REPORT ON:

Analysis of Agricultural Water Supply Issues
National Water Supply Expansion Program
British Columbia

Submitted to:

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EXECUTIVE SUMMARY

Over the past few decades, all of the regions of British Columbia have experienced extreme shortages of water for agriculture at one time or another. In some cases multi-year periods of lower than normal precipitation have resulted in shortages, while in other case the shortages are due to seasonal periods of reduced precipitation and stream flow.

The economics of high value crops such as berries, tree fruits, grapes, and other specialty crops are particularly dependent on water availability. If severe water shortages occur, for even one year, the resulting damage may lead to crop loss for 8-10 years.

This report is based on the series of eight (8) provincial workshops and a review of available data and documentation . It was commissioned by Agriculture and Agri-Food Canada, Prairie Farm Rehabilitation Administration, to support the National Water Supply Expansion Program in BC.

The identified issues and constraints, in the order of province wide priority, include:

- timely availability and distribution of water,
- competition with non-agricultural users for limited water resources,
- on-farm water use efficiency,
- gaps in the available information on water needs and available sources,
- cost of developing new sources of water,
- cost of rehabilitating existing supply systems,
- licencing and allocation procedures,
- quality of water used by agriculture,
- need for planning and education to manage competing demands, and
- the availability of water for livestock watering.

The study developed recommendations for program initiatives, including:

- flexibility to address regional differences,
- promotion of on-farm water conservation,
- protection of water supplies and delivery infrastructures for the long term needs of agriculture,
- resources for collection of information on water use and availability in agricultural areas,
- resources for feasibility studies and design of infrastructure,
- resources for capital improvements to infrastructure,
- providing assistance in resolving conflicts between agricultural and non-agricultural users, and
- promotion of effective partnerships between agriculture interests and environmental agencies and groups.

Recommended program management is through a Management Committee, comprised of industry representatives chosen by the BC Agriculture Council, British Columbia Ministry of Agriculture, Food and Fisheries and Agriculture & Agri-Food Canada, which would establish program and investment priorities subject to terms of funding established by the NWSEP and the APF.

The envisioned cost shared program includes information gathering, technology transfer, feasibility assessment, planning, design and capital expenditures for new infrastructure and rehabilitation of old infrastructure. The program would provide assistance to projects involving only agricultural users as well as the agricultural components of projects involving multiple users of the water resource.

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ACRONYMS USED IN THIS REPORT

AAFC	Agriculture and Agri-Food Canada
AEPI	Agriculture Environment Partnership Initiative
APF	Agriculture Policy Framework
BCAC	BC Agriculture Council
BCCA	BC Cattlemens' Association
BCFGA	BC Fruit Growers' Association
BCMAFF	BC Ministry of Agriculture, Food and Fisheries
BCMOF	BC Ministry of Forests
BCMSRM	BC Ministry of Sustainable Resource Management
BCMWLAP	BC Ministry of Water, Land and Air Protection
CEAA	Canadian Environmental Assessment Act
DFO	Fisheries and Oceans Canada
INAC	Indian and Northern Affairs Canada
LWBC	Land and Water BC
NGO	Non-governmental Organization
NWSEP	National Water Supply Expansion Project
PFRA	Prairie Farm Rehabilitation Administration

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1.0 INTRODUCTION

Agriculture and Agri-Food Canada (AAFC), through the Prairie Farm Rehabilitation Administration, has contracted Golder Associates Ltd. (Golder) to conduct an analysis of British Columbia's agricultural water supply issues pertaining to the National Water Supply Expansion Program (NWSEP). This draft report provides a discussion of water supply issues and constraints in the agricultural areas of the Province of British Columbia, the existing programming available for water supply infrastructure and information development; gaps in information with respect to agricultural water supply needs; possible solutions to identified water supply constraints, regions of the province where funding should be targeted, and the types of projects that should be funded.

This report identifies critical water management issues and constraints in BC to provide a basis for prioritizing projects.

1.1 Background

The National Water Supply Expansion Program is a four year program involving a $60 million investment in secure water sources for agriculture as one measure for alleviating the impacts of drought. The goal of the initiative is to improve producer's capacity to deal with drought situations through expanded water supply and protection of the resource. The objective of this federal program is to reduce the risk of future water shortages through the planning and development of secure water sources for agriculture and encourage the implementation of sustainable practices in the development and protection of water resources in rural agricultural areas of Canada.

Program Description

Through the NWSEP, AAFC will provide financial assistance for priority agricultural water supply problems across Canada. These may include new infrastructure such as surface water storage projects, wells, regional water pipelines, pasture pipelines and tank-loading facilities. Other projects may include strategic studies that will identify water supply solutions for areas that are currently experiencing shortfalls or are anticipated to experience water supply shortages in the near future.

AAFC announced of $10 million in funding on August 9, 2002 to accelerate investment in NWSEP. This funding was targeted at drought affected areas in Canada to help mitigate the effects of the 2002 drought and to prepare for the delivery of the remaining $50 million for NWSEP.

The agriculture industry is expected to cost share various activities proposed under the NWSEP initiative. The level of cost sharing and the potential for partnering with other agencies or private organizations varies depending on the specific type of activity.

Strategic initiatives may include cost sharing with provincial agencies, agricultural organizations, and conservation groups. Potential partners, especially funding partners, will be the provincial governments and those eligible for project assistance (farmers and ranchers, agricultural and conservation groups, rural communities, rural municipalities, agri-business and rural enterprises).

It is understood that the $60 million program budget will be distributed as follows: $10 million in 2002/03; $20 million in 2003/04; $20 million in 2004/05 and $10 million in 2005/06. The $10 million allocated for 2002/03 will be used to help develop water supply expansion projects and examine water supply issues across Canada through a national water scoping study that includes this report. The results of the scoping study combined with consultations with the provinces will assist the funding agencies in identifying program activities and priorities for the remaining $50 million.

Anticipated Program Outcomes

It is understood that intermediate outcomes from the NWSEP are:

(i) increased reliability and quality of water supplies and ability to withstand the impacts of drought; and,
(ii) improved management of existing water resources.

The long-term outcome is more diversified and profitable agricultural production across Canada accomplished by reducing the impact of drought.

1.2 Objective of Study

AAFC's objective for this study is to prepare for British Columbia's participation in the 3-year, $50 million national component by:

- defining the scope of agricultural water supply needs by region;
- determining the nature and extent of water supply constraints on agriculture; and,
- identifying priorities for agricultural water supply expansion in B.C.

Golder's scope of work includes identification of future programming options for British Columbia's share of the remaining $50 million of the NWSEP. The results of this study will be incorporated into negotiations and consultations with the federal government, provincial government, and agricultural stakeholders.

1.3 Methodology

Golder conducted six (6) regional workshops with water supply experts and interested parties from various parts of the province during the month of November 2002. A

summary of the workshop results was presented to the BC Ministry of Agriculture Food and Fisheries (BCMAFF) staff at "Water Connections 2", held in Abbotsford on November 26, 2002.

Golder also facilitated an expert advisory group workshop in Abbotsford on January 13, 2003. During the workshop, Golder reviewed the preliminary findings, confirmed issues and identified activities and types of projects that could be supported under the National Water Supply Expansion Program.

The total of eight (8) workshops were held as indicated in Table 1.

Table 1
Locations and Dates of Project Workshops.

Region	Location	Date
Kootenays	Cranbrook	November 14, 2002
Cariboo/Skeena/Peace	Prince George	November 15, 2002
Okanagan	Kelowna	November 18, 2002
Thompson	Kamloops	November 19, 2002
Fraser Valley	Abbotsford	November 21, 2002
Vancouver Island	Nanaimo	November 22, 2002
BCMAFF “Water Connections 2”	Abbotsford	November 26, 2002
Provincial Expert Advisory Group	Abbotsford	January 13, 2003

A summary of the workshop proceedings was made publicly available at the project website (http://water.golder.ca).

Invitations to the six regional workshops were sent to agency staff and to agriculture industry groups as recommended by the BC Agriculture Council (BCAC). Some industry groups decided to send representation to only one workshop for input to the process. A summary of the attendance at the workshops is listed in Table 2 below.

Table 2
Summary of Workshop Attendance by Participant's Affiliation.

Category	Commodity	Kootenays	Fraser Valley	Cariboo/Skeena /Peace	Okanagan	Thompson/ Nicola	Vancouver Island
Producer	Beef	6		3		6	
	Dairy		1	2			3
	Horses					1	
	Hogs		1				
	Poultry		1				
	Tree Fruit	1			3		
	Berries		3				
	Grapes				1		
	Greenhouse		2				2
	Nursery						
	Ginseng					1	
	Other						3
Agency	Provincial:						
	Land and Water BC		2	1		4	3
	BCMSRM					1	
	BCMAFF	2	3	3	2	3	3
	BCMWLAP				1		
	BCMoF	2					
	Federal:						
	AAFC		1	1		1	
	INAC				1		
Irrigation District					2	2	
Municipality			5	1	1	1	1
NGO			2	1	4		1
Consultant		1	2	2	2	1	1
Total Attendance		**12**	**23**	**14**	**17**	**21**	**17**

Golder also conducted a literature review of existing available information on agricultural and rural water supply needs and problems in the agricultural areas in BC. This review included:

- Cencus of Agriculture data (1996);

- Land and Water BC (LWBC) databases;
- BC Ministry of Water, Land and Air Protection (BCMWLAP) publications;
- BC Ministry of Sustainable Resource Management (BCMSRM) publications;
- BC government water well registry, sensitive aquifer mapping, and surface water allocation / licensing record database;
- BC Ministry of Agriculture, Food and Fisheries (BCMAFF) publications; and,
- Available studies commissioned by agricultural producer groups.

Reports and documents used in the preparation of this report have been identified in Appendix VII.

This report is based on the series of workshops and literature review, and discusses BC's water supply issues and constraints and recommends NWSEP programming options to provide solutions to the identified issues and constraints.

2.0 AGRICULTURAL WATER USE IN BC

Regions within British Columbia experience the highest, and some of the lowest, precipitation in Canada (Coote, 2000). Within the agricultural producing areas of the province, mean annual precipitation ranges from under 300 mm to over 2500 mm (Environment Canada, 1993). Water shortages are common in the late summer months even in the wettest areas where water demand is highest in summer but most precipitation occurs in winter. This makes storage of water in reservoirs a common feature throughout most of the province.

Irrigation was practiced on a small scale in British Columbia before 1900, but the first use of large scale irrigation began in the 1960s after the widespread installation of electric power in rural areas. In 1944, the Prairie Farm Rehabilitation Administration (PFRA) assessed irrigable areas for war veterans returning to BC. Since that time, water supply for livestock and irrigation of high value crops has expanded throughout the province.

BC Agriculture produces a wide range of products, several of which are high valued crops which require irrigation for successful production.

The major commodities produced in BC include:

- Poultry and eggs,
- Floriculture and nursery,
- Cattle and calves,
- Vegetables,
- Berries and grapes,
- Tree fruits, and

- Several specialty products

A summary of selected agricultural statistics by economic region and type of farm is attached as Appendix VIII. These statistics are based on data from the 1996 Census of Agriculture.

2.1 Regional Water Use

Water use for agriculture in British Columbia is difficult to quantify. It has been estimated that surface water sources supply 82% of water used for municipal, domestic and rural purposes (Coote, 2000). Surface water is licensed in the province, and has been since the late 1800's. However, actual water use is unknown since there has been no comprehensive review to correlate the licensed quantity to actual use.

Surface water rights are granted under the provincial Water Act, and are defined by type of use. Agricultural water supply for greenhouses and stockwatering are licensed to a maximum withdrawal rate in the units of gallons per day. Water licences for irrigation, nurseries, frost protecting, flood harvesting and crop suppression are licenced to a maximum annual volume in the units of acre feet per year, as are licences for storage. A preliminary regional delineation for defining the distribution of water use in B.C. is shown in Figure 1 and Figure 2 provides a graphical summary of licensed surface water use by region.

Groundwater use in agriculture is limited and has not been defined geographically. The first use of groundwater to supply a major irrigation district in BC was in 1963 when a high capacity well was constructed at Oyama in the Okanagan Valley to irrigate a variety of fruit tress, grapes and other commercial crops. The use of groundwater for irrigation to irrigate commercial crops (primarily raspberries and strawberries) in the Fraser Lowland has become significant in the last 10 years.

Groundwater use is not licenced in B.C. There is a well registry to record information on wells (location, capacity, etc.) however, participation in the registry is voluntary.

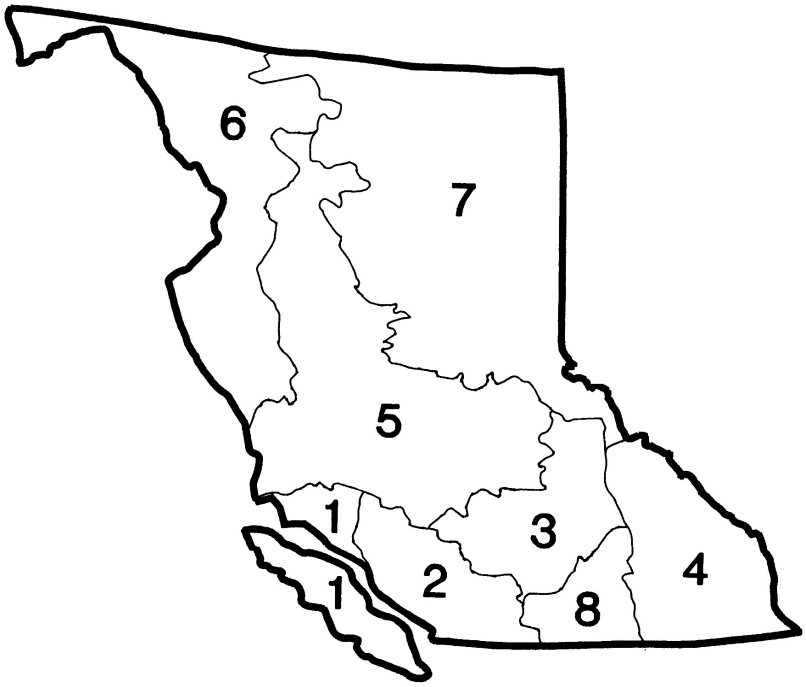

Figure 1. Agricultural Regions within British Columbia (MAFF, 2000).

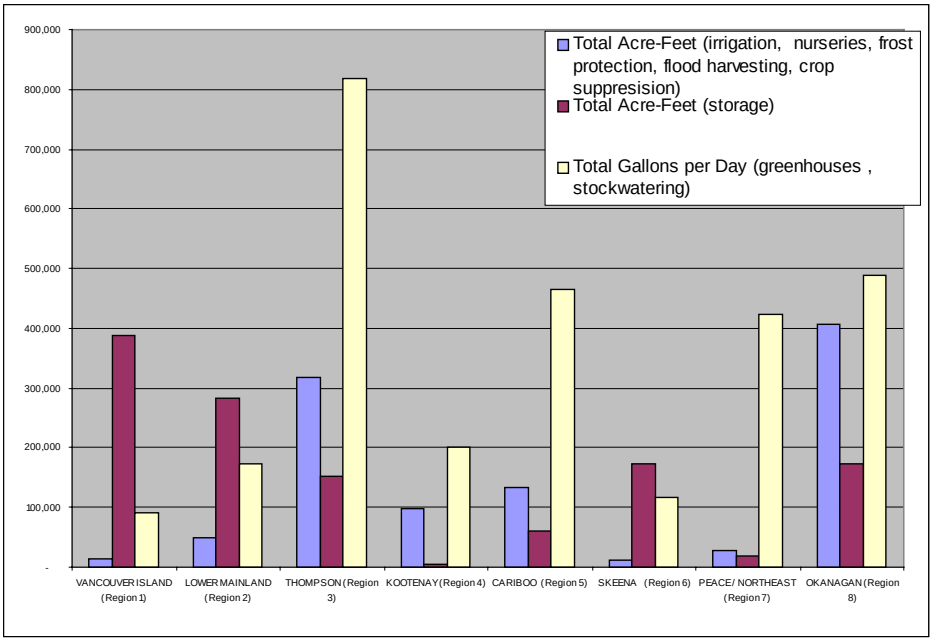

Figure 2. Regional Surface Water License Distribution (LWBC, 2002a).

2.2 Water Availability

While BC is perceived to have an abundance of water, it is often inaccessible. The majority of new license applications are for water bodies with existing licenses. Approximately 28% of the licensed stream length in the province currently has allocation restrictions. In 2000, 23 watershed groups in BC were subject to water allocation restrictions on 40% of the licensed stream length (BCMWLAP, 2002a).

The percentage of observation wells with declining water levels due primarily to human activities increased from 10% in 1965-1970 to 14% in 1995-2000. Declining water levels related to human activities are mostly a result of intensive local groundwater pumping for industry, agriculture and municipal water supplies and decreased recharge due to impervious surfaces in urbanized areas. (BCMWLAP, 2002a).

2.3 Water Quality

Water quality issues for agricultural water supply in BC are primarily related to food safety of fresh market produce and livestock health, both of which are very important. Pathogens in sources of agricultural water supply in BC have led to restrictions on marketability of vegetables and berries.

2.4 Water Demand

The total irrigated area in each region of B.C. is presented in Table 3, along with a list of primary agricultural activities with high water demand. Additional agricultural activities occur in each region, but were deemed to have lower water demand.

Table 3
Regional Agriculture and Irrigated Area

	Region	Primary Agriculture Activities with High Water Demand	Total Irrigated Area (ha, % of total irrigated)
1	Vancouver Island	Fruit, small fruit, vegetable	6,125 (3%)
2	Lower Mainland	Livestock, berries, vegetables, forage, nursery.	12,980 (7%)
3	Thompson	Livestock, forage, ginseng	53,199 (28%)
4	Kootenays	Livestock, forage	19,182 (10%)
5	Cariboo	Forage, livestock	40,749 (22%)
6	Skeena	Livestock, forage	4,467 (2%)
7	Peace/Northeast	Grain, seed crops, livestock, forage	1,292 (1%)
8	Okanagan	Tree fruits, grapes, forage, nursery	50,562 (27%)

From MAFF, 2000

2.5 Infrastructure Needs

The most recent list of inadequate or failing infrastructure within each of the regions is the 1984 Talisman report that was compiled under ARDSA funding. The ARDSA program is described in more detail later in this report.

2.6 Current Water Supply Programming

There are presently four sources of funding that can potentially be used to assist in developing agricultural water supply in the Province of B. C. They are discussed below.

- The **Rural Water Development Program** (AAFC, 2002) provides financial and technical assistance for initiatives that lead to improved water management in the Peace River region of the province. The program is designed to alleviate water supply constraints, aid in the development, expansion and diversification of agricultural operations, and encourage the implementation of sustainable practices in the development and protection of water resources. The program covers 75% of eligible costs for activities that involve development of information or technologies, and/or the dissemination of information. Financial contributions of up to one-third of eligible costs may be provided for infrastructure projects.
- The **BC Investment Agriculture Foundation** (AAFC, 2003) is a non-profit organization that invests federal and provincial funds for agriculture improvement projects. Funding is supplied in partnership with industry organizations to foster long-term growth, employment and competitiveness of agricultural production in B.C. The foundation administers funds for Agriculture and Agri-Food Canada's Canadian Adaptation and Rural Development (CARD) Fund which provides funding for innovative projects designed to foster increased growth, self-reliance, employment and competitiveness for British Columbia’s agriculture, agri-food sector and rural communities. The program also assists improved natural resource management among other developments.
- The **Agriculture Environment Partners Initiative** (AEPI) is a fund established to assist resolution of key environmental and wildlife issues in the agriculture sector. It is funded by the provincial and federal agriculture ministries through the Agri-Food Futures Fund, and is administered by the BC Investment Agriculture Foundation.
- The **Livestock Management Water Stewardship Program** (BCCA, 2002) is available for on-farm environmental projects with the objectives of improving farm income by adoption of environmental practices that improve water quality for livestock groups. The focus of this program is environmental management, not water supply. However, many livestock watering projects could involve improvements to existing supplies such as relocation of watering sites away from streams, fencing of

riparian areas, and potentially development of new sources for livestock watering. This program is funded by the AEPI.

- In addition to the above programs that include funding, the Provincial Dam Safety Program (LWBC, 2003) was instituted to aid dam owners in ensuring that their structures are designed, constructed and maintained according to acceptable standards for public safety. Large dams generally pose a greater hazard than smaller dams, however, the probability of smaller dams failing can be much higher due to the lack of owner resources and appreciation of the consequences of a dam failure. No funding is associated with this program.

2.7 Past Water Supply Programming

Previous agricultural water supply programs in BC were sponsored by a number of consecutive federal-provincial agreements. The programs were implemented to improve opportunities for productive employment in BC and promote balanced development in the province. Each of the programs allocated a portion of the funds to water supply, through rural electrification and regional (not on-farm) irrigation projects. Summary descriptions of these programs follow.

- **PFRA Funding**. The non-Peace River BC regions have not been recipients of PRFA funded or managed programs for water supply, with the exception of special PFRA funding for construction of irrigation and drainage works in the interior of BC from the late 1940's until 1968. From 1968 to 1989, BC did not have access to any of PFRA's technical or financial assistance for dugouts, wells, stockwatering dams, or irrigation projects. PFRA expanded their assistance into the Peace River area of BC in 1989.
- **Agricultural Rehabilitation and Development Act** (ARDA) – 1961 to 1966. The ARDA program, in part, introduced irrigation, drainage, and flood control infrastructure outside of the farm gate in targeted "rural regions". For the ARDA program, and subsequently the ARDSA program, implementation was primarily undertaken by the BC Ministry of Agriculture, Fisheries and Food, with specific technical services conducted by a Water Resources Engineering group of the BC Ministry of Environment (now the Ministry of Water Land and Air Protection). Program applicants were required to retain consulting engineers to assist with individual project design and implementation.
- **Agriculture and Rural Development Subsidiary Agreement** (ARDSA I) - July 1977 to July 1982. This $60 million shared federal provincial program was funded 37.5% from the federal government, 37.5% from the provincial government, and 25% from the local applicant. The local applicant could be a local municipality, regional district, improvement authority or a group of more than three landowners. Local governments often made the application and then established cost sharing agreements with private landowners in the benefiting areas. To ensure long-term operation and

maintenance of the projects, contracts were normally established with local cost-sharing partners to define long-term responsibilities. In the 1977-82 agreement, $10.1 million of ARDSA funds were combined with $3.5 million of local funds to provide 32 projects with a combined 15,092 hectares of potential improvements.

- **Agri-Food Regional Development Subsidiary Agreement** (ARDSA II) – 1985 to 1990. The funding and programs were essentially the same as ARDSA I.
- The **Agricultural Land Development Assistance Program** (ALDA) - 1975 to 1990. ALDA was a provincial program that provided low-interest loans for on-farm capital improvements. During the final years of the program in the late 1980's, the program provided agricultural credit for a minimum project cost of $5,000. The maximum loan per farm was $75,000. Loans were amortized over a term of 15 years and interest rates for the loans were at half of the bank prime rate on approved credit. The ALDA funding was heavily utilized for on-farm irrigation works, but did not cover portable equipment.

2.8 Regulatory Obligations

The provincial water rights process involves a priority system based on application date. When more than one license has been issued for the same stream or source of water, the license with the earliest application date (priority date) has first right to the available supply. The license with the second earliest priority date has the second right, and so on (LWBC, 2002b).

According to Provincial policy, maintaining the natural stream environment and instream uses for the fisheries resource is important for maintaining water quality and, recreational, aesthetic and cultural values (BCMELP, 1996). Accordingly, water availability for instream uses may take precedence or priority over licensed water rights. In situations where a water allocation decision will significantly impact instream water uses, the comptroller or regional water manager may refuse the application or enforce water license conditions to protect the instream use. The minimum flow required to sustain the fisheries resource for minimum acceptable spawning and rearing habitat has been set at 10% of the Mean Annual Discharge (MAD). The provincial policy has been stated as follows:

For streams where the natural mean monthly flow falls below 10% MAD, extractive licensed demands should only be allowed for the period of months when the mean monthly flow is above 60% of the MAD (BC MELP, 1996).

Standards for determining in-stream flow needs for fish are presently being developed in BC by the Ministry of Sustainable Resource Management.

The former Ministry of Environment, Lands and Parks has published a series of reports documenting the history of water rights of individual Indian Bands throughout British Columbia. These reports identify recommendations of the Indian Reserve Commission, Orders in Council of the Government of British Columbia, determinations of the Board of Investigation under the Water Act, and licensing decisions of the Comptroller of Water Rights and more recently Regional Water Managers. In specific circumstances and locations in the province, the decisions may result in constraints on agricultural water availability.

Federal funding for a project triggers a review under the Canadian Environmental Assessment Act (CEAA). In many cases the review is undertaken as a self-assessment by the federal agency that is providing the funding, but for larger projects and for those projects involving multiple agencies, a responsible authority (RA) must be determined and an independent environmental assessment must be completed. Based on the trigger and the potential scope of perceived impacts, the environmental assessment will be classified as either a screening level or comprehensive level assessment. A screening systematically documents the anticipated environmental effects of a proposed project and determines the need to modify the project plan or recommend further assessment to eliminate or minimize these effects. Projects identified on the Comprehensive Study List Regulations must be assessed through a comprehensive study under CEAA or be referred to a review panel. Typically, they are large-scale, complex and environmentally sensitive projects that may have a greater potential for adverse environmental effects. Both screening and comprehensive level assessments generally involve public comment. (CEAA, 2002).

2.9 Water Conservation

Water conservation is an objective and a strategy for resource management that promotes the efficient and effective use of water. It minimizes loss and waste of water and thereby protects the water resource.

Water conservation may include storage of river flows during periods of high flow for use during dry periods. Excess water during any year can be used during subsequent growing seasons or drought conditions. Another key element of water conservation is water use efficiency. Water use efficiency can be improved by refurbishing water conveyance systems, implementing on-farm strategies (such as upgrading irrigation equipment to improve efficiency and field improvements to reduce seepage, runoff and ponding), scheduling irrigation to suit local weather patterns and soil and crop types, and implementing water use metering to promote more efficient use of water.

A range of water conservation measures are practiced in B.C. resulting in a wide spectrum of efficiencies. Use of domestic waste water for irrigation is becoming a

common practice. Highly efficient drip irrigation methods are used in some regions but highly inefficient flood irrigation is also practiced. Significant returns in water saving could be achieved province-wide by implementing water conservation practices.

2.10 Demand Management

Water supply for irrigation is managed using both "supply" and "demand" management methods. Historically, water management has focused more on the supply-side method. This is an infrastructure-oriented approach that focuses on providing water and related services. Recently, the shift has been towards demand management attempts to reduce consumption by modifying human behavior. It encourages users to manage water supply more efficiently and has proven to be a cost effective technique.

Demand management is a strategy that involves "conservation measures that improve water use efficiency, increase water recycling, and minimize waste water" and "the adaptation and implementation of a strategy by a water institution to influence the water demand and usage in order to meet the objectives of economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services". The focus is on reducing overall water consumption and learning to subsist within the existing local water resource constraints.

Some of the practices of water demand management include:

- Education, awareness and training.
- On-farm water conservation practices.
- Selection of crops with high yield per unit water consumed or crops with low water demand.
- Optimization of existing infrastructure and/or retrofitting with efficient irrigation devices and/or technologies.
- Metering water use.
- Water-wise tilling and field preparation.
- Improved irrigation scheduling and control.
- Improved irrigation efficiency and water application uniformity.
- Reduction of water and soil evaporation.
- Use of waste water or recycled water.
- Provision of incentives for water-wise irrigation.
- Auditing of irrigation practices.
- Decision making models to identify optimum management.

The following improvements in water use efficiency were reported by Agrodev (1994) based on a literature review of case studies and experience in various regions across North America:

- Public awareness and education programs can result in a 10% drop in total consumption;
- Water metering of agricultural users in the USA has resulted in consumption savings of 25-35%; and,
- More intensive crop irrigation scheduling in the Columbia River Basin in Washington state has resulted in a 15% water saving.

These reported water savings may be achieved in BC by encouraging water conservation and administrating demand management.

3.0 SUMMARY OF ISSUES AND CONSTRAINTS

Funding by NWSEP for drought protection in B.C. is intended to resolve the issues and constraints to agricultural water supply that are outlined herein based on information gathered from a series of province-wide workshops held in November 2002. Resolution of the main issues or constraints benefits farming, industry and the public.

The major issues and constraints as identified in the workshops are listed below:

- Availability / distribution of water to agriculture;
- Competition for limited water resources with non-agricultural users;
- On-farm efficiency (education and resources to improve efficiency);
- Information (water needs, water availability, knowledge of sources, etc.);
- Public awareness of agriculture's water needs and how water can be shared; and,
- Policy issues related to existing and future allocation of water for agricultural use.

3.1 Workshop Conclusions

1. The availability of long-term water supply is a limiting factor to agricultural expansion in each region in the province;
2. Existing licensed water for agricultural use can be used more efficiently, allowing expansion of agricultural production. However, increasing efficiency may increase costs;
3. Increasing efficiency of water use will require irrigators to be trained and convinced to adopt water conservation measures;
4. Developing new water supply systems and upgrading existing water supplies may be accomplished through partnerships. Considerable effort must be expended to ensure that there is long-term security of water for agriculture;
5. There are considerable gaps in the information needed to make decisions about water use for agriculture. These gaps include the quantification of regional water needs on a commodity basis, availability of groundwater sources, and uncertainty regarding the water needs for fish;

6. Agricultural producers have limited financial capacity to rehabilitate existing water supply infrastructure (dams, ditches, pipelines, etc.); and,
7. Conserving and enhancing water supply for agriculture is a shared responsibility of the agriculture industry and government.

At the conclusion of each of the six workshops held throughout the province in November, the participants developed, and then voted on, a list of issues and constraints facing water supply for agriculture in their specific region. Details of the issues and constraints are included in the minutes of each of the workshops. The implications of the issues and constraints to each region were assessed during and following the January 2003 expert consultation. Lists of the issues and constraints in order of priority, as established by workshop participants at each workshop, follow.

Kootenay Region (Cranbrook Workshop, November 14, 2002)

1. Livestock Water Availability
1. Availability /Distribution of Irrigation Water
3. Riparian Health / Ecosystem
4. Urban / Rural Competition
5. Education to Manage Multiple Use Better
6. Availability of Groundwater
6. On-Farm Efficiency
8. Irrigation Water Restrictions due to Public Perception
8. Allocation & Licensing for Livestock
8. Domestic Water Supply & Quantity
11. Deterioration of Infrastructure
11. Lack of Groundwater Information
11. Loss of Access to Water
11. Fish

Cariboo & Peace Regions (Prince George Workshop, November 15, 2002)

1. Cost/Capital to Develop Supplies
2. Irrigation Water Availability
3. Knowledge about Water Sources
4. Livestock Water Availability
5. Competition with other Users/Resources
5. On-Farm Potable Water
5. On-Farm Efficiency
5. Water User Cooperation
9. Water Quality (Source & Impacts)
9. Extension / Education
9. Multiple Use
12. Drought Supply (Storage)

Okanagan Region (Kelowna Workshop, November 18, 2002)

1. On-Farm Water Efficiency
2. Competitive Water Use
2. Groundwater Availability
2. Infrastructure Rehabilitation
5. Cost of Supply
6. Governance
7. Off-farm Management
8. Water Quality
9 Surface Water Availability (Volume/Timing)

Thompson/Nicola Region (Kamloops Workshop, November 19, 2002)

1. Lack of Information / Needs Analysis
2. Competing Demands for Present & Future Needs
3. Infrastructure Rehabilitation (Storage and Conveyance)
4. New Storage
5. On-Farm Efficiency
5. Availability for Irrigation
7. Process for Licensing
8. Cost of Upgrading/Developing Supply
8. Availability for Livestock
10. Conservation Watershed Protection

Fraser Valley Region (Abbotsford Workshop, November 21, 2002)

1. Quality of Supply
2. Availability (Volume & Timing)
3. Competing Interests (In-stream, Urban/Rural, Other Resources)
4. On-Farm Efficiency
5. Infrastructure Development Funding
6. Mutual Understanding
7. Information
8. Mechanism for Making Groundwater Decisions

Vancouver Island Region (Nanaimo Workshop, November 22, 2002)

1. Competing Users for Limited Resource
2. Planning
3. Availability (Timing)/Storage
4. Education on Water for Agriculture
5. On-farm Efficiency/Scheduling
6. Water Licensing Process
7. Quality
8. Information Needs

9. Cost of Infrastructure
9. Pricing

A combined list of issues/constraints, in order of priority, follows.

BC-WIDE:

1. Availability / Distribution of Water
2. Competition for Limited Water Resources with Non-Agricultural Users
3. On-farm Efficiency (Education and resources to improve efficiency)
4. Information (Water needs, water availability, knowledge of sources, etc.)
5. Cost / Capital to Develop New Water Supply Sources
5. Rehabilitation of Existing Infrastructure
7. Governance / Licensing (Allocation procedures for surface and groundwater)
7. Quality of Source Water for Agricultural Use
9. Education / Planning as a means of Managing Multiple Use / Demands
9. Livestock Water Availability
11. Public Relations & Education -Public Perception
12. Riparian Health / Ecosystem Protection
13. Domestic Water Supply & Quantity

3.2 Expert Advisory Group

An expert advisory group workshop was held in Abbotsford on January 13, 2003 to review the findings from the regional workshops and identify activities and types of projects that could be supported by the NWSEP in BC.

Table 4 presents a logical framework analysis of the expert advisory group discussions.

Starting with the NWSEP objectives the analysis considers the general types of actions needed to achieve the objectives, examples of the types of action, how the action addresses regional issues and the type of programming required to support the actions. The analysis then summarizes the expected results with respect to drought proofing and promoting growth in agriculture.

Table 4.
Logical Framework Analysis of NWSEP Meeting on January 13, 2003

NWSEP Objective	How to Achieve	Examples	Regional Issues (From workshops)	Programs (Expert Committee)	Drought proofing results	Growth Results
Reduce risk of future water shortage	Planning	Strategic studies to identify water supply solutions	Availability of long term water supply & improved efficiency	Planning for secure water supply	Possible, if drought causes water shortages	All discussion centered on greater water supply for agriculture
Improve producers capacity to deal with drought	Development of secure water sources	Infrastructure – surface storage, pipelines, tank-loading facilities	Regional water supply issues identified as seasonal	More concerned with greater water supply for agriculture	Addresses water supply challenges rather than drought proofing specifically	Expansion of agricultural production to keep up with market demand
	Implementing sustainable practices	Improve efficiency of infrastructure	Gaps in info needed to make these decisions	Information and technology transfer programs needed	Increased efficiency could reduce demand for water	Important component of expansion
	Financial assistance	Cost-sharing on water supply related projects	Producers have limited financial capacity	Financial assistance programs needed	Needs to be negotiated with provincial agencies	Provides “push” to get projects implemented
	Policy changes	Clarification of water allocation restrictions	Many users have water supply policy issues	Some suggestion of round tables for planning	Frequent issues that would be extenuated during a drought	Understanding and reduction of red tape will lead to development

4.0 ANALYSIS OF ISSUES

4.1 Duration of Water Shortage

Over the past few decades all of the regions of British Columbia have experienced extreme water shortages for agriculture at one time or another. In some cases, such as in the Cariboo region, shortages have occurred due to multi-year periods of lower than normal precipitation. In the Fraser Valley, Vancouver Island, Thompson, and Okanagan regions, where much of the commercial agriculture cannot thrive without irrigation, the water shortages have occurred due to seasonal periods of reduced precipitation and stream flow.

4.2 User Group vs Individual Response to Drought

Where irrigation and water use is managed by a user group or organization (e.g. irrigation district), there are often practices and methods available to plan for years with insufficient water. For the remainder of the agricultural producers in the province, each water user must accommodate water shortages independently, and has done so with varying degrees of success.

4.3 Infrastructure Constraints

Rehabilitation of existing water storage and conveyance infrastructure represents serious constraints to efficient and effective water supply.

4.4 Information Gaps

Lack of information and insufficient data limit the ability of decision makers to optimize water supply and water use. The most common data gap pertains to local groundwater or aqufer information. Other data gaps include insufficient hydrometric flow data from streams, lack of information on actual water use, and a lack of awareness about how decisions are made regarding water allocation and licensing.

4.5 Programming Needs

A program is needed to provide technical and financial assistance focused primarily on planning for a secure agricultural water supply. Financial assistance for infrastructure was identified as a critical need. The stakeholders' generally agreed that $50 million over 3 years is insufficient to achieve significant improvements in infrastructure.

4.6 Regulatory Concerns

Water users are concerned that lack of hydrological and hydrogeological data in some regions may result in unjustified water licencing restrictions or inappropriate allocation decisions. Regulations may unfairly prevent existing water users from obtaining sufficient water supply and new water users from obtaining any water. Many producers and producer groups are concerned about constraints that may result from future groundwater licensing in the province. They are very concerned about licencing restrictions associated with fully "allocated" surface water supply systems, especially restrictions on licencing for stockwatering.

4.7 Implementation Constraints

A number of stakeholders were concerned about the government's ability to implement a program to improve and expand water supplies in B.C. Concerns included access to the program by all agricultural producers, the method of delivery, and the handling of CEAA responsibilities.

Implementing the program will require increased input by government staff to evaluate proposals and provide technical advice. However, present delivery models in the Province and recent downsizing of government staff may limit the government's ability to implement the program to expand water supply.

5.0 RECOMMENDATIONS

5.1 Recommended Program Initiatives

The following recommendations pertaining to program initiatives are based on the provincial scoping workshops and assessment by the expert advisory group:

1. The program should address differences in regional constraints and issues by providing flexible criteria, allowing funding for various types of projects.;
2. The program must be structured in a way that encourages and supports on-farm water conservation activities;
3. The program should provide methods to protect the water supply and delivery infrastructure for the long-term needs and rights of agriculture water users;
4. The program should provide resources (funding and technical expertise) to gather information specific to agricultural water use and availability of water in agricultural areas of the province;
5. The program should provide resources (funding and technical expertise) for detailed engineering feasibility and design of water supply infrastructure;

6. The program should provide resources (funding) for capital improvement of water supply infrastructure for both on-farm and regional use;
7. The program should contribute to co-operative and non-confrontational resolution of conflicts between agricultural and non-agricultural water use objectives; and,
8. Effective partnerships between agriculture interests and environmental agencies need to be developed and fostered. They are an important part of achieving the objectives and outcomes of the program.

5.2 Recommended Program Management

The model of industry-driven program management is favoured by the provincial government. This model is currently used to administer the Agriculture Environment Partnership Initiative (AEPI), and is proposed for delivery of other Agricultural Policy Framework programs. The BC Agriculture Council, representing the collective interests of BC's primary agriculture producers via producer farm organizations in all regions of the province, has administered the AEPI program through a management committee model.

To follow this model, and to provide a single "window" for the industry to access APF programs, a Management Committee is proposed as a means of managing the BC component of the NWSEP. The Management Committee would be comprised of industry representatives chosen by the BC Agriculture Council, British Columbia Ministry of Agriculture, Food and Fisheries and Agriculture & Agri-Food Canada. The Management Committee would have the final authority on all strategic decisions including the approval of all projects subject to compliance with the terms of funding established by NWSEP and APF. The Management Committee, through its annual plan, would establish program and investment priorities. Technical input would be provided by provincial and federal agencies on a referral basis.

5.3 Recommended Program Activities

The NWSEP is intended to provide funds for the expansion of agriculture through water supply-related activities. It is envisioned that the program will include information gathering, technology transfer, feasibility assessment, planning, and implementation of new capital works or improvements to existing water supply infrastructure.

The component related to implementation should supply cost-share funding for the rehabilitation, improvement, and construction of agricultural water supply facilities for agricultural use alone or in combination with fishery, recreational, or other beneficial uses of water. In this regard, an objective of providing assistance to entities engaged in irrigation should be to assist those entities in improving their efficiency of water use beyond current levels.

Improved water use efficiency and/or quantitative water savings could be achieved with the implementation of one or more of the following:

(i) canal and lateral linings;
(ii) piped conveyance and distribution system;
(iii) consolidation and/or realignment of delivery systems;
(iv) flow measuring devices, e.g., flow control devices;
(v) entire structures/regulating structures (which are new or replace obsolete ones)
(vi) multiple use water storage dams and reservoirs;
(vii) automation with central control of regulating structures including on-off control of pumping plants in canals and laterals; and,
(viii) new booster pumps for pressurized systems.

Other projects associated with an agricultural water supply facility that do not specifically contribute to quantitative water savings, but may be covered under the cost-sharing program could include

(i) diversion dams;
(ii) rehabilitation or improvement of storage dam(s) or part(s) thereof.

Implementation would include design, construction, and improvement of agricultural water supply facilities for storing, diverting, transporting, or distributing water to land for irrigation and for protecting and enhancing fisheries, recreational, or other beneficial uses that may be associated with such facilities.

A suggested program for British Columbia with two primary components is illustrated in Table 5.

Table 5
Recommended Program Elements, Examples, and Cost Share Formulae

	Program	Examples of Eligible Activities	Cost Share Formula
A	Information gathering, technology transfer, feasibility assessment, planning	❑ Technical studies on water use ❑ Investigative studies on groundwater availability in a particular area ❑ Implementation of an irrigation scheduling information webpage ❑ Background economic benefit studies including cost/benefit feasibility ❑ Studies for policy purposes (e.g. Instream flow needs, water needs by commodity in a specific region) ❑ Investigation and preliminary design of rehabilitation measures for a storage dam ❑ Regional water use planning for sustainable agricultural water use ❑ Assessment of water supply options to improve water quality	Funding from NWSEP of up to 75% of the total eligible cost, to a maximum contribution of $75,000.
B	New capital works or improvements to existing water supply infrastructure	<u>Results in improved water use efficiency and/or quantitative water savings:</u> ❑ Canal lining to decrease seepage losses in conveyance; ❑ Installation of flow meters throughout an irrigation district; ❑ Upgrade of canals to piped conveyance;	Funding from NWSEP of up to 33% of the total eligible cost, to a maximum contribution of $75,000.
		<u>Agricultural water supply that does not contribute to quantitative water savings</u> ❑ Diversion structures ❑ Dam rehabilitation	Funding from NWSEP of up to 25% of the total eligible cost, to a maximum of $50,000 NWSEP contribution

6.0 CLOSURE

We trust that the information provided in this report is sufficient for your immediate needs. If you have any questions concerning this report, please contact us.

Yours very truly,

GOLDER ASSOCIATES LTD.

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CW/RDM/LS/tk
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APPENDIX I

REGIONAL WORKSHOP MINUTES

ANALYSIS OF AGRICULTURAL SUPPLY ISSUES IN BRITISH COLUMBIA
NATIONAL WATER SUPPLY EXPANSION PROGRAM

NOTES FOR KOOTENAY'S CONSULTATION MEETING
November 14, 2002 – 1:00 P.M. to 3:30 P.M., CMT
B.C. Government Building
2nd Fl., 42 8th Ave. S.W.
Cranbrook, B,C.

FACILITATOR: Russell Merz, Golder Associates Ltd.

NOTES: Gary Barrett, Golder Associates Ltd.

ATTENDEES: *Attached.*

Introduction

Russell Merz (RM) provided an introduction to the meeting, including a review of meeting rules.

RM noted that the National Water Supply Expansion Program (NWSEP) is a $60 million program set up by the Federal Government to cover a potentially wide variety of projects. Some $10 million has been allocated to drought relief in the Prairie Provinces, providing potentially $50 million for NWSEP programs. A wide variety of project might fall under this program, but no criteria have been set as yet. Consultants have been retained (or soon will be in the case of Quebec) to develop criteria. Golder Associates Ltd. (Golder) has been retained to suggest criteria for British Columbia.

The program funds may be divided among regions based on agricultural receipts, which might place British Columbia's (B.C.'s) share at $4.5 to $5.0 million. In answer to a question from an attendee, provinces have not been approached by the Federal Government to share the costs.

This workshop focuses on the Kootenay Region. One of the key objectives is to identify water supply issues that may be limiting agriculture in this region. The meeting participants will be asked at the end of the meeting to help identify priorities for this region. Meeting rules were introduced (see the copy of the slide presentation in Appendix I). Participants were asked to write down what they considered the top three water supply issues in the region. These were to be collected at the break and the results collated to assist in developing priorities at the end of the meeting.

Initial Questions and Discussion

Why isn't the PFRA here? [In the Kootenay and other agricultural areas in B.C., other than the Peace River, where it currently operates.]

Response: by RM, with input from attendees. The PFRA (Prairie Farm Rehabilitation Administration) operates only in the prairies, which the Peace River region in British Columbia is deemed to be a part of. RM noted that the PFRA is administering this portion of the NWSEP program [the setting of the criteria], but it has not been decided how the subsequent portions of the project will be administered.

How does the NWSEP fit with other programs to deal with drought; for example programs to provide stability during droughts?

Response: by RM, with input from attendees. There is some recognition that it would be only part of the solution to such issues. We are not sure what the other responses to drought will be, although there is apparently on the order of $1 billion in program funding that may become available, although that has not yet been ratified by the Federal Government. It is understood that a unified strategy is to be developed, but we don't know what that strategy is yet. There appeared to be a consensus among the attendees that the need for a unified strategy should be identified in the report for this project.

Issue Identification

The PFRA asked for some specific questions to be posed as part of this project. The questions and responses are summarized below.

Do you know the quantities of surface water used?

R.M. We know that B.C. has licensed quantities recorded, but does not appear to have records of the actual use.

Responses:
(1) Erikson could provide an estimate, but there are no projections.
(2) Ranches could generally provide ballpark estimates.
(3) Forages. More than half of the forage crops in the region are probably irrigated.
(4) Livestock. A rough estimate could be made by multiplying stock x 20 gal per day. May not represent what the need is, though.

(5) Tree fruits. An estimate could be made.
(6) It was noted that this area [East Kootenay] is in a rain shadow more impacted by periodic drought than some other areas.

How do you know when you are impacted by a drought? Standards are being set for flow requirements for fish. In the future, "who" gets water in the low flow years will be an issue. How do you back-up a claim that drought is impacting the area?

Responses: (1) Could we look at, for example, the Creston area, and look at how many hectares of land might be upgraded if additional irrigation supply was available?
(2) There are criteria in place, but in B.C. we have so many microclimates that the current system does not work well. PFRA and Agriculture Canada approaches are not effective where we have small pockets that may be experiencing drought since their system requires impacts over a larger area for recognition of a drought.

How much groundwater is used?

Responses: (1) Much of the groundwater that is used supplies domestic water on agricultural lands. The amount actually used for agricultural purposes is small. Some wells are used for livestock watering, but in most cases the primary purpose was for domestic use.

Responses to the issue of water (surface or groundwater) availability:
(1) There are considerable areas that could be developed if additional water for agricultural purposes were available.
(2) There are conflicts between domestic and agricultural use. For example, in one area an Irrigation District became an Improvement District to take advantage of funding for upgrading the system, but now the water is controlled by the domestic users, who require a higher standard of water quality and have a higher call on the water.

What type of existing infrastructure needed to supply agricultural water is inadequate or failing?

Responses: (1) There needs to be an expansion of dugouts. Some areas have springs, but need dugouts to increase storage capacity for livestock use.
(2) On some local rangeland, 13 sloughs are currently dry or unusable. Another is in jeopardy. Only one lake is left and 3 or 4 creeks on the fringes of the range. The range unit is in jeopardy.

(3) A local Improvement District requires a large investment on the mainline. There is some loss in capacity. Probably only can supply about 50% of that needed.
(4) There are problems on some Crown Land ranges. There are 4 or 5 pastures supplied by wells in the past, but they are not operating anymore. It is not clear if it is due to a drop in the water table or just lack of maintenance on the wells.
(5) ARDA in the late 70s or early 80s provided some funds for infrastructure, particularly with respect to a particular spring. That spring has now "dried up," but it is not clear if growth or the drought is the problem.
(6) There is growth in some industries, cherries for example. A tripling in acreage in the Creston area would be possible, replacing some apple orchards and expanding beyond that. This expansion would require considerable growth in supply, which the current system can not supply.

Discussion of Water Quality Issues:

(1) Water quality is a growing concern. Forestry is a major concern (sediment)
(2) Agriculture's impact on water quality is also an issue. There is growing pressure to maintain quality, especially where livestock waters.
(3) The drought exacerbates the problem. Cattle are increasing accessing riparian areas due to limitations on others sources of water.
(4) It was noted that there was a Riparian Audit done and this area fared poorly. Also, there is a large ungulate population that contributes. The responsibility should all be on the backs of those in the agricultural industry.

Additional Water Supply Discussion:

(1) A comment was made that PFRA is being geographically prejudiced since some programs available on the prairies are not available here.
(2) It was noted that in the Creston area the investments in water system have been made by the users. It was argued that they should not be left out of programs. It was noted that they also supply domestic users.

Are you accessing any existing public funding source for water supply?

Responses:
(1) No funding for Crown range lands. The question of whether this program would apply to rangelands was raised.
(2) It was noted that some funding was available in the past. The City of Cranbrook adopted a spray irrigation system about 20 years ago that the Federal Government supplied about 20% of the funding for. This program was very beneficial for agriculture. Fairmont has a similar program about 20 years ago. In the intervening years, no other projects of this nature have been developed in the area.
(3) A question was raised about whether the program was focused on drought or not. RM indicated that although some of the funding was directed to drought issues on the Prairies, the remainder is earmarked for infrastructure.
(4) RM noted some funding for community pasture development was available about 20 years ago.
(5) Someone recalled that funding to put a ramp into a lake for access has been made available. A few minor projects of this nature had received some funding.

Are there information gaps with respect to agricultural water supply needs in your area?

Responses:
(1) Most people don't know what 500 gallons per day is. Water licenses for domestic users do not guarantee quality or quantity and many domestic users do not recognize this.
(2) When a new license is issued, there is often no communication with existing users of that source. In some cases, the new amount licensed would not be available or would limit the amount available to other users.
(3) Comment. Frost protection requires a considerable amount of water. That water just leaches into the ground. Need to use other methods.
(4) The amount of water used by livestock on crown land is not known. There are no rights for these uses at present. However, it was noted that the BC Forest Service is supposed to put licensing in place to ensure that there is enough water for Crown lands. It was also noted that licenses are hard to get now, especially mass applications. It was suggested that a blanket license for Crown lands might be a solution. It was noted that a few years ago, there had been a request to list all sources of water and the number of cattle on each unit.

Should more information on how to manage water be available?

Responses: (1) Very few people [in the tree fruit industry] measure soil moisture. There is a huge amount of waste. Education is a major need.

BREAK

Major Issues:

Issue	Initial Tally	Vote
Water on Crown land for irrigation.	7	8
Irrigation water restrictions / public perception	1	1
Allocation / License for Livestock	2	1
Availability / Distribution for Irrigation	8	6
Domestic water and quality	3	1
Riparian Health / Ecosystem	5	2
Availability of Groundwater	4	2
Urban / Rural Conflict	3	3
Water Use Efficiency	2	2
Groundwater information lacking	2	0
Education to manage water use better	2	3
Loss of Access	0	0
Fish	0	0
Deterioration of Infrastructure	0	1
Initial Tally: if 0, then not mentioned in the tally of the issues identified at the beginning of the meeting *Votes: each participant had three votes.*		

The top issues were identified as:

1. Lack of water for livestock on range. (8 votes).
2. Availability / distribution of irrigation (6 votes).
3. Riparian health / ecosystem (5 votes).
4. Urban / rural conflict (3 votes).
5. Education on managing water use better (3 votes).

Potential solutions identified included:

1. Separation of domestic and irrigation supplies.
2. Explore groundwater resources. There is considerable land that could be put into production if water were available, but no one in agriculture can take the financial risk of drilling a dry well. Would like to see (a) exploration of groundwater supply potential and (b) proving of the resource by drilling wells.

WRAP UP

Did we address all the issues?

Responses: Yes. Comment: only two out of about 15 commodity producers present, although the issues are likely to be similar.

Did we address groundwater and surface water issues?

Response: Yes.

Are there other issues?

Responses:
(1) Because we don't have a PFRA, we have nobody to administer such a program.
(2) It was suggested that this could be done through commodity groups.
(3) It was noted that there is problem going through commodity groups. It would likely result in a large group of other commodity groups not participating.
(4) It was agreed that program administration would be a big issue.
(5) It was suggested that this could be contracted out.
(6) It was suggested the meeting summary be posted on the internet site.

ANALYSIS OF AGRICULTURAL SUPPLY ISSUES IN BRITISH COLUMBIA

NATIONAL WATER SUPPLY EXPANSION PROGRAM

NOTES FOR SKEENA/PEACE/CARIBOO CONSULTATION MEETING
November 15, 2002 – 10:00 A.M. to 12:00 P.M., PST
Civic Centre
Room 201
855 Dominion St
Prince George, B.C.

FACILITATOR: Russell Merz, Golder Associates Ltd.

NOTES: Nancy Elliott, Golder Associates Ltd.

ATTENDEES: *Attached*

REGIONAL WATER LICENSING

Russell: How much water is demanded by agriculture? Is there a correlation between licensing and water use?

Tom: Difficult to get irrigation licensing in Cariboo due to allocation.
- need to use water more efficiently
- introduction of fisheries protection act creates difficulty getting license for large water withdrawal from tributaries.

Russell: Is it important to know how much water each commodity needs?

A) Types of infrastructure needed to supply agricultural water
- **dams**
- **should this program address these structures?**

Tom: Problems for owners of dams/structures, provincial staff available for inspection of dams has drastically reduced; therefore no advice for landowners.

Dan: 3 – Phase power an issue.

Tom: Physical geography of the country – water resources away from area where water is needed. This leads to:
- large pumping costs
- storage
- diversion

Paul: Poor quality water is an issue for supply sources – now have to address the high cost of treating it, and look at new technology.

Brett: In Peace region no irrigation, what other issues?

Dale: Issues are keeping cattle out of creeks: need fencing, wells, storage
3 Phase power – not an issue in Peace now but in dry years may be an issue.

Peter: Advancement in technology available to users – whether using water efficiently.
Do we have enough storage capacity – Yes, conserve water use later.

What are the constraints, do we need to increase water supply?

Peter: No idea of groundwater potential in Cariboo – major potential or use.
Good capability for industry to grow – short on irrigation and water supply (storage).
Funding would encourage a change to low labor input systems – pivots.
Move out of inefficient systems to efficient systems.

Dan: Constraint – lack of storage (dugouts) and delivery of water so that it is clean and efficient.

Jim: Great potential for growth in cattle/calf numbers in the region – shortfall is pasture and range and protecting water on pasture and range.

C) Public funding sources

Jim: BCCA Livestock Program - Producers apply for 25% funding on farm, riparian fencing etc.
Locally – Fraser/Nechako Riparian protection maximum $8000.00 – on farm only.

Dan: Livestock water usage has historically not been licensed on crown and private land – DFO indicates water needs to be licensed = stumbling block accessing funding.

Tom: There is now more inter-agency involvement.
Limits development of use of water
- people unwilling to get together to build joint systems
- usually one land owner – one intake
- organize as group of people to develop more ambitious projects
- MOF holds licenses for community.

Brett: On farm & crown funding sources?

D) Are there information gaps?

Tom: groundwater

Joan: surface water – lack of gauging stations.

Tom: Hydrology information for larger systems is available. Need to know more about smaller systems.

How to allocate water licenses – hire University co-op students to gauge smaller systems that have limited data.

10% of mean annual flow in streams – fisheries requirement.

Requirement of Canadian Environmental Assessment Act (CEAA) – if applying for funding of a large well delivering more than 83g/min would require CEAA environmental assessment - costly.

Paul: Peace R. Watershed Council – there will be data.

E) Accessing any existing public funding sources.

Jim: Funding sources for various areas, but focused on environment and on partnering with other organizations. Will forward information to RM.

Paul: Regional board providing funding for studies in the Peace River Regional District.

BREAK

	Score
1) Irrigation water availability (source, quantity, licensing)	6
2) Livestock water availability	4
3) Knowledge about water supplies	5

4) Drought supply (storage) 0
5) Water quality (source & impacts) 1
- water quality to agriculture from other uses e.g., pulp mill
6) Competition with other users (water export) & resources 2
- e.g., fish
7) Cost/capital to develop supplies 7
8) On farm potable water 2
9) Multiple use (e.g., hydro IPP) 1
10) Efficiency/Compensation 2
11) Extension/Education (irrigation knowledge) 1
12) Cooperation water use (optimize use) 2
- EA could be dealt with as a group
- Solution to #6

Don: Important to understand hydrological cycle effects of other industries e.g., forestry & logging – clear cuts affect availability of water.

Jim: Chilanko R. – not individually logging or agriculture but it was also due to forest fire.

Solution Identification

Dan: Part of cost is time and timeliness – a lot involved – knowledge of what needs to be done to pursue from start to finish.

Paul: Key issue – so many Ministries involved in governing water use. Recommendation – one lead ministry to streamline the process.

Tom: Head butting in the Ministry – cooperation with other agencies. Fisheries issue, navigable waters.

Brett: Funding for livestock & irrigation, all top 4 issues tightly linked. Money available to hire consultant – on farm review to determine efficiency

Question Wrap-up, Issues?

Dan: Flood control and beavers – permission to remove beaver dam – cooperation will help.

Need to know how to address issues, where to get information.

Are all the community groups in the region represented?

Terry: Forestry greenhouse – Peter & Jim will provide Russell with names to contact.

Tom: Greenhouses have generally been located where groundwater sources are.

Did we address surface & groundwater?

Paul: Government agency need license for surface water no license for groundwater.

Questions/Comments?

Paul: Timeframe?

Russell: Summary consultation – December 9th
Advisory committee – January
3 year program 2003 – 2006.

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ANALYSIS OF AGRICULTURAL SUPPLY ISSUES IN BRITISH COLUMBIA
NATIONAL WATER SUPPLY EXPANSION PROGRAM

NOTES FOR OKANAGAN CONSULTATION MEETING
November 18, 2002 – 1:00 P.M. to 3:30 P.M., PST
Manteo Resort
3762 Lakeshore Road
Kelowna, B.C.

FACILITATOR: Russell Merz, Golder Associates Ltd.

NOTES: Remi Allard, Golder Associates Ltd.

ATTENDEES: *Attached.*

INTRODUCTIONS

- Comments by individual denoted by initials

REVIEW AGENDA

- Workshop to discuss issues for funding
- $50 M remaining for Canada, plus $10 M already designated for prairies

RM: asked for each participant to identify top three issues relating to water supply in agriculture and to write these down on a piece of paper before starting discussions

- These answers collected by RA for discussion later

Relative quantity of water used for agriculture?

JA: Indicated additional water resources available from lakes in Okanagan Valley

TP: Indicated water monitoring report (metering) within SEKID resulted in 10 % water consumption reduction.

RM showed slide with distribution of water licenses by region in the province, divided between irrigation and other uses. The proportion of agricultural licenses is very large for the Okanagan.

TV: Asked to clarify distribution is not quantity but percentage of licenses.

RM: Clarified data shows % of licences, not quantity used. Agricultural expected to be larger consumer (77% of licences issued)

IS NEW INFRASTRUCTURE NEEDED?

JA: Indicated Lake Country is planning significant infrastructure improvements as distribution system is outdated.

WM: Indicated many water supply dams in upper watersheds along Okanagan Valley need upgrading and safety reviews.

TV: Indicated something about inputs such as diesel fuel?

TP: Everybody needs upgrades as most purveyors have not utilized adequate capital works replacement planning.

WHAT ARE CONSTRAINTS IN OKANAGAN?

WM: Competitive water use between aquatic demands and irrigation demands.

RM: Min. of Sustainable Resources now doing studies for minimum flow requirements for fish.

TP: Ministry can take 5% of flows during drought. Concerned about climate change and sustainability of long-term water supplies to determine “drought” but rely on government services to allow for forecasting and planning ahead of drought occurrence.

BB: Off stream water licensing is an issue.

- Legal access to off stream water (permits & licensing)
- Need money (grants) to develop small water supplies for cattle away from riparian areas
- This could be bigger issue outside of Okanagan

LL: Perception by others is that agriculture is using majority of water. Not necessarily true but fisheries stakeholders strongly believe this.

WM: Competitive water demand between domestic, agricultural and industrial, etc. Low cost for Agricultural water must be maintained.

TV: Difficulty in forecasting in future if loosing climate stations due to cut-backs.

IS ANYONE GETTING ANY PUBLIC FUNDING?

- Apparent that if not local government (Infrastructure grants), then funding not available
- Nobody aware of other funding available

HB: Grape growers, south end of valley low precipitation this year, concerned about availability of water, particularly small supplies (systems) dependent on groundwater as lowered groundwater levels. Difficult to get surface water licenses.

Does wine industry have a plan for growth in the valley and corresponding projection for water needs?

HB: No, just studies being done regarding water use on site, but generally agreed in wine industry that water shortage exists and will get worse.

TV: Back to Lake Country issue- why not use water more efficiently? Metering consumption and user fees based on consumption will improve water use, management and efficiency.

JA: Agreed that metering, management etc., will be of benefit, but #1 issue is cost of water to agricultural producers. Lake Country needs infrastructure upgrades but does not want to pas on costs to agricultural users.

TV: Cheapest water is water already in the pipe, development of new supplies and extensions of infrastructure for growth are very expensive. Management, conservation, efficient use, are important.

LL: Lake Country is not addressing any of these issues, i.e. urban vs. agricultural vs. efficient management.

TP: Cannot get off topic by focusing on agricultural vs. urban needs/competitive use. Water quality requirements for agricultural and domestic use are different. Cannot twin systems.

RM: Competition for water supply has been a common issue in all workshops.

IS WATER QUALITY AN ISSUE?

HB: In wine industry elevated metals in groundwater is an issue in south Okanagan.

WM: Agreed, plus high iron content, nitrates elevated but not an issue yet for agriculture in Okanagan.

TP:Turbidity is an issue as clogs filters, which is a maintenance issue.

ST: output of this report has to address on-site (on farm) works to be implemented (comment not in response to a question and changes direction of discussion).

JA: Agriculture users generally say water quality not an issue, but clogging from turbidity is a real problem.

Anyone aware of public funding for studies as opposed to infrastructure improvements?

BB: Agriculture Environment Initiative partnering initiative exists.
- (Various discussion about what is covered under this endeavor).

BREAK – 15 mins.
- during break RA & RM establish master list of issues based on submission of three issues from each attendee given prior to starting workshop
- master list included
    1. Groundwater availability
    2. Infrastructure Rehabilitation
    3. Competitive water use
    4. Water Quality
    5. Surface water availability
    6. On farm water management/conservation
    7. Off farm water management/conservation
    8. Cost of water
    9. Governance
- resume discussions regarding appropriate coverage for each item in list
- some changes made (RM has final sheet)

TV: The report issued from this study could be used down the road for further studies, so we need to get all opinions and identify all issues, even though they may not currently be priority issues.

WM: Agriculture community could implement water conservation – need some research to support Best Management Practice (BMP) for application.

EACH attendee asked to cast three votes for most important issue (item on list) by placing a dot next to that item

RM reviewed list to rank listed items based on number of votes (dots) for most important issue (most dots) to least important issue (least dots)

RM: Has master list and rankings

PC: BCFGA now implementing climate station(s) for monitoring.

TP: Metering good for a lot of issues. Great to have in drought situation.

TV: Environmental farm planning another critical issue not really represented in list.

BW: Surprised water quality is not an issue.

WM: Metering of consumption leads to pricing water as a commodity, which leads to trading and valuation of competitive uses for water (Not necessarily good).

HAVE WE REPRESENTED ALL OF AGRICULTURAL COMMUNITY?

- No rep from Cattlemen Association nor Hay Growers Association

ST: Concerned that PFRA in BC will direct $ to primarily to Peace River area (where PFRA is active in BC).

LL: Nice to be in room with people focused on broader platform than aquatic issues (which seem to predominate in BC).

HB: Does anyone have emergency/contingency plans for extreme shortages?

TP: SEKID does but based on forecasting from government (now a reduced commodity). SEKID issued quotas for growing season and metered consumption.

JA: Lake Country 6-7 hours from source to demand, can make allocation decisions while water is on the way.

RM: Out of time, general closing remarks.

ANALYSIS OF AGRICULTURAL SUPPLY ISSUES IN BRITISH COLUMBIA
NATIONAL WATER SUPPLY EXPANSION PROGRAM

NOTES FOR THOMPSON REGION CONSULTATION MEETING
November 19, 2002 – 10:00 A.M. to 12:00 P.M., PST
AAFC Research Station
3015 Ord Road
Kamloops, B.C.

FACILITATOR: Russell Merz, Golder Associates Ltd.

NOTES: Nick Sargent, Golder Associates Ltd.

ATTENDEES: *Attached.*

Notes are not intended to be verbatim. *Italicised* were added by NJS during transcription.

Quantities of surface/ groundwater used for this region, how important is it to know how much?

Consensus	Very important
R-M	Don't know how much is used.
Delta Irrigation	Single biggest user is irrigation.
R-M	Indicates not the case.
Delta Irrigation	Surprised by numbers *Note: does that mean the numbers are wrong or Delta has skewed view of water use or is it that we only see the use that's on a water licence whereas they see the actual use.*
Victor Piva	Why is all water recorded (i.e., none available)?
Joyce Keller	Normally allocation is by duty not requirement.

Mike Edwards	Confusion about license use as recorded by WLAP, old domestic licenses may now be used for livestock.
Mike Edwards	Re the numbers shown for usage (% distribution) the storage figure seems to be on the low side.
Ron Smith	Storage is needed to effectively irrigate through the year.
R.M	Explains how water use was calculated. Some licenses may not be fully utilized.

What constraints does this region face?

Joyce Keller	Many stream reaches are dry *(due to overuse and practice of placing wells adjacent small streams)* and hence need storage.
Andrew Petersen	Stock watering needs storage; however, many stream reaches/ sections do not have areas amenable to storage.
Joyce Keller	Salmon River dry *(at Falkland)* due to public pressure…wells next to streams.
Ron Smith	Comment that all the problems are not new and that WLAP has, as long ago as 20 years, been issuing shut down orders on licenses to try and protect streams.
Ted Van der Gulik	As dams age their allowable storage is being reduced to keep them safe… hence storage capacity overall is being reduced.
?	Many users of dams may not be paying for that service, particularly recreational cabin owners getting the benefit of impoundments created by ranchers. To replace dams the engineering *(and general study costs)* exceed the construction costs *As so many additional studies tagged onto the dam design.*

	Along the North Thompson there are 4-5 dams with wood pipes that are now at end of their 50 year life span. Now dam inspectors are getting 'itchy'. Previous government just used to take them out of service. Liability issues are a big concern (anything over 6 ft considered to be a large risk).
Ron Smith	Old dams did not have any fish passage provision in their design. The new ones must have and this drives up cost too.
Karen Rothe	Three things she sees as critical: - Changing hydrograph *due to climate and also logging/ development practices;* - Land use pressures…population growth; and, - Independent power users.
Mike Edwards	Constraints in our *(Interior)* watershed. Freshet moved ahead by couple of weeks due to logging. If the ditches can't get the freshet then storage can't be filled during freshet.
Joyce Veller	DFO *(or provincial fish people?)* has application to secure water for Adams and Seaton system. This is to provide flow for anadramous species. It will mean other potential users are out of luck and irrigation may not be allowed during certain times of the year.
Ron Smith	DFO are trying to correct an old wrong.
Karen Rothe	There are *(technical*) problems establishing what the actual fish flow requirements are.
Joyce Veller	Is it possible to use a Section 44 Order in Council to preserve water for agriculture?
Ted V-G	Hasn't really worked to date as it requires both levels of government to work out how things should be done.
Ron Smith	At a high level, need to resolve *(water use)* conflict between the two levels of government.

Ted V-G	Watersheds need to be planned so that agriculture is allocated a certain amount of the available water. Lots of ALR land no use as it has no water associated with it
Arne Raven	Need to establish our need right now and in the future or pressure from down south will take it before we know what we need/have ***(this was an underlying theme in both P-G and Kamloops).***
Ted V-G	There is a Canada wide database to address the issue of water usage. It has data from across Canada and anyone can access it. NWRI are running it for the Feds. Is it possible for this program to link with it or to transfer funding between the two?

Other than dams what other infrastructure issues are out there?

Tim	Conveyance and water systems presently leak.
Joyce Keller	Get so cattle aren't wading in streams also there is a ditch sealing system *(to stop ditch bottom leakage).*
Ted V-G	Don't even know how much ditching is present in this area so can't tell what the loss might be.
Ted Moore	Loss from ditch base not necessarily a "loss", it provides soil moisture.
All	General discussion about ditch losses being in the wrong place and inefficient.
Ken McDougall	It's a big problem when it's not wanted.
Ron Smith	We need flow measurements and measurements of application and use.
Andrew Petersen	This would be a large cost.
Mike Edwards	What about joint *(shared)* systems.
R.M.	These systems are difficult.

Graham S	Groundwater is a big black box *(don't know much about its use or its availability).*
Arne	It would be a solution to winter feeding. However cost of dry holes is prohibitive *(Hence more information would be good).*

Are there water quality issues

Paul Devic	Many lakes in the area have poor water quality (declines over the year due to alkali) affects agricultural production.
Ted V-G	On-farm system efficiencies could be realised.
? Paul Devic	Moving pivot system much more efficient than spray guns but cost an issue.
Karen Rothe	Will the report be divided into technical and process issues (the latter tax incentives, loans, funding, programs etc) Will there be recommendations for Federal - provincial harmonization of regulations
R.M	May not be directly applicable to this report.

Are there any funding opportunities available?
(In general consensus was BC is under funded/ programmed compared with other provinces or those under PFRA jurisdiction)

Mike Edwards	Hydro developers are looking for opportunities…maybe ranchers/ hydro people could do projects jointly (See MacDougall comment).
Joyce Keller	During good years why can't the farmers use excess flows.
Ted V-G	A seasonal license policy would allow production of 1 or 2 crops before water use stopped to maintain fish flows.
Joyce Keller	Water release plan needed.
Ken MacDougall	Problem with involving Hydro providers is that eventually they want all of the flow and the farmers get nothing or farming becomes secondary.

Joyce Keller	Issue of duty and license… some are over licensed… we need to get to equitable water distribution.
Mike Edwards	Another reason why we need a database.
Ralph Michell	ALR is troublesome, but in fact a lot of it is unuseable (no water).
Ted V-G	Regarding the ALR, it comes down to economics…more economical (or better economics) to put in a 40 lot subdivision and pay for water supply than for farming. However, bottom line is that if there's no water nothing will happen in certain areas.

Is there funding availability for water projects?

David Borth	Partners such as Ducks Unlimited…there is not much funding available for the area. They wanted PFRA to extend into BC so that their members could benefit from some of the PFRA programs…There are many other pressures these days (on water use).
R-M	There is a lack of information regarding both need and supply.
Graham S	We have gone backwards in terms of funding.
Andrew Petersen	BC does worse than other areas of Canada.
R-M	Even the definition of a drought is unclear.
?	A lot of creeks are now dry and production is down 25% to 50%.
	Participants PLACE DOTS
Mike Edwards	Comments re excess water use.
Paul Devic	Getting a new or amended water license is a large problem. We need the process defined. *We did FRBC assessments for the entire province…what about a "WRBC" assessment of the same kind.*
Andrew Petersen	Works cannot proceed until a license is received.

Brian Nuttall	License requirement (for govt. to issue) is 140 days. However, if there's not enough data the license is delayed and the onus is on the potential licensee to get the information.
Ted V-G	The licenses will take way longer to get than any funding so there will be a problem *(implementing the program).*
Arne Raven	Other groups fighting amongst themselves often hold up his applications (particularly Indian Bands).
Victor Piva	He sees a problem that 100% of water is licensed but it's apparently not being used.
David Borth	The most important thing (in terms of spending potential monies) is a needs analysis *(presumably with availability)* so that anything that is done in the future is sustainable.
Joyce Veller	Water supply is on the table for treaty negotiations.
Arne Raven	The playing field is not level in this issue.
Karen Rothe	There is always a cross-jurisdictional issue in use of water *(a problem).*
David Borth	(AGAIN) yes absolutely we need a needs analysis.
Ken MacDougall	Yes, it would save money *(in the long run).*
Menno Schellenberg	Ginseng growers use is, in fact, pretty low.

Issues were ranked with top three chosen

Paul Devic	All the issues brought up *(ten??)* are almost equally important and deserve funding / addressing.

ANALYSIS OF AGRICULTURAL SUPPLY ISSUES IN BRITISH COLUMBIA
NATIONAL WATER SUPPLY EXPANSION PROGRAM

NOTES FOR FRASER VALLEY CONSULTATION MEETING
November 22, 2002 – 1:30 P.M. to 4:00 P.M., PST
MAFF Agriculture Centre
1767 Angus Campbell Rd.
Abbotsford, BC

FACILITATOR: Russell Merz, Golder Associates Ltd.

NOTES: Christy Wright, Golder Associates Ltd.

ATTENDEES: *Attached.*

- INTRODUCTION - Round Table
- AGENDA
- MEETING RULES
- BACKGROUD & OVERVIEW
- 3 ISSUES - On Stickies
- OUTCOMES
  - Final report February 2003

Do you know how much H_20 is being used/available?

Marion: Commodity vs regional - differences, farmer specific

Dave: We only know pieces - we don't know!

Russ: Only surface H_20 is licensed - groundwater is not

Narinder: From prov. database so it may not be agri-specific and multiple uses are not included

Russ: Also many licences are old
Only some streams are gauged - the others are estimated

Water supply constraints

- Volumes - timing
- Quality - respective to commodity (i.e. washing veggies)

Dist of Kent release to H_20 once finished or recycled, especially into fish bearing streams

- Competition for uses - delicate balance esp. in aquifer areas (e.g. Chilliwack, Abby, Langley)

Dist of Kent - RR has well-point - if surrounded by agriculture - water allocation and quality

- Cheaper to pump groundwater vs. GVRD supply
- Over use (conflict between users)
- Some draws - covered under CEAA

Narinder: Groundwater legislation, but has not been proclaimed (or how to enforce)

Dave: Irrigation quality vs. processing quality - i.e. Cloverdale food safety, irrigation

Ted: Should farmers pay where GVRD already supplies?

Russ: Competition for H_20 with special interest groups, i.e. fish (instream flow needs) fish screen requirements

Dist of Kent

- Climate change compounds the problem of competition - streams drying up
- Streams drying up where historically this never happened

Frank: Abby irrigation provides habitat - would otherwise be dry streams

Marion: All H_20 from N. of mountains - this also has hydro competition

Cornelis: Threat to agriculture - i.e. reflooding the Sumas

Types of infrastructure?

Dist. of Kent:

Maintenance of irrigation systems - if collector system - if fish get in then DFO will then want compensation - user conflict

Narinder: ARDSA gone now - it is up to individual/municipal.

- Each municipality has own approach

- Need one group to coordinate
- 4 levels don't coordinate with each other (Fed/Prov/Munic/Farmer)

Dave: A very long history
- Range of types
- No problem with finding problems to fix - new or old

Frank: If H_20 available can supply the agricultural industries - i.e. - dairy - herd size, chicken - more barns
- Can we use gravity fed H_20?

Narinder: Education required - use of byproducts - conservation, efficiency of use

Accessing existing funding?

Dave: In Delta, development cost charges (DCC) are being levied with each new/expansion permit - cost charges (i.e. $/ha) - but then obligated to provide services still have to pay water use fees

Marcel: DDC's - not working the way they should

Frank: Greenhouses requesting larger quantities but where does this come from?

Ted: Irrigation - convenience system - drawing too much and scheduling issues
- Need to monitor use (efficiency, amount)

Dist. of Kent:
Water security (NAFTA)

Parm: How much are we wasting??

Narinder: Some $ used to be available - should be researched

Frank: Efficient systems - need good quality

Mary M: Greenhouses - storage - purification

Marmeet: Problems with using rain H_20 - impurities
- Timing for supplementing H_20
- Info gaps - $ to use recycling

Ted: Water resuse, recycling - opportunities to do this in lower mainland

Marmeet: Can do some recirculation especially where disease is a problem

Information gaps?

Marion: We need process and coordination - funding often does not come to this

Andrew: How much is there? Inventory using GIS.

Ted: We know some info on groundwater - no requirement.

Frank: DFO & Ag. Canada should get together to understand needs
- So far has been confrontation

Narinder: H20 available but is not right here for use
- Pumping system for lower mainland (old study)
- Fish can't survive H_20 shortage
- Whereas farmer can get H_20 from elsewhere
- Need coordination

Dave: Yes, lots of info gaps

Funding sources available?

Ted: Fraser Basin - high competition
- Land base
- What irrigation
- Needs in agriculture
- H_20 needs
- Opportunities for federal funding

Frank: Taxation

Dedar: Universities

Parm: Investment Agriculture
- Funnel funds for specific projects
- Enviro enhancement

Cornelis: No $ for H_20 management right now in Investment Agriculture

BREAK

#2 - 10 - 1 Availability (volume/timing)
#1 - 16 - 2 Quality of supply H_20 instream
#3 - 11 - 7 Competing interests A - instream B - Other Resources C - Urban/Agriculture
8 - 4 Ch Farm Efficiency
4 - 5 Infrastructure development $
2 - 6 Information
3 - 8 Mutual understanding
9 Mechanism for G.W. decisions

Parm: No flexibility in DFO

Ted: (D of K) - "No net loss"

Dave: Groundwater - no legislative body governing

Cornelis: No documentation regarding where/how much ground H_20

Narinder: Information available but <u>not</u> required

Dave: $ for getting H_20
- Cost may △ between municipalities even through all H_20 from GVRD

Narinder: Rewards and compensation - on farm efficiency reward

Mutual Understanding - must lead to policy development

All issues addressed, groups represented?

Marion: Connection with Hydro production

Andrew: Likely not Ag-Hydro issue! (small scale) - opportunity to access information

Mary/Margaret: Floriculture not represented, but likely same issues

Cornelis: Issues can change tomorrow, so must be cognisant of this.

- Expansion of municipal systems
- Education and promotion for upgrades (rewards)
- Tie with food safety
- Infrastructure - develop added sources/efficiency
- Nutrient, management - some $ available (integrate)
- Testing for quality for surface H_20
- Flooding - upgrading existing facilities
- Land development above agricultural Lands, runoff
- Legislation - compliance and enforcement
- Need joint fed/prov.
- Treatment systems (w/infrastructure) i.e. ultraviolet to treat coliforms

Targeting $

- From DFO
- Partnering - cost share w/competing interests
- Tax benefit for WQ (re riparian buffer) i.e. CREP program
- Expand existing planning for Agriculture for 7C - municipality applies for $ - reward & recognition
- Economic Diversification (regional) - cost share

- Opportunity to review and comment on draft
- MAFF - Will give preliminary findings on Tuesday meeting

- Delivery mechanism - BC Invest. Ag. Found - can split from there

ANALYSIS OF AGRICULTURAL SUPPLY ISSUES IN BRITISH COLUMBIA
NATIONAL WATER SUPPLY EXPANSION PROGRAM

NOTES FOR VANCOUVER ISLAND CONSULTATION MEETING
November 22, 2002 – 10:00 A.M. to 12:00 P.M., PST
Beban Park Recreation Centre
Room 7/8
2300 Bowen Road
Nanaimo, B.C.

FACILITATOR: Russell Merz, Golder Associates Ltd.

NOTES: Pat Brisbin, Charcoal Creek Projects Inc.

ATTENDEES: *Attached*

Arnis
Water Allocation Reports
has a list of those done for Island locations
there may be a map showing locations

Michael
mentioned potential irrigation demand study done with Erich Schulz (may be at Abbotsford BCMAFF office)

INTRODUCTION

What are needs?

Greg: Insufficient storage

Jim: In CRD metered 1million m3/yr from municipal system
1% of ag use ?, certainly < 2%
other ag use unrecorded

Ted: Can they link metering to crop and location etc (to assess unit irrigation demands)?

Jim: May be some confidentiality concerns?

Licensed use?

Eric: Use does not equal licensing, not by a long shot.

Gerry: They use 100 gpm from well 24 hrs/day during summer.

Wayne: In Cowichan Valley more than half of irrigation (agricultural) use from groundwater.

Jim: Lack of planning for agricultural water needs.

Wayne: Englishman River study, agriculture was invited to participate.
Crofton pulp mill, dam, nothing allocated to agriculture.

Wayne: Other (non-ag) uses getting majority of water allocation.

Arnis: Temporal distribution, not total annual flows, is the problem.

Randy: Are suitable storage sites available?

Arnis: Many short streams with few lakes.

Jim: Distribution an issue on Saanich Peninsula, ag demands not in one block.

Ivar: Greenhouse operations can store own runoff.
Alberni Valley 6 feet rain per year.
once farm drained (ditches) have created fish habitat.
no communication with DFO, they claim to have 1st rights to water.

Wayne: Drainage system discharge can be stored.
but on farm storage costly, loss of land.

Greg: If create pond, need license for security.
Then pay for water which is not needed every year.

Ivar: Need storage.
Need rules to protect the farmer.

Erik: If licensee improves efficiency, need to ensure that excess water is available.

Cdn company sold to US company, licenses turned over to Americans.
If not making beneficial use, water should be allocated to someone who will use it.

Wayne: Company sold land but did not have licenses (or portion of license) transferred.

Randy: Are existing rights beneficially used?
Joint / common works, do not always have clear agreements about how works are to be operated.

Do not always have proper easements.
Lack of proper agreements, easements can be a constraint.

Arnis: Need water use plans.

Ted: With a water use plan, agriculture cannot always make beneficial use of water (within 3 yrs).

More water should be reserved for agriculture.

Section 44 in Water Act

Randy: Have mechanisms, do not use them often enough.

Jim: Emerging demand for instream flows (fisheries and aesthetics).
This leads to reduction in available water.
In urban setting, water quality is deteriorating, failing septic systems.

David: If cattle moved out of streams, then need license to water but stream is fully licensed.

Infrastructure - inadequate or failing?

Greg: Help should be available for design of storage.

Erik: Improvement Districts originally set up to help farmers.
North Cedar ID does not have specific agricultural rate and does not want to deal with farmers

Jill: More land is being allocated to on farm storage.

Wayne: Established dams (dam sites) where land has subsequently been subdivided now have problems with some land owners not wanting any flooding

Randy: If pipeline is licensed there is a mechanism to expropriate an easement if an easement cannot be negotiated.

However, right to flood land subject to decision by Lieutenant Governor in Council

How much water is there left to allocate?

Larry: Not much available in summer, therefore typically looking at storage or groundwater.

Is groundwater available?

Jim: Planning done for residential, commercial
no planning for agriculture

Chris: Looking at groundwater for Chemainus, would free up surface licenses.
Allocate former surface rights to agriculture.

Jill: Trying to identify areas being irrigated.
Did inventory of land use, cropping.
Funding; some from Ducks Unlimited and Environment Canada.

Ted: If information is GIS-based, would now have the data available to look at efficiencies, impact of scheduling changes.

For individuals, government concerned about total volume and peak withdrawal rates, therefore if more efficient could irrigate more land (if land is available).

Jim: Reuse of water by agriculture.

Greg: Farmer does not have voice in resource management decisions.

Ted: Information gaps should be added to list.
Good inventory information is needed.

Wayne: Public and local govts do not appreciate the needs of agriculture, and how water availability will increase yields.

Add education to the list

Arnis: Costs, part of cost of infrastructure.

Erik: Costs of water North Cedar at $0.77 /m3 vs Saanich at $0.17 / m3

Ted: Add efficiency, on-farm scheduling.
Do not forget reuse / recycling.

Ivar: Govt should make aquifer mapping available.
Reduce the risk of drilling a dry hole.

Greg: Must preserve our quality.

Jill: Water quality issue with shellfish fishery.
Need good quality is surface discharges to ocean.

Larry: Ag does not have a voice.

Ted: Ag has a voice, but no one is listening.

Wayne: Need more discussion about groundwater regulation.

Larry: Need fed impact assessment if withdrawal is greater than 75 l/s.

Ted: Asked who would want their wells licensed, at some cost to them.
Gerry: Depends on what it means.

Erik: No

Jill: Agriculture would lose out to other interests.

Ted: But licensing would protect your interests

Robin: Administration listens to politicians who listen to number of votes therefore agriculture does not get a fair shake.

Larry: Which projects are ready to go?

SOLUTIONS

Ted: Have done study on impacts of improved efficiency.

Ted: Provincial program.
Different pots of money.
Different groups to apply for money.
"Planning money" to Reg Districts, etc.
"Improved efficiency money" directly to farmers.

Jim: People are concerned about the "position" of agriculture in the overall scheme of things.

Gerry: Better efficiency does not help someone with no water.

Robin: Need allocation for future use by agriculture.
Otherwise no expansion in agriculture.

Greg: Money for planning should come from other sources, this money should be for farmers.

Ted: For "competing uses" what specific things should be funded?

Erik: How to prevent farmers from being "outvoted".
Need fairness legislation.

Gerry: If farmers get the money it could give them an advantage over other interests.

Erik: Does not need money, needs the means to get access to water.

Jim: Diversity; different areas may have different problems.
Need to create partnerships through planning

ANALYSIS OF AGRICULTURAL SUPPLY ISSUES IN BRITISH COLUMBIA
NATIONAL WATER SUPPLY EXPANSION PROGRAM

NOTES FOR MAFF WATER CONNECTIONS MEETING
November 26, 2002 – 9:00 A.M. to 10:00 A.M., PMT
Banquet Room, 2nd Floor
Legacy Sports Centre, Exhibition Park
#4 - 3270 Trethewey Street
Abbotsford, B,C.

FACILITATOR: Russell Merz, Golder Associates Ltd.

NOTES: Pat Brisbin, Charcoal Creek Projects Inc.

ATTENDEES: *Attached.*

Kathleen Z: If water quality is not on the top 4 list will it be ignored

Mark Y: Allocations, procedures are an issue.

Russ M: Land and Water BC does not collect the information needed to process an application, it is the applicant's responsibility.

Pete F: Will money be tied to a benefit / cost analysis?

Ted M: What are the benefits to agriculture compared to the benefits to other users?

Bill W: Other needs (i.e. on-farm processing) are important?

Russ M: Is improving domestic supplies part of expanding agriculture?

Mark Y: Projects should be prioritized, do not want funds gone with good high priority projects waiting to be done.

Ted V: Different pots of money will be available, may be different "programs" for different regions.

Greg T: What about areas which do not have irrigation districts or improvement districts?

Rick V: Program does not represent a large amount of money.

Dave M: Need better water management in some areas to “save’ agriculture rather than think about expanding agriculture.

Jill H: If producer groups manage funding areas without strong producer organizations may lose out.

Graham S: Consider a larger investment to create a sustainable program (annual funding would be returns from investment).

ALDA program was popular with producers.

Mark R: Do not want a complex administration for a relatively small amount of money, want a simple delivery mechanism, do not want high ratio of administration.

Ron B: Expect “industry delivery”, BCAC to administer.

In areas or for groups where there is not a strong organization, MAFF staff could take a lead role in completing applications.

Other significant sources of funds (Ducks Unlimited, Fish organization ??, Conservation and Nature Trust groups).

Would like to see APF funding levered into larger projects, procure additional funding.

APPENDIX II

REGIONAL WORKSHOP ATTENDEES

FRASER VALLEY WORKSHOP ATTENDEES

Harmeet Atwal	BC GreenhouseGrowers Association
Parm Bains	Fraser Basin Council
Philip Bergen	Agriculture & Agri-Food Canada
Neil Calver	City of Chilliwack
Frank Flokstra	BC Chicken Growers Association
Mary-Margaret Gaye	BC Greenhouse Growers Association
Raman Gill	BC Raspberry & Blueberry Council
Marcel Grashof	BC Pork Producers / BC Ag Council
Peter Heide	City of Chilliwack
Cornelis Hertgers	BC Milk Producers Association (Dairy)
Maria Jeffries	BC Rasp/B.C. Blueberry/FV Strawberry/Cole Crops
K.K. Li	City of Surrey
David Melnychuck	BC MAFF
Russell Merz	Golder - Abbotsford
Mark Robbins	BCMAFF
Marion Robinson	Fraser Basin Council
Narinder Singh	Land and Water BC
Dedar Sihota	Blueberries
Kim Sutherland	BCMAFF Regional Ag.
Andrew Upper	Land and Water BC
Ted Westlin	Dist. of Kent Agassiz/Agassiz-Harrison Mills
Christy Wright	Golder - Abbotsford
Frank Wright	City of Abbotsford

KOOTENAYS WORKSHOP ATTENDEES

Gary Barrett	Golder - Castlegar
Phil Burk	BC Forest Service
Alan Edwards	Waldo Stockbreeders
Gordon Edwards	Waldo Stockbreeders
Bill Coy	Windermere District Farmers Institute
Jodie Kekuk	BC Forest Service
Don Low	BCMAFF
Russell Merz	Golder - Abbotsford
Cam McDonald	FLA
Mike Malmberg	MAFF
Faye Street	East Kootenay Cattlemen's Association
Steve Street	Rancher & KIA
Bill Truscott	Cherries Kokanee

PEACE / CARIBOO REGION WORKSHOP ATTENDEES

Roland Baumann	BC Cattlemen's Association
Joan Chess	Fraser Basin Council
Terry Dever	BCMAFF
Peter Fofonoff	BCMAFF
Brett Henschel	AAFC-PFRA
Floyd Jackson	Prince George Cattlemen's Association
Richard Martens	DMS Farms
Dale Martens	DMS Farms
Russell Merz	Golder - Abbotsford
Tom Muirhead	Land and Water BC Inc.
Nick Sargent	Golder - Kamloops
Paul Solmes	Peace River Reg. Dist.
Jim Tingle	MAFF
Daniel Weaver	Sinkut Mtn Cattlemen

OKANAGAN WORKSHOP ATTENDEES

Remi Allard	Golder - Kelowna
Jack Allingham	District of Lake Country
Brian Baehr	BC Agriculture Council / Ag Environment Fund
Hans Buchler	Independent Grape Producers
Pierre Calksi	BC Fruit Growers Association
Lorne Davies	Genstream Environ. Consulting
Phil Epp	WLAP (Env. Stewardship Div)
Lisa Jarrett	Okanagan North Growers Co-op
Lynn Laschuk	Lake Country Watershed Roundtable
Wray McDonnell	MAFF
Russell Merz	Golder - Abbotsford
Cliff Normand	Okanagon Falls Irrigation
Toby Pike	South East Kelowna Irrigation District (SEKID)
Stan Swales	Okanagan North Growers Co-Op
Dale Thomas	INAC
Steve Thompson	BC Agriculture Council
Ted Van der Guilik	MAFF
Bruce Wilson	Water Supply Association

THOMPSON REGION WORKSHOP ATTENDEES

David Borth	BC Cattlemen's Assoc.
Peter Boshaird	Monte Hills Livestock Assoc.
Klaas Broersma	AAFC (Kamloops)
Paul Devic	Heffley Creek Irrig. District
Kevin Dickenson	Land and Water BC
Mike Edwards	Land and Water BC
Ellen Hockley	Horse Council BC
Charlie Keller	Squam Bay Livestock
Joyce Keller	A. Ag.
Russell Merz	Golder - Abbotsford
Ken MacDougall	Peterson Creek Water Users Com
Ralph Michell	South Kamloops Stock
Ted Moore	MAFF
Brian Nuttall	LWBC
Victor Piva	Pinantan Stock Assoc

Arne Raven	Pinantau Stock Assoc
Karen Rothe	MSRM
Nick Sargent	Golder - Kamloops
Menno Schellenberg	Assoc. Ginseng Growers
George Smith	LWBC
Graham Strachan	MAFF
Ted Van der Gulik	BCMAFF

VANCOUVER ISLAND WORKSHOP ATTENDEES

Larry Barr	Land & Water BC
Patrick Brisbin	Charcoal Creek Projects Inc.
Randy Cairns	LWBC
Arnis Danbergs	LWBC Inc.
Erik Duivenvoorde	Imperial Pacific Greenhouses
Wayne Haddow	MAFF
Chris Hall	Dist of North Cowichan
Jill Hatfield	MAFF
Mary Hof	Dairy Producer
Gerry Hof	Dairy Producer
Robin Holmgren	Cedar Farmers Alliance
Bruce McNab	McNab Ent.Ltd./McNab Farms
Russell Merz	Golder - Abbotsford
Avar Rage	BC Hot House
Jim Sandwith	Saanich Peninsula Agr. Comm.
David Tattam	Island Farmers Alliance
Ted Van der Gulik	BC MAFF
Greg Wynalow	Wynalow Farms Ltd.

APPENDIX III

WORKSHOP PRESENTATION

APPENDIX IV

NON-WORKSHOP INPUT

Non-Workshop Input:

Glen Lucas	BC Fruit Growers Association
John Baldwin	Land and Water BC
Jason Elliot	Rancher, Rock Creek, BC

ANALYSIS OF AGRICULTURAL SUPPLY ISSUES IN BRITISH COLUMBIA
NATIONAL WATER SUPPLY EXPANSION PROGRAM

NOTES FROM BC Fruit Growers Association CONFERENCE CALL
December 3, 2002 – 10:30 to 11:30 A.M

FACILITATOR: Russell Merz, Golder Associates Ltd.

NOTES: Russell Merz, Golder Associates Ltd.

ATTENDEES: Glen Lucas BC Fruit Growers Association
Joe Sandina - Grower Summerland - 21 acres apples
Alan Paton - VP Oliver - 6 acres high density apples
Penny Gamble - Lake Country - 34 acres apples
Russell Merz - Golder Associates Ltd.

Introduction

Russell Merz (RM) provided an introduction to the NWSEP workshops.

- Lake Country - public
- Naramata - power outage/boil

Federal Advisory Board
- discussions - focus is on on-farm irrigation upgrades
- assessment of current agriculture - what we use, impact replanting program use
- 18,000 acres tree fruit in BC - steady supply of water needed
- microjet/drip being used on replant areas
- know effects
- use more efficiently
- cooling water needed in hot season
- metering was implemented at South East Kelowna Irrigation District (SEKID) - don't know how effectively this worked?
- 10 gpm/acre is needed with drip systems, resulting in a 50% saving

- want full amount when need it!
- Security of supply vs. increased urban demand - peak use demand

Have an idea of water use in the area for fruit growers, as the Okanagan Valley Tree Fruit Authority has records on irrigation systems and scheduling

Grape growers - all have put in overhead sprinkler systems - not sure why. The higher exposure leads to higher evaporative losses

Suggestions for NWSEP Program:
- money for upgrades - $1500/2000/acre is required to convert from sprinkler to drip
- should include criteria that encourage reduced water use

A concern that overhead systems are still needed, primarily for cooling/frost protection. When frost protection is needed, the use is at 100% of allotment for the full time period, and all growers need it at the same time - true peak demand.

Regional District of Okanagan-Similkameen (RDOS) - one of many that make agricultural water available for urban
- OVTFA study - 70-80% of water resource for agriculture - need to re-assess this!
- See water inventory/water balance/water use allocation process - how are fisheries interests incorporated? In-stream flow needs.
- Competing interests/demands for limited recourse are a critical issue.

- Various groups have been citing outdated reports/studies relating to water use in region. Some say 60/40 agriculture/urban
- need census on agricultural water use, including types of irrigation systems in use
- "Growing with Care" is an Agriculture Environment Partnership Initiative program that involves set-up of weather network stations, primarily for use in pest/disease forecasting but the evapotranspiration would help scheduling, as would local soil moisture monitoring.

- Concerns about how all members pay - only few get benefit
- Membership have questions about the water meter program and how to recover costs?

- Is the weather station project is more critical to horticulture industry due to weather/ precipitation deficit?
- tree fruit/grapes - if water is not available for l year, may lose 8-10 years due to damage

As a case in point of the importance of water, the recent Summerland municipal election was centered on two issues - 1) water, 2) roadways.

- The water issues were quality - turbidity, and quantity - no lake water being used, so dependant on the Trout Creek watershed. However, there are minimum instream flow needs for fish in Trout Creek, but only 200 fish were counted. The reservoir leaks - so the impact on groundwater if lined is important. The Thirsk dam requires an upgrade

- Current use, trends, planning are all important water issues - need inventory
- Concern - $1M to upgrade - reason to upgrade is turbidity - not an issue

- Segregate money - tie engineering money to agriculture, not urban use

- Promotion/publicity is required - money from NWSEP ?
- Some focus on social, economic, environmental benefits is needed
- $5/10K should be directed to public relations for each project

- residential uses odd/even day exemption for lawn watering - significant public relations is needed for residents to understand the implications of drought.

- "Water" - need public awareness of limitations of the natural resource.

APPENDIX V

MINUTES FROM THE EXPERT ADVISORY GROUP MEETING

NATIONAL WATER SUPPLY EXPANSION PROGRAM

ANALYSIS OF AGRICULTURAL WATER SUPPLY ISSUES
IN British Columbia

EXPERT ADVISORY PANEL MEETING

10:00 AM to 3:30 PM
January 13, 2003

MAFF Building, Abbotsford
(1767 Angus Campbell Rd)
Abbotsford

Agenda

1.	**Welcome:** • **Introductions & meeting rules** • **Project background and scope** • **Meeting objectives and outcomes**	**10:00**
2.	**Presentation of initial findings**	**10:20**
3.	**Discussion of regional issues**	**10:50**
4.	**Presentation and discussion of proposed program (Potential activities and projects to be included)**	**11:40**
	Lunch Break (catered)	*12:00*
5.	**Presentation and discussion of proposed program (cont'd)**	**12:45**
6.	**Wrap-up NWSEP recommendations.**	**1:45**
	Break	*2:00*
7.	**PFRA 2001, 2002 Drought questionnaire**	**2:15**
8.	**Adjourn**	**3:30**

ANALYSIS OF AGRICULTURAL SUPPLY ISSUES IN BRITISH COLUMBIA
NATIONAL WATER SUPPLY EXPANSION PROGRAM

NOTES FOR THE EXPERT ADVISORY GROUP MEETING
January 13, 2003 – 10:00 A.M. to 3:30 P.M., PST

MAFF Building, Abbotsford
(1767 Angus Campbell Rd)
Abbotsford

FACILITATOR: Russell Merz, Golder Associates Ltd.

NOTES: Pat Brisbin, Golder Team

ATTENDEES: *Attached.*

Notes are not intended to be verbatim.

- Dave Kiely - description of NWSEP program
    - "Reduce The Risk of Future Water Shortages"
    - Drought Mitigation Measures ($80M)

    - $60M NWSEP
    - $20M National Land & Water Information Service (NLWIS).
    - Early tax deferral (Income from Sale of Cattle).
    - Crop insurance administrative flexibility.

    - <u>2002 Funding:</u>
    - RWDP Sask $4M
    - Regional Pipelines and strategic studies - Alberta 3.5M
      Manitoba 1.5M

    - Strategic Studies - N.S. $300K
      N.B. $300K

    - National Drought Impact Study

    - Strategic Studies
    - GW Exploration
    - Phase I plus mapping, geophysics, building 5 Regions
    - Water Supply Options

- National Scoping Study $400K
  - BC
  - Prairies
  - Ontario
  - Quebec
  - Atlantic

- Key Issues to be addressed from scoping studies
- How are they addressed now
- Gaps in terms of response

- Treasury Board Submissions
- Announcement in April (program in place)
- June or July for program start up

R. Merz Summary of issues and constraints identified and prioritized in the regional workshops held in November 2002.

Peter Waterman
inefficient use by domestic users
easier for them to make changes than for orchardist to install new system

Russ: an example was related during one of the regional workshops
SEKID told farmers they would only get 80% normal supply
asked domestic users to cut back
agricultural producers took up the challenge, reduced below 80%
domestic users irrigated whenever allowed and use increased.

Lance:
individual increases efficiency, what happens to saved water

K. Dickenson:
could amend license, reduce dirty, increase acreage

Ted:
Victoria says. volume & peak withdrawal are key, not acreage in use

K. Dickensen:
essentially no information on actual use
off stream livestock watering big issue in Thompson

B. Baehr:
governance major issue

Russ:
how often is producer told no when applying for license?

Narinder: depends on source
Also, now must deal with other agencies (Water Mgmt used to be able to allocate w/o consultations in F.V. - streams said to be fully licensed by other agencies but no studies/information on source

Ted:
some/many producers don't bother to apply
More watershed planning
Proponent needs to do background studies but costly
This program could be big help
"reserve" for agriculture vs beneficial use rules

Bonaparte
Naramata } Case studies

Lemieux Creek - Kevin Dickenson

Was to be a model for working level allocation planning
This plan still in draft stage
some problems - i.e. how much for fish - this amount has changed during the study
many other systems - need to be studied

Narinder:
need data collection
gov't has no funds to do this
Russ:
allocation plans on Vancouver Island

Ted:
could use entire budget on data collection, program too short for data collection

APF Data Program - compile existing information, not much (if any) to collect new data.

Grant:
need the allocation planning @ operational level

Ron:
asked about allocation planning policy

Kevin:
MSRM - strategic level planning Trepanier Creek
working level - quantifies and deals with outstanding license applications
SRM doing planning for some streams

Kevin:
Island Plans
done by allocation technicians

Ted:
need local group to provide initiative (has been the case in the past)
Island plans (done in-house) - not "integrated" - MAFF not consulted, Ag. doesn't agree with some

Narinder:
need more joint efforts, agency corporation

Ted:
Black Creek, good example of integrated planning
built 2 dams
but new water went to fisheries
farmers didn't have money to get water for ag.
longer term perspective needed for agriculture

Stephanie:
did DFO people attend workshops?
water use planning process in B.C., BC Hydro starting consultative process

Russ:
process from new Water Act
started with biggest licenses, 22 held by B.C. Hydro

Kevin:
are supposed to review 20% licenses/yr
not possible, don't have resources to do review
Hydro studies - being handled by Victoria staff

Stephanie:
A good model

Al Kolhut:
Incentives for Hydro if they reduce use

Narinder:
some benefit for Hydro
other licenses don't have the incentive
Ag needs water @ same time Hydro needs water (or can't afford to release extra water)

Russ:
Different approach to different regions or commodities?

Brent - if different needs, yes
Ted - No
Grant - No

Al Kolhut:
Information portion includes technology transfer? - Russ - yes

Brian Baehr:
Education and awareness
In Ag Env. Partnership few education and awareness projects alone, but portion of other projects

Ted:
Combine A & B (info gathering and dissemination and planning

Dave:
not 100% - 75%
other groups may have more money

Brian B.:
education and awareness @100%

Peter Waterman:
"Growing with Care" program
looking @ all aspects of production
could include water issues in this program
should provide technical assistance since gov't doesn't do it anymore
need continuity of consistency

Grant:
if program doesn't produce results, people may not bother

Ted:
who reviews projects

Peter:
for improved efficiencies through scheduling, need real time weather information

Al Kolhut:
central source of information (province wide)
have done studies for Land Commission, sitting in someone's files

Program delivery?
Who handles funding
Who makes the application

Ron:
Program cannot be accessed by gov't for "back filling"

Dave:
4 individual came forward, told they need legal entity to sponsor project

Ted:
province getting out of Water Users Communities, etc

Ron:
want plans to "living plans"

Kevin:
Nicola Lake Dam - only 2/3 storage available
need dredging but DFO demanding study (Burbot issue) $30,000

Russ:
Is the CEAA (Canadian Environmental Assessment Act process to be triggered)?

combine A & B (information gathering and planning)
who is eligible?
how would they apply?

Ted:
should fit in with other APF programs

Ron:
APB cost share money - BCAC Mgmt Committee

Phil Bergen:
would have to argue for something else

Dave:
want one stop shop

B. Baehr:
BCAC would be prepared to manage this program
would use same model, "sub" program for individuals

Brent:
application deadlines
evaluation process to rate projects?
feels should have a rating process to ensure money goes to the best projects

Ron:
have application deadline
if application greater than available funding, then rank

Dave:
need to cover key issues/target areas - let the applicants know what the target issues are

Ted:
with good program structure will have reasonable allocation of funds
(without having to rank applications)

Peter Waterman:
set criteria
fund applications which meet criteria until funding allocated

Ron:
if cost sharing is set right will only attract interested/keen applications

Brian B
have shifted allocations between program segments to reflect applications being received
can Fed gov't apply? - no
Provincial gov't - yes

Will Jolley
dam project
hydrology - peak/high flows
drought assessment
site conditions - geotechnical
all good storage sites taken
address known deficiencies
look @ raising dams to increase supply

Ted:
intake some assistance d/s of dam
need to release water in anticipation of needs
access to dam site (time required) can be a constraint
SEKID can open gates remotely

Brent:
Water needs for a community pasture

Lance:
Conveyencing losses

Russ:
Minimal ag. content

Ron:
Use cost share of upper limit to attempt to target ag. components of projects which include other groups
Ted:
Not in favour of money going to irrigation systems
Conversions are already happening
Key is the management of the system, more so then the type of system
drip w/o good management doesn't save water

Ron:
don't worry about total funding
if extremely high demand, if considered very important for this program could divert funds from other programs

Lance:
livestock watering during winter

Russ:
is "plan" req'd before capital funding?
improve conveyancing system
fix identified deficiency in a dam

Kevin:
as of April lst have 140 days to turn around application, includes referrals to other agencies
if deficiency of info from proponent, clock stops

Will:
need license
then permit (approval) to construct
then construction

Canadian Environmental Assessment Act
if federal trigger (federal funding is one of the triggers) need Env. Assessment
part of the process

Dave:
Western Diversification - proponent is responsible for CEA

Ron:
This issue has been dealt with before, will have to be addressed all across the country

Brett:
Exclusion list
Try to modify project so it becomes excluded

Ron:
Drilling well in Abbotsford aquifer - doesn't deserve funding
May be different if aquifer not well defined

Ted:
Help get water to the farm gate
But not the on farm irrigation system

Dave:
Does BC have an irrigation strategy

Ron/Ted - No
Brent:

1.5 X 10^6 ha of arable land is Crown Land

Dave:
interest in irrigation in other parts of Canada increasing
processors are demanding uniform quality, size, etc

Administration

B. Baehr:
would get lump sum "in trust:? Dave - No

Dave
so much each year, definite end to program
program design must accommodate this funding
need cost sharing between fed/prov

B. Baehr:
this format limits type of projects, limits benefits, impacts design of program

Will Jolley:
would there be a website

B. Baehr:
reimbursement or up front

Pritt:
progress payment
payments based on invoices

Lance:
25% may not be enough to promote some projects

Ron:
max for capital 50%
minimum to amount required to trigger action

Dave:
33% for infrastructure
total federal cash?

Ted:
can administrating groups reduce amount of funding, adjust cost share?

APPENDIX VI

CONTACT INFORMATION FOR WATER SUPPLY EXPERT ADVISORY GROUP

Provincial Consultation - Analysis of Agricultural Water Supply Issues

Expert Advisory Group Meeting - January 13, 2003

First Name	Last Name	Title	Organization	Address	Phone	Email
Brian	Baehr		BC Agriculture Council	Kelowna	250 763-9790	bebaehr@silk.net
Phil	Bergen	Marketing and Trade Officer	Agriculture and Agri-Food Canada	New Westminster	604 666-7794	bergenp@agr.gc.ca
Lance	Brown	Engineering Technologist	Agriculture, Food and Fisheries	Kamloops	250 371-6064	Lance.Brown@gems6.gov.bc.ca
Stephanie	Carroll	Senior Program Biologist	Fisheries and Oceans Canada	Vancouver	604 666-3662	carrolls@pac.dfo-mpo.gc.ca
Kevin	Dickenson	A/Land and Water Manager	Land and Water BC	Kamloops	250 377-7043	Kevin.Dickenson@gems4.gov.bc.ca
Grant	Henry	Resource Planning Specialist	Sustainable Resource Management	Victoria	250 356-8117	Grant.Henry@gems5.gov.bc.ca
Brett	Henschel	Head, Water Programs	AAFC-PFRA	Dawson Creek	250 782-3116	henschelb@agr.gc.ca
Will	Jolley	A/Head Dam Safety	Land and Water BC	Victoria	250 387-3263	William.Jolley@gems6.gov.bc.ca
Dave	Kiely	A/Director, North Alberta and BC	Agriculture and Agri-Food Canada	Edmonton	780 495-6365	kielyd@agr.gc.ca
Al	Kohut	Senior Groundwater Specialist	Water, Land, and Air Protection	Victoria	250 387-9465	Al.Kohut@gems7.gov.bc.ca
Alain	Moor	District Manager, Medicine Hat	Agriculture and Agri-Food Canada	Medicine Hat	403 526-2429	moora@agr.gc.ca
Karen	Rothe	Watershed Planner	Sustainable Resource Management	Kamloops	250 371-6242	karen.rothe@gems9.gov.bc.ca
Ted	Van der Gulik	Senior Engineer	Agriculture, Food and Fisheries	Abbotsford	604 556-3112	Ted.vanderGulik@gems8.gov.bc.ca
Peter	Waterman	Director	BC Fruit Growers Association	Kelowna		bcfga@bctree.com
Rod	Bailey		Golder Team	Saltspring Island		rbailey@saltspring.com
Patrick	Brisbin		Golder Team	Abbotsford		brisbin@rapidnet.net
Russell	Merz		Golder Team	Abbotsford	604 850-8786	rmerz@golder.com

APPENDIX VII

AGRICULTURE WATER SUPPLY LITERATURE AND INTERNET LINKS

Agriculture and Agri-Food Canada. 2002. PFRA Rural Water Programming in Alberta; Frequently Asked Questions, February 2002.

Agriculture and Agri-Food Canada. 2002. PFRA Rural Water Programming in British Columbia; Frequently Asked Questions, February 2002.

Agriculture and Agri-Food Canada. 2002. Rural Water Development Program. http://www.agr.gc.ca/pfra/rwdp_e.htm.

Agrodev Canada Inc. 1994. Water Supply and Management Issues Affecting the BC Tree Fruit Industry. Submitted to the Okanagan Valley Tree Fruit Authority. April 1994. 74 pp.

Atwater J., Groundwater Section. 1994. Groundwater Resources of British Columbia. Co published by BC Environment and Environment Canada. 200 pp. http://wlapwww.gov.bc.ca/wat/gws/gwbc/!!gwbc.html.

BC Ministry of Agriculture and Food. 2000. Irrigated Area in British Columbia; Irrigation Factsheet 550.100-1, Agdex #560. Revised September 2000. 4 pp.

BC Ministry of Agriculture, Food and Fisheries. 2000. Fast Stats; Agriculture and Food 2000. 23 pp.

BC Ministry of Agriculture, Food and Fisheries. 2000. South East Kelowna Irrigation District Demand Management Project. Resource Management Branch.

BC Ministry of Agriculture, Food and Fisheries. 2002. Census of Agriculture 2001 and Historical Comparisons; BC Summary May 2002. Statistical Services Unit, Policy and Economics Branch. 7 pp.

BC Ministry of Environment, Lands and Parks. 1996. Courtenay River Water Allocation Plan. Vancouver Island Region, Nanaimo, BC. 51 pp.

BC Ministry of Water Land and Air Protection. Offstream Watering to Reduce Livestock Use of Watercourses and Riparian Areas. Water Quality Factsheet. 7 pp.

BC Ministry of Water, Land and Air Protection. 2002a. Environmental Trends in British Columbia 2002. 64 pp.

BC Ministry of Water, Land and Air Protection. 2002b. Indicators of Climate Change for British Columbia. 48 pp.

British Columbia Cattlemen's Association. 2002. Livestock Management Water Stewardship Program. http://www.cattlemen.bc.ca/lmwsp.htm.

Canadian Environmental Assessment Agency. 2002. Environmental Assessments Under the Canadian Environmental Assessment Act. http://www.ceaa.gc.ca/

Coote, D.R. and L.J. Gregorich (eds.). 2000. The Health of Our Water—Toward Sustainable Agriculture in Canada. Research Planning and Coordination Directorate, Research Branch, Agriculture and Agri-Food Canada, Ottawa, Ont. 173 pp.

Environment Canada. 1993. Canadian Climate Normals, 1961-1990. Volume 1; British Columbia. Atmospheric Environment Service, Ottawa, Canada. 132 pp.

Kerr Wood Leidal Associates Ltd. 1990. Demand Management of Irrigation District Water Supplies in the Okanagan Valley. Summary Report and 6 Technical Working Papers.

Land and Water BC Inc. 2002a. License Statistics - Region by District. Water Rights Information System Database queried on November 7, 2002. Unpublished.

Land and Water BC Inc. 2002b. Information Sheet: Water License Holders Rights and Obligations. http://lwbc.bc.ca/water/surface.html.

Pacific Challenge Consulting Services. 1999. Nechako Valley Agriculture Reference Manual. Sponsored by the Nechako Valley Regional Cattlemen's Association.

Shady, A. 1989. Irrigation drainage and flood control in Canada. Canadian International Development Agency, Hull, Quebec. 309 pp.

Stephens, K.A., T. Van der Gulik, and C. Johnston. 1992. Demand Side Management; The Okanagan Valley Case Study. Presentation to the American Water Works Association 1992 Annual Conference.

Talisman Land Resource Consultants. 1984. Overview Study of Water Constraints Impacting Agricultural Development in British Columbia. Project No. 84-063. Submitted to the BC Ministry of Agriculture and Food and Agriculture Canada. 99 pp.

Tingle, J. 2002. Development of the Fraser / Nechako Riparian Program for the Prince George Area (2002-2004). Unpublished BC Ministry of Agriculture, Food & Fisheries document.

Washington State Department of Ecology. 2003. Agricultural Water Supply Facilities; Proposed Rule Amendments to Chapter 173-170 WAC. http://www.ecy.wa.gov/programs/wr/AWSF/awsfhome.html

APPENDIX VIII

SELECTED AGRICULTURAL STATISTICS BY ECONOMIC REGION AND TYPE OF FARM

Selected Agricultural Statistics by Economic Region and Type of Farm

Source: http://www.agf.gov.bc.ca/stats/index.htm
Based on data from the 1996 Census of Agriculture

Vancouver Island/Coast

Type of Farm	% of Farms	% of Farm Receipts	% of Farm Capital	% of Farm Area	Average Farm Size (acres)
Tree Fruit	7.86%	1.02%	5.90%	3.25%	20
Grain and Oilseed	0.00%	0.31%	0.97%	2.54%	512
Other Field Crop	4.58%	0.92%	4.39%	6.59%	39
Potato and Vegetable	6.15%	5.42%	5.03%	4.19%	32
Berry and Nut	2.88%	1.40%	2.29%	1.35%	22
Grapes	0.00%	0.26%	0.49%	0.21%	18
Greenhouse Vegetables	1.41%	2.58%	1.55%	0.38%	13
Other Crops (Specialty)	1.74%	0.70%	1.14%	1.95%	54
Floriculture and Nursery	8.26%	19.16%	7.20%	3.44%	19
All Other Crops	5.02%	3.23%	4.34%	3.91%	37
Total Crops	**38.64%**	**34.97%**	**33.27%**	**27.77%**	**34**
Dairy	5.32%	33.65%	13.96%	18.87%	168
Cattle	16.21%	4.82%	16.44%	25.98%	76
Hog	1.98%	2.06%	1.73%	1.24%	30
Poultry	3.08%	10.91%	2.72%	1.28%	22
Egg	5.39%	5.49%	3.98%	1.21%	11
Horses	13.77%	4.04%	13.45%	7.97%	27
Bees	1.37%	0.61%	0.91%	0.36%	12
Other Livestock (Specialty)	7.86%	2.08%	8.41%	8.48%	51
All Other Livestock	6.42%	1.41%	5.17%	6.88%	51
Total Livestock	**61.40%**	**65.07%**	**66.77%**	**72.27%**	**56**
All Farms *	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**47**

x Confidential

* Numbers may not add due to rounding.

Lower Mainland-South West

Type of Farm	% of Farms	% of Farm Receipts	% of Farm Capital	% of Farm Area	Average Farm Size (acres)
Tree Fruit	3.42%	0.30%	1.90%	1.07%	13
Grain and Oilseed	0.15%	0.06%	0.15%	1.47%	398
Other Field Crop	3.86%	0.94%	3.40%	4.19%	57
Potato and Vegetable	5.07%	5.89%	6.79%	10.44%	84
Berry and Nut	9.63%	10.02%	13.11%	8.06%	34
Grapes	0.18%	0.01%	0.13%	0.04%	8
Greenhouse Vegetables	0.98%	3.20%	1.54%	0.28%	12
Other Crops (Specialty)	2.60%	3.27%	2.46%	1.49%	22
Floriculture and Nursery	10.74%	18.30%	9.53%	4.04%	16
All Other Crops	1.98%	0.69%	1.67%	1.67%	34
Total Crops	**38.57%**	**42.64%**	**40.64%**	**32.71%**	**34**
Dairy	10.35%	23.08%	19.11%	26.58%	104
Cattle	16.03%	4.41%	12.15%	27.13%	69
Hog	1.61%	3.45%	1.75%	1.31%	33
Poultry	5.19%	16.03%	5.93%	1.93%	16
Egg	4.46%	6.74%	0.36%	1.16%	11
Horses	16.36%	2.45%	11.77%	6.36%	16
Bees	0.57%	0.06%	0.23%	0.12%	8
Other Livestock (Specialty)	4.01%	1.02%	3.18%	1.71%	17
All Other Livestock	2.90%	0.15%	1.69%	1.04%	15
Total Livestock	**61.43%**	**57.36%**	**59.36%**	**67.30%**	**45**
All Farms *	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**41**

Thompson/Okanagan

Type of Farm	% of Farms	% of Farm Receipts	% of Farm Capital	% of Farm Area	Average Farm Size (acres)
Tree Fruit	30.33%	25.14%	28.83%	2.82%	23
Grain and Oilseed	0.61%	0.37%	0.58%	0.63%	259
Other Field Crop	8.25%	8.42%	7.73%	3.87%	140
Potato and Vegetable	3.95%	2.43%	2.62%	0.56%	35
Berry and Nut	0.96%	0.19%	0.53%	0.06%	14
Grapes	2.53%	2.51%	2.91%	0.39%	38
Greenhouse Vegetables	0.32%	0.39%	0.19%	0.02%	9
Other Crops (Specialty)	0.66%	0.46%	0.37%	0.13%	28
Floriculture and Nursery	2.97%	8.46%	2.90%	0.34%	28
All Other Crops	1.98%	3.81%	1.24%	0.43%	54
Total Crops	**52.56%**	**52.18%**	**47.90%**	**9.25%**	**44**
Dairy	3.17%	12.52%	6.20%	2.63%	207
Cattle	19.42%	19.99%	28.10%	80.90%	1,039
Hog	0.59%	0.89%	0.43%	0.17%	69
Poultry	1.34%	4.82%	1.28%	0.22%	33
Egg	1.25%	1.80%	0.75%	0.14%	27
Horses	15.00%	3.98%	10.69%	4.02%	67
Bees	0.83%	0.38%	0.47%	0.10%	28
Other Livestock (Specialty)	3.32%	2.44%	2.63%	1.86%	140
All Other Livestock	2.58%	0.52%	1.62%	0.82%	79
Total Livestock	**47.50%**	**47.34%**	**52.17%**	**90.86%**	**477**
All Farms *	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**249**

Kootenay

Type of Farm	% of Farms	% of Farm Receipts	% of Farm Capital	% of Farm Area	Average Farm Size (acres)
Tree Fruit	8.35%	5.35%	5.19%	0.53%	17
Grain and Oilseed	1.20%	3.20%	1.89%	1.60%	353
Other Field Crop	11.65%	6.24%	9.81%	7.28%	321
Potato and Vegetable	4.99%	7.28%	2.81%	0.84%	44
Berry and Nut	1.13%	0.15%	0.55%	0.08%	19
Grapes	0.28%	0.11%	0.28%	0.04%	35
Greenhouse Vegetables	0.50%	0.54%	0.31%	0.07%	35
Other Crops (Specialty)	2.60%	1.18%	2.71%	5.07%	559
Floriculture and Nursery	4.57%	10.06%	2.66%	0.66%	41
All Other Crops	2.88%	x	x	x	x
Total Crops	**38.15%**	**34.11%**	**26.21%**	**16.17%**	**117**
Dairy	4.14%	17.82%	6.36%	3.92%	249
Cattle	30.04%	33.38%	47.10%	69.90%	612
Hog	0.85%	0.23%	0.43%	0.12%	35
Poultry	1.06%	0.87%	0.54%	0.13%	32
Egg	3.44%	2.75%	1.96%	0.66%	50
Horses	13.69%	5.24%	10.17%	5.33%	102
Bees	0.99%	0.60%	0.49%	0.09%	23
Other Livestock (Specialty)	3.30%	1.36%	2.02%	0.85%	68
All Other Livestock	4.43%	1.84%	3.08%	2.13%	126
Total Livestock	**61.94%**	**64.09%**	**72.15%**	**83.13%**	**353**
All Farms *	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**263**

Cariboo

Type of Farm	% of Farms	% of Farm Receipts	% of Farm Capital	% of Farm Area	Average Farm Size (acres)
Tree Fruit	0.50%	0.08%	0.15%	0.02%	25
Grain and Oilseed	0.67%	0.40%	0.53%	0.32%	345
Other Field Crop	15.73%	6.04%	10.31%	8.41%	255
Potato and Vegetable	1.62%	0.30%	0.62%	0.14%	59
Berry and Nut	0.39%	0.05%	0.27%	0.10%	184
Grapes	n/a	n/a	n/a	n/a	n/a
Greenhouse Vegetables	0.39%	0.71%	0.13%	0.01%	10
Other Crops (Specialty)	x	x	x	x	x
Floriculture and Nursery	2.23%	24.48%	4.04%	0.26%	88
All Other Crops	2.23%	0.65%	1.17%	1.14%	366
Total Crops	**23.76%**	**32.71%**	**17.22%**	**10.40%**	**312**
Dairy	3.62%	4.81%	3.80%	1.86%	369
Cattle	43.14%	51.95%	61.66%	80.34%	1,335
Hog	1.06%	0.30%	0.36%	0.16%	108
Poultry	0.78%	0.04%	0.11%	0.03%	33
Egg	1.00%	2.17%	0.61%	0.06%	38
Horses	16.85%	4.38%	10.05%	4.02%	171
Bees	0.45%	0.09%	0.15%	0.10%	148
Other Livestock (Specialty)	4.01%	1.70%	2.80%	1.50%	268
All Other Livestock	5.23%	x	x	x	x
Total Livestock	**76.10%**	**66.85%**	**82.72%**	**89.61%**	**844**
All Farms *	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**717**

North Coast

Type of Farm	% of Farms	% of Farm Receipts	% of Farm Capital	% of Farm Area	Average Farm Size (acres)
Tree Fruit	3.16%	x	x	x	x
Grain and Oilseed	1.36%	3.36%	1.36%	1.64%	183
Other Field Crop	13.07%	4.81%	10.26%	15.45%	200
Potato and Vegetable	11.27%	4.53%	10.61%	3.85%	52
Berry and Nut	2.26%	x	x	x	x
Grapes	n/a	n/a	n/a	n/a	n/a
Greenhouse Vegetables	1.81%	x	x	x	x
Other Crops (Specialty)	0.90%	x	x	x	x
Floriculture and Nursery	5.86%	14.19%	11.61%	1.52%	38
All Other Crops	6.31%	x	x	x	x
Total Crops	**46.00%**	**26.89%**	**33.84%**	**22.46%**	**95**
Dairy	4.06%	1.53%	2.92%	2.11%	79
Cattle	15.77%	16.78%	23.55%	45.64%	438
Hog	1.36%	0.62%	0.91%	0.39%	43
Poultry	n/a	n/a	n/a	n/a	n/a
Egg	8.11%	24.64%	6.86%	0.55%	10
Horses	13.52%	6.74%	13.09%	14.53%	163
Bees	1.36%	0.69%	0.60%	0.08%	8
Other Livestock (Specialty)	2.71%	2.21%	2.59%	1.29%	72
All Other Livestock	7.21%	6.76%	5.44%	6.69%	141
Total Livestock	**54.10%**	**59.97%**	**55.96%**	**71.28%**	**200**
All Farms *	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**151**

Nechako

Type of Farm	% of Farms	% of Farm Receipts	% of Farm Capital	% of Farm Area	Average Farm Size (acres)
Tree Fruit	0.11%	x	x	x	x
Grain and Oilseed	1.14%	2.51%	1.82%	2.18%	1,169
Other Field Crop	19.49%	7.74%	14.32%	15.83%	497
Potato and Vegetable	2.17%	0.66%	1.04%	0.23%	63
Berry and Nut	0.31%	1.18%	1.08%	0.14%	266
Grapes	n/a	n/a	n/a	n/a	n/a
Greenhouse Vegetables	0.11%	x	x	x	x
Other Crops (Specialty)	0.11%	x	x	x	x
Floriculture and Nursery	2.17%	11.07%	2.17%	0.21%	65
All Other Crops	3.20%	1.74%	2.28%	4.36%	830
Total Crops	**28.81%**	**24.90%**	**22.71%**	**22.95%**	**486**
Dairy	5.47%	25.47%	13.22%	7.65%	851
Cattle	43.30%	43.42%	51.50%	62.69%	881
Hog	0.52%	0.22%	0.28%	0.29%	335
Poultry	0.52%	0.02%	0.10%	0.01%	9
Egg	1.24%	0.10%	0.55%	0.12%	59
Horses	12.68%	3.13%	7.20%	3.74%	179
Bees	0.52%	0.12%	0.27%	0.04%	45
Other Livestock (Specialty)	3.30%	1.36%	1.94%	0.91%	168
All Other Livestock	3.51%	x	x	x	x
Total Livestock	**71.06%**	**73.84%**	**75.06%**	**75.45%**	**658**
All Farms *	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**608**

Peace River

Type of Farm	% of Farms	% of Farm Receipts	% of Farm Capital	% of Farm Area	Average Farm Size (acres)
Tree Fruit	n/a	n/a	n/a	n/a	n/a
Grain and Oilseed	15.69%	35.13%	20.67%	16.98%	1,228
Other Field Crop	24.58%	9.81%	13.63%	13.75%	847
Potato and Vegetable	0.61%	0.25%	0.21%	0.08%	136
Berry and Nut	0.11%	x	x	x	x
Grapes	n/a	n/a	n/a	n/a	n/a
Greenhouse Vegetables	n/a	n/a	n/a	n/a	n/a
Other Crops (Specialty)	0.06%	x	x	x	x
Floriculture and Nursery	0.66%	0.44%	0.26%	0.10%	191
All Other Crops	3.57%	3.60%	6.55%	0.05%	5,597
Total Crops	**45.28%**	**49.23%**	**41.32%**	**30.96%**	**1,216**
Dairy	3.40%	5.34%	3.57%	2.06%	685
Cattle	33.14%	34.46%	39.52%	39.23%	1,343
Hog	0.61%	0.96%	0.41%	0.21%	395
Poultry	n/a	n/a	n/a	n/a	n/a
Egg	0.17%	0.23%	0.16%	0.01%	58
Horses	10.70%	2.87%	6.06%	3.48%	368
Bees	0.55%	1.05%	0.42%	0.07%	129
Other Livestock (Specialty)	3.30%	2.82%	5.24%	2.77%	953
All Other Livestock	2.91%	3.01%	3.28%	3.71%	1,446
Total Livestock	**54.78%**	**50.74%**	**58.66%**	**51.54%**	**1,068**
All Farms *	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**1,135**