, more than two visits per year were assumed to represent three visits) and the “average” number of visits per operation over the survey period was three. The nature of the visit was categorized as a complaint and/or complaint follow-up by 30% of the respondents and a response to the helicopter surveys by 55% of the respondents (none of the respondents related the former with the latter). Thirty-six percent of the respondents indicated visits were related to education and/or tours. Although the question on the consistency in the personnel conducting the visit was

not explicitly clear, it was intended that this reflect the advice related to environmental issues and 88% of the respondents felt there was consistency.

2.2.2 Operational Changes and Reasons

Ninety-seven percent of the respondents indicated that some operational practice change had occurred to correct environmental concerns over the past three years. Of this group, 85% rated their instigating the change on their own initiative but 45% of these also identified that a MELP inspection and/ or MAFF advice was also a factor. Enforcement action and/or peer advisor advice were not identified by any of the respondents as a reason for instigating change. Nine percent identified loan availability as a factor.

2.2.3 Time and Financial Investment To Making Environmental Changes

Three respondents missed filling out the second page of the questionnaire which included questions related to time and financial investment made to environmental changes. Thirty-four percent of the respondents did not quantify this part of the questionnaire. Of the 66% that did respond, since 1994, 24% indicated their time investment ranged between 1-5 days, 14% >5 to 10 days, 24% >10 to 20 days and 24% >20 days.

Thirty-eight percent of the respondents did not quantify their financial investment made to environmental changes. Of the 62% that did respond, since 1994, 38% estimated expenditures of between \$1,000 to \$10,000 dollars (average \$2,500 dollars) and sixteen percent estimated expenditures ranging between \$20,000 to \$100,000 dollars (average \$38,000 dollars).

2.2.4 Environmental, Stewardship Awareness and Site Visits

Eighty-one percent of the respondents indicated that their overall environmental awareness had increased over the last three years. Of this group, 81% ranked their awareness on stewardship and riparian issues as either a 4 or 5 (on a scale of 1 to 5 with 1 being low and 5 being high). Twenty-three percent rated themselves as a 5 and none rated themselves less than 3. Producers were asked about their own operations compliance with the "Code". Of the respondents with both an increased environmental awareness plus a high stewardship/riparian awareness, 90% rated their own operations as either a 4 (60%) or 5 (30%) (on a scale of 1 to 5 with 1 being never and 5 being always). Nineteen percent of respondents indicated their awareness had not increased and 50% rated their operations as a 4 and 50% as a 5.

In terms of comfort level related to requesting a site visit to help with environmental concerns, 90% indicated that they would be comfortable making such a request. The preference of agency was identified as 50% MAFF, 35% MELP, 9% no preference and 5% contractor and/or peer advisor.

2.2.5 Environmental Concerns and Future Plans

Fifty-two of the respondents indicated contaminated runoff was the greatest concern and of this group 38% also identified livestock access to watercourses and/or confined livestock areas as a concern. In regards to concerns with riparian habitat, 16% of the respondents identified this item.

All respondents attempted to provide some indication of their future plans. Nineteen percent indicated environmental improvements would be made within twelve months and 29% indicated improvements were planned for in the next five years. The majority of all the respondents (61%) indicated that environmental improvements would be made as time (42% of all respondents) and/or money (45% of all respondents) was available.

2.3 Highlighted Practices

Some of the practices that were changed over SAPTB are illustrated in Plates 1-7. These ranged from simple containment ponds to intercept runoff (Plate 2), adding fencing to deny cattle creek access (Plate 4), to completely re-designing and re-building confined areas (Plates 6 & 7).

2.4 Salmon Arm Status (*Okanagan/Shuswap Fall and Winter Manure Management*)

In response to public concerns of contaminated runoff from agricultural operations impacting the Salmon River, a helicopter fly-over of the area was undertaken on March 11, 1996. This flight varied from the others in that individual sites were not being targeted for potential impact identification but the area was being viewed for an overall estimation of the scope of the contaminated runoff problem. The flight path included cattle grazing and feeding areas in Westwold and Falkland and the agricultural operations from Silver Creek to the mouth of the Salmon River at Shuswap Lake.

The 1996 helicopter fly-over of the Salmon River watershed indicated that the practice of spreading liquid dairy manure on snow and frozen ground was widespread. A selection of photographs gives a representative visual impression of the scope of the problem (Plates 8-15). Video footage was also taken to gain a more comprehensive view of the runoff situation. When spring thaw occurred, the manure contaminated runoff entered local watercourses and ultimately Salmon Arm Bay of Shuswap Lake. This situation was also occurring in the North Okanagan area administered by the Penticton sub-region of MELP and the runoff was entering the Okanagan Lakes system.

A series of stakeholder meetings were initiated by MELP following the fly-over. Representatives including the affected agricultural producers, MELP, MAFF, Salmon River Community Roundtable Association, peer advisory groups, local commodity groups and scientific experts participated. It was recognized that due to a number of factors the immediate enforcement of the "Code" wasn't the logical next step and, would possibly deter a more phased proactive approach which would need the support of local producers.



Plate #1: Before
Contaminated runoff flows parallel to watercourse.
Flow < 30 meters from creek, high impact potential.

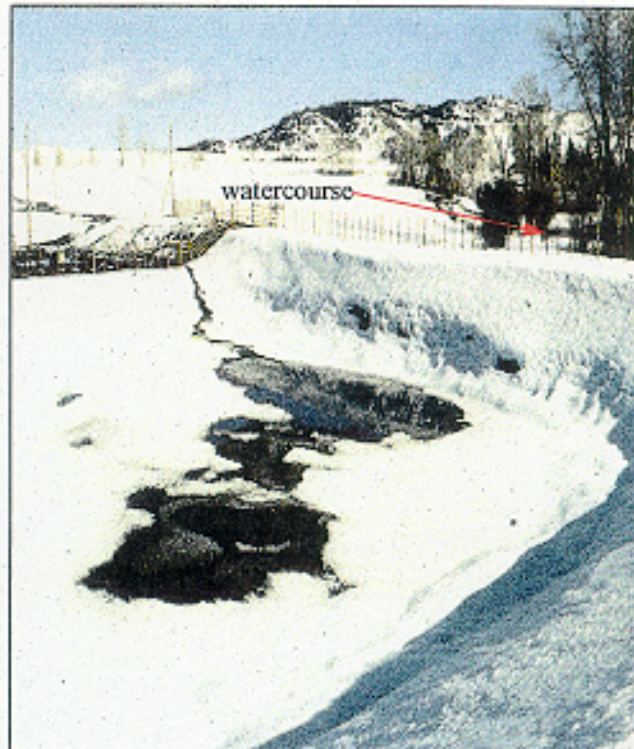


Plate #2: After
Runoff is captured in containment pond
Pond located in path of flow visible in Plate #1.



Plate #3: Before
Confined livestock areas have access to creek.



Plate #4: After
Newly constructed fence lines deny any access to creek.



Plate #5: Before

Confined livestock areas slope to lake shore, allowing full access with high runoff potential.



Plate #6: After

Resloped and relocated pens direct runoff away from lake into containment ponds.



Plate #7: After

Newly constructed fence lines deny any livestock access to lake.



Plate #8



Plate #9

Spreading of manure on frozen, snow covered ground can cause contaminated runoff to impact surface water.



Plate #10



Plate # 11



Plate #12

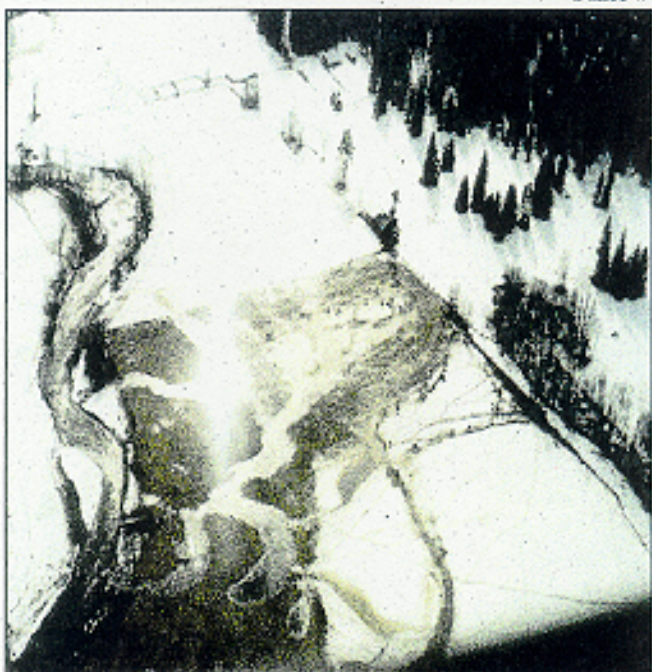


Plate #13



Plate #14



Plate #15

Issues that needed to be addressed included: (1) insufficient local scientific documentation on the agronomic value and effects of spreading manure on snow and frozen ground, (2) the importance of a variety of risk factors (e.g. slope, location and vegetative cover) that might be managed site specifically and (3) variations in weather patterns in the area and how common an occurrence the problem was. It was evident that because many of the farmers had been practicing this form of manure “management” for many years, the potential impact on the environment was not understood and/or was being underestimated. As a consequence, the next step was to take a consultation approach to try to make progress on this issue.

The initial result of the stakeholder consultation was a consensus on and notification by MELP on fall and winter manure management and associated environmental risks (Appendix 2). An information sheet clarified the issue and set a goal for making improvements. Producer responsibilities were defined and the risks associated with the specific practices were also described. This approach garnered various agency support and was presented to members of the Kamloops-Okanagan Dairy Association (KODA) at their annual 1996 fall meeting.

Runoff resulting from the application of manure to frozen snow covered ground was again evident in Spring 1997 and this practice remains an ongoing regional issue. The manure management information sheet was re-issued to KODA members in the fall of 1997 and they were instructed that assessment and enforcement would continue during the 1998 runoff period

2.5 Cariboo/Bridge Creek Basin Status

In the spring 1996, it was determined that seventeen producers and a total of thirty-nine impact sites remained at a moderate or higher rating (Table 3). Letters were sent to the individual producers indicating that concern and that further site inspections would follow. The initial site inspection determined that each producer understood what was required to lower the phosphorus delivery rating and ascertained whether there would be difficulty in achieving the necessary reduction. The producer was informed that a follow-up inspection of each site would occur during the runoff period in 1997 to confirm implementation and the success of any remediation measures undertaken.

Table 3: Phosphorus Delivery Rating Assessments of Bridge Creek Basin Sites - 1996/97

Potential Impact	Sites in 1996	Sites in 1997
low-moderate	15	32
moderate	20	6
moderate-high	4	1

In April 1997, site inspections occurred at the various feeding locations of the seventeen producers. The timing and nature of the runoff event during the winter/spring of 1997 caused manure contaminated runoff to occur at nine ranches. One operation was

considered to be causing an impact to a watercourse while the remainder of the ranches had controlled the runoff and avoided a discharge to surface water.

With the exception of one operation, sixteen ranches have an ongoing pollution risk due to topography and location in relation to a watercourse. Location and need to rotate feeding sites contributes to the high potential for a discharge of contaminated runoff to surface water, under certain snow melt conditions.

MELP responded to eighteen public complaints (eleven in 1996 and seven in the first eight months of 1997) in the Cariboo area since initiation of the joint work in the two regions.

3.0 DISCUSSION

3.1 Regional Code Implementation and Barriers

The experience gained through SAPTB has demonstrated that it remains necessary for MELP to maintain a regional inspection plan in order to reduce the impact from contaminated runoff and to ensure compliance with the “Code”, utilizing enforcement capabilities when deemed necessary. While some progress is definitely being made in some areas, past experience indicated that these results may be lost if regulatory requirements are not reinforced on an ongoing basis. Due to the dynamic nature of many of these operations and their size, a rotational inspection program may be one means to cover a large geographic area such as the Thompson basin and the Cariboo regional area. A summary of sites that were identified to be in non-compliance with the “Code” as assessed from photographs taken during helicopter fly-overs in 1994, 1995 and 1996 illustrate a trend of an ongoing regional need (Table 4). Non-conforming confined livestock areas are pens that are located less than the 30 meter setback from a watercourse, as stated in the “Code”. Under certain conditions this setback requirement didn’t apply if it was a permanent confined livestock area constructed prior to April 1, 1992 and that pollution of a watercourse was not occurring. Work to date has indicated that where such sites remain in use, the risk of pollution and contaminated runoff is often high. The risk is increased when access to a watercourse from these confined livestock areas also occurs. On many Thompson Basin and Cariboo area ranches, relocation of pens does not appear to be as simple a management option as might be expected and in many cases innovative solutions will be required to reduce the risk of pollution. The low percentage of closed site files in the non conforming category (5 of 54 files or 9%) highlights the belief that non-conforming confined livestock areas with access to a watercourse and a high runoff risk are still a problem and are in need of continued inspections.

Table 4: Summary of Impact Ratings of Non Compliance Sites as Assessed from Aerial Photographs - 1994-96

		Problem as Assessed from AERIAL PHOTOS - 1994-96									
		Runoff	Access General	Access Seasonal	Access Confined	Feeding	Storage	Non Conforming	Other	Open	Closed
IMPACT RATING											
1	low	1	1	4	0	0	1	4	16		
2		0	5	3	5	2	1	6	5		
3	moderate	7	10	6	14	12	1	23	3		
4		6	0	4	19	2	0	14	1		
5	high	4	0	0	4	0	0	7	0		
unable to rate		1	8	2	3	2	0	2	22		
TOTALS		18	16	17	42	16	3	54	42	162	46
Closed site files		1 (6%)	7 (44%)	4 (24%)	6 (14%)	4 (25%)	2 (67%)	5 (9%)	17 (41%)		

3.2 Peer Advisor Process and Regional Needs

The results of the referrals sent to peer advisors in 1994 indicated disappointing results and subsequently, referrals were not continued under the BCCA (BC Cattlemen's Association) peer advisory system (EnvirAlert), pending satisfactory improvement in the process (John, 1996).

In January 1997, MAFF, in conjunction with the BCCA and other producer associations initiated a province wide program to train peer advisors per a MoU between the two parties in support of the Farm Practices Protection (Right to Farm) Act (MAFF, 1995; MAFF, 1996). The Act covers odour, noise, dust and other disturbances. Other agencies including MELP, DFO and DOE participated in the training program to present peer advisors with information covering management areas related to pollution legislation, contaminated runoff concerns, riparian habitat management and environmental stewardship. Attendance at the peer training sessions was estimated to be approximately 60% of those invited to attend the Kamloops, Barriere and Williams Lake sessions.

MELP is negotiating a separate Agricultural MoU with BCCA and other commodity groups to provide policy and procedural guidance and to promote a consistent approach among government agencies and peer group organizations when resolving "Code" complaints. Peer advisors are requested to cover both "Right to Farm" and "Code" complaints. Parties signing the MoU will agree-in-principle to respond to complaints by visiting the site, assessing the risk of pollution and reporting back within specified guidelines. It is expected that the MoU will be finalized by Spring 1998.

3.3 Proactive Initiatives

During the fall and winter of 1997, BCCA continued with their proactive approach to reduce environmental impacts from agricultural operations. They committed to improving

the results of EnvirAlert referrals through re-inspections, improved tracking of referrals and experimenting with the types of referrals that a volunteer group could be expected to successfully handle. In addition, they have published a series of educational articles in their bi-monthly magazine "Beef in BC". The first in the series, "Ranching...Rights and Responsibilities", appeared in the November/December 1997 issue (BCCA, 1997). The series included an overview of the regulations that affect agriculture and the agencies that enforce them combined with examples of management practices that might be affected.

The annual BCCA Environmental Stewardship Award was inaugurated in 1995. To date, two of the three recipients were nominated as a result of the SAPTB initiative.

3.4 Water Quality Assessment

While some water quality monitoring was conducted earlier on in SAPTB, this aspect of the program was curtailed (John, 1996). Experience with the USEPA Rural Clean Water Program (EPA, 1993) and Section 319 National Monitoring Program (EPA, 1995) to assess the effectiveness of watershed technologies (e.g. best management practices) designed to control non-point source (NPS) pollution, even in ideal situations, frequently required a 6- to 10-year evaluation period. The difficulty in quantifying non-point source pollution results from the often diffuse nature of the sources and unpredictability of the events, which often results in a lack of statistically significant results. The nature of runoff events is such that the flow of manure contaminated runoff may occur only during the warmest hours of the day, making it difficult to estimate the total volume and contaminant loading. However, the chemical strength of the contaminated runoff, often equivalent in many respects to raw domestic sewage, is clearly a concern (John, 1995).

Tracking runoff over a 57,924 square kilometer area (Kamloops region) presents enormous logistical problems, depending on available resources. Runoff may flow under the snow layer and discharge directly into a watercourse under the frozen ice layer, not visible to the sampler. Often the physical risk of sampling under snow melt conditions can be prohibitive. For these reasons runoff data often reflects a "snapshot" of an individual site and does not generally comprise what would be considered a comprehensive regional overview

4.0 RECOMMENDATIONS FOR THOMPSON BASIN AND CARIBOO REGION

- One approach has evolved in the region over the past few years to address the problem of geographic scale and the irregular nature of problems at many operations. Numerous site inspections, at various times of the year, have identified the conditions that exist on various ranches that increase the risk factor of runoff occurring. Among these risk factors the slope, vegetative cover, feeding location, livestock density and watering methods are all important and have been observed as such under actual field conditions. An inspection of every ranch, at the anticipated time of a runoff event cannot realistically occur, therefore, ongoing education, awareness and persuasion have

become and should continue to be one of the principal tools to address agricultural problems, in addition to enforcement measures when necessary.

- Experience elsewhere has found farmer involvement in project planning and problem identification often results in greater participation in voluntary NPS pollution control projects (EPA, 1993). However, it was also reported that one of the lessons learned in the Rural Clean Water Program was that awareness of the impacts of agriculture on water quality does not necessarily translate into ownership of water quality problems by farm operators. Therefore, based on this study and regional experience, a proactive field program with as many site visits as possible (on a rotational basis) during the spring runoff period are required to keep environmental awareness a high priority with producers in the Thompson basin and Cariboo region.
- Knowledgeable producers who know their own holdings are the first line of pollution prevention and in determining what management practices might best be changed. The producer survey response indicated that producers consider themselves to have a generally high environmental awareness. MELP actively encourages producers to walk their land on the worst possible day(s) with the intent to identify evidence of brown, contaminated runoff. If contaminated runoff is discharging to surface waters, or is likely to discharge to surface waters then runoff controls through diversions or ponding or other means must be implemented. Remediation measures will be necessary to prevent such discharges from being repeated and should be tracked to see that this is the case. Producers are encouraged to keep diaries of environmental protection practices that they have instigated.
- Producers need to understand why the release of the nutrients, sediments and micro-organisms can be detrimental to the use of surface waters and the value of increasing their voluntary efforts to improve water quality. Watershed stewardship guidelines provide landowners with this information (DFO, 1997). That and other related material have been gathered and made widely available to local producers - this activity should continue to be supported.
- The Salmon River winter manure application practices and subsequent contaminated spring runoff problem remains an ongoing concern. A non-point source Action Plan designed specifically for agriculture in this watershed needs to be developed and implemented. The Fall and Winter Manure Management Information Sheet represents a basis and beginning for this process.

References

Ministry of Agriculture, Fisheries and Food Environmental Guidelines for Beef Cattle Producers in British Columbia. BC Ministry of Agriculture Fisheries and Food, 1992.

Ministry of Agriculture, Fisheries and Food Environmental Guidelines for Dairy Producers in British Columbia. BC Ministry of Agriculture, Fisheries and Food, 1993.

Ministry of Agriculture, Fisheries and Food. Bill 22 - 1995 Farm Practices Protection (Right to Farm) Act. Province of British Columbia, 1995.

Ministry of Agriculture, Fisheries and Food. Strengthening Farming in British Columbia. A Guide to Implementation of the Farm Practices Protection (Right to Farm) Act. Ministry of Agriculture, Fisheries and Foods, 1996.

British Columbia Cattlemen's Association . Beef in B.C. Volume 12 Number 4 November/December 1997: 53-59.

B.C. Reg. 131/92 (O.C. 557/92) Agricultural Waste Control Regulation. Queens Printer for British Columbia, Victoria, 1992.

Broersma, K., P. Webb, B. Roddan and K. Wallach. Status Report of Projects in Waste Management in the Livestock Industry in the Interior of British Columbia, 1995. DOE FRAP 1995-30.

Department of Fisheries and Oceans. Watershed Stewardship A Guide For Agriculture. Department of Fisheries and Oceans, 1997.

Environmental Protection Agency. Section 319 National Monitoring Program: An Overview. North Carolina Cooperative Extension Service, North Carolina State University, 1995.

Environmental Protection Agency. Evaluation of the Experimental Rural Clean Water Program. EPA-841-R-93-005, 1993.

Fraser River Action Plan. Proceedings of the Federal/Provincial Information Session January 14, 1992. Government of Canada and Province of British Columbia, 1992.

Hart, J.S., Assessment of Livestock Wintering Areas in Bridge Creek Basin, 1996. DOE FRAP 1996-03.

John, B, Survey of Agricultural Practices in the Thompson Basin - 1995. DOE FRAP 1996-14.

John, B, & Geier, M, Survey of Agricultural Practices in the Thompson Basin - 1994.
DOE FRAP 1994-26.

Task Force, 1981. Thompson River Basin Pre-Planning Task Force Report. Canada-
British Columbia. February 1981.

ACKNOWLEDGMENTS

BC Environment gratefully acknowledges the cooperation of the staff and members of the British Columbia Cattlemen's Association and the staff of the Ministry of Agriculture, Fisheries and Foods who have supported this project.

APPENDIX 1

Thompson Basin Agricultural Project Environmental Questionnaire



July 14, 1997

Dear Producer:

The Fraser River Action Plan (FRAP) calls for the reduction in the loading of nutrients and other contaminants from agricultural sources. Identifying these sources and developing suitable prevention and abatement measures ensures sustainable agriculture in this province. FRAP has provided funding since 1994 for staff of the Ministry of Environment, Lands and Parks in the Southern Interior region to carry out this mandate under the title of the Thompson Basin Agricultural Project.

As the Fraser River Action Plan is in its sunset year, the agencies involved in this local project feel that benefits will be gained from obtaining your point of view on this subject. Please find enclosed a short questionnaire and a stamped return envelope. These questionnaires are being sent randomly to 100 producers in a variety of commodities who have been visited as a result of the Thompson Basin project. Take a few moments to fill it out. Your answers will be compiled by October 1997 and published in a final report to be available in March 1998. I would be pleased to make copies of the results available upon your request.

Be assured that your identity is not important to the results of this survey. There is no need for a return address. Your cooperation is greatly appreciated. If you have any questions or concerns please call me at (250) 371-6299.

Yours Truly,

Barb John
Agricultural Impact Officer
Regional Pollution Prevention

Thompson Basin Agricultural Project Environmental Questionnaire

Abbreviations:

Ministry of Environment, Lands & Parks = **MELP**

Ministry of Agriculture, Fisheries & Food = **MAFF**

1. Has your ranch or any other holdings you manage been visited or inspected between 1994 and 1997 related to environmental concerns by:

- | | |
|--|--|
| <input type="checkbox"/> MELP staff?
<input type="checkbox"/> MAFF staff?
<input type="checkbox"/> Other? (specify): _____ | <input type="checkbox"/> A Contractor?
<input type="checkbox"/> A peer advisor? |
|--|--|

2. How many site visits or inspections occurred over the past four years? Specify year if possible.

1994	0	1	2	more than 2
1995	0	1	2	more than 2
1996	0	1	2	more than 2
1997	0	1	2	more than 2

3. What was the nature of the visit or inspection?

- | | |
|--|---|
| <input type="checkbox"/> Complaint
<input type="checkbox"/> Complaint follow-up
<input type="checkbox"/> Educational | <input type="checkbox"/> Ranch Survey (helicopter fly over)
<input type="checkbox"/> Tour
<input type="checkbox"/> Other (specify): _____ |
|--|---|

4. Did you find consistency in the personnel conducting the visit?

- | | |
|------------------------------|-----------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No |
|------------------------------|-----------------------------|

If yes, was the consistency beneficial? Comment: _____

If no, would consistency be beneficial? Comment: _____

5. Were any operational practices changed on your farm to correct environmental concerns over the past three years?

- | | |
|------------------------------|-----------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No |
|------------------------------|-----------------------------|

If yes, were these changes instigated as a result of:

- | | |
|---|--|
| <input type="checkbox"/> Your own initiative?
<input type="checkbox"/> Availability of loans/funding?
<input type="checkbox"/> Helicopter flyovers?
<input type="checkbox"/> MELP site inspection? | <input type="checkbox"/> MAFF site advice?
<input type="checkbox"/> An enforcement action?
<input type="checkbox"/> Peer advisor recommendation?
<input type="checkbox"/> Other? (specify): _____ |
|---|--|

6. What do you consider your investment in environmental changes to have been since 1994?
(specify year if possible)

- Time _____ approx. hrs
- Money _____ approx. cost
- Other (specify): _____

7. Do you feel your overall environmental awareness has increased in the past three years?

- Yes
- No

8. How do you rate your awareness of riparian/stewardship issues? Circle one.

- low high
1 2 3 4 5

9. Do you feel your agricultural operation complies with the "Code of Agricultural Practices for Waste Management"? Circle one.

- Never Always
1 2 3 4 5

10. Would you feel comfortable requesting a site visit to help you with any environmental concerns?

- Yes
- No

If yes, what agency would you prefer? (See question 1) _____

11. What do you consider the greatest environmental concern on your farm?

- Contaminated runoff
- Livestock access to watercourses
- Other (specify): _____
- Riparian/habitat destruction
- Location of confined livestock area

12. Future environmental improvements on this farm.

- will definitely occur with the next 12 months
- are planned for in the next 5 years
- Other (specify): _____
- will occur as time is available
- will occur as money is available

13. Would you like a copy of a report summarizing the results of this survey?

- Yes
- No

Additional comments/suggestions : _____

APPENDIX 2

199/97 Fall & Winter Manure Management Information



1996/97 FALL & WINTER MANURE MANAGEMENT INFORMATION (for the Okanagan/Shuswap)

Goal: To prevent contaminated runoff from entering surface or groundwaters.

Issue: Excess nutrients entering into surface waters in the Shuswap/Okanagan have resulted in reduced water quality. Runoff from manured fields is believed to be a significant source of these nutrients. Manure may also carry pathogens which, together with excess nutrients, may reduce downstream water quality for drinking or recreation.

Producer Responsibility: Manure must be applied to land only as a fertilizer or a soil conditioner. Producers are responsible for ensuring that contaminated runoff from their fields does not enter watercourses (i.e. ditches, streams, marshes, rivers or lakes).

What is Contaminated Runoff? Water is contaminated if it exceeds the water quality objectives for the water course it enters.

☞ Rule of Thumb: If the water running off of a manured field is brown in color, it is clearly contaminated.

What can producers do?

In order to prevent or reduce the risk of contaminated runoff from entering a watercourse, producers should not spread manure:

- within 5 m of a bank or slope leading to a watercourse;
- within 30 m of any well, stream or spring used for domestic purposes. These distances should be increased where the ground slopes toward the stream, watercourse or well;
- on steep or very long shallow slopes where erosion and/or surface runoff is likely to occur;
- on saturated soils or in areas of standing water where manure will not infiltrate into the soil; and
- within the high water mark of field depressions during times of the year when there is a risk of direct surface runoff to a water course.

Fall and winter application rates should not exceed the total annual nutrient requirements of the crop. Fields receiving manure should have a good level of vegetative cover or crop residue present. Avoid tilling under crop residue as this may increase the risk of soil and manure loss in runoff. A crop specialist can advise the producer on a suitable application rate.

Uncontaminated runoff (clean water) should be diverted around pens, exercise yards, manured fields, or other areas where contamination is likely to occur. If contamination of some runoff is likely, facilities should be constructed (storages, berms, swales etc.) to contain that runoff until it can be spread as a fertilizer.

☞ Rule of Thumb: If runoff water is clean - keep it clean!

Application Conditions:

1. Manure application to unfrozen ground in fall.

This is a good time to apply manure to many corn or grassland sites as most of the manure nutrients will be available for the crop next spring. Avoid wet areas, areas close to a watercourse and fine textured soils with long or steep slopes.

☞ Rule of Thumb: If there has been runoff or flooding in previous years - don't apply manure to that field.

2. Manure application to frozen ground in fall or winter This practice is not recommended on most fields.

The risk of contaminated runoff from this practice is high. If you must apply manure to frozen ground then apply to grassland or standing grain stubble where soils are coarser textured, and where slopes are shallow. Stay well away from water courses.

☞ Rule of Thumb: Fields which have had runoff, even if only in some years, should be avoided as the risk of runoff is high.

3. Manure application to snow covered ground.

This practice is not recommended - and may be further restricted in future if spring runoff continues to occur.

Manure applied to snow is most at risk to create contaminated runoff. This is due to an increased rate of melt and limited potential for the manure to bind to the soil or crop residue. If you must apply manure to snow covered ground use fields that are level or have a shallow slope, are well away from a watercourse, have coarse textured soils, have a northern exposure (aspect) and have significant vegetative cover.

☞ Rule of Thumb: Fields which have had runoff at snowmelt, even if only in some years, should be avoided as the risk of runoff is high.

continued on back

BC Environment: role and intentions

Enforcement of the Agricultural Waste Control Regulation is the mandate of BC Environment. Resolution of the "manure contaminated runoff" issue is essential to the success of a self regulated, environmentally sustainable agricultural industry. The Ministry is working actively with producer groups to substantively eliminate manure contaminated runoff within a tight time frame to meet BC Environment regulations and public expectations.

Responsibility for compliance with the Regulation rests with the producer. The Ministry is prepared to work with producers to find solutions where unusual circumstances exist. Producers who continue to experience contaminated runoff are in violation of the Regulation and are subject to enforcement under the Waste Management Act.

Contacts for more information

BC Environment

- Barb John, Agricultural Impact Officer, Kamloops, **(604)** 371-6299
- Ron Townson, Environmental Protection Officer, Penticton, **(604)** 490-8276

BC Ministry of Agriculture, Fisheries and Food

- Brian Harper, District Agriculturist, Salmon Arm, **(604)** 832-1629
- Ted Moore, District Agrologist, Kamloops, **(604)** 371-6052
- Kevin Murphy, District Agriculturist, Vernon, **(604)** 260-3000
- Geoff Hughes-Games, Soil Specialist, Abbotsford, (604) 556-3102

Agriculture and Agri-Food Canada

- Dr. Bernie Zebarth, Soil Scientist, Summerland, **(604)** 494-6391

AEPC or Commodity Group Peer Inspectors

Note Phone numbers with **(604)** (*bolded*) will change to (250) in October 1996