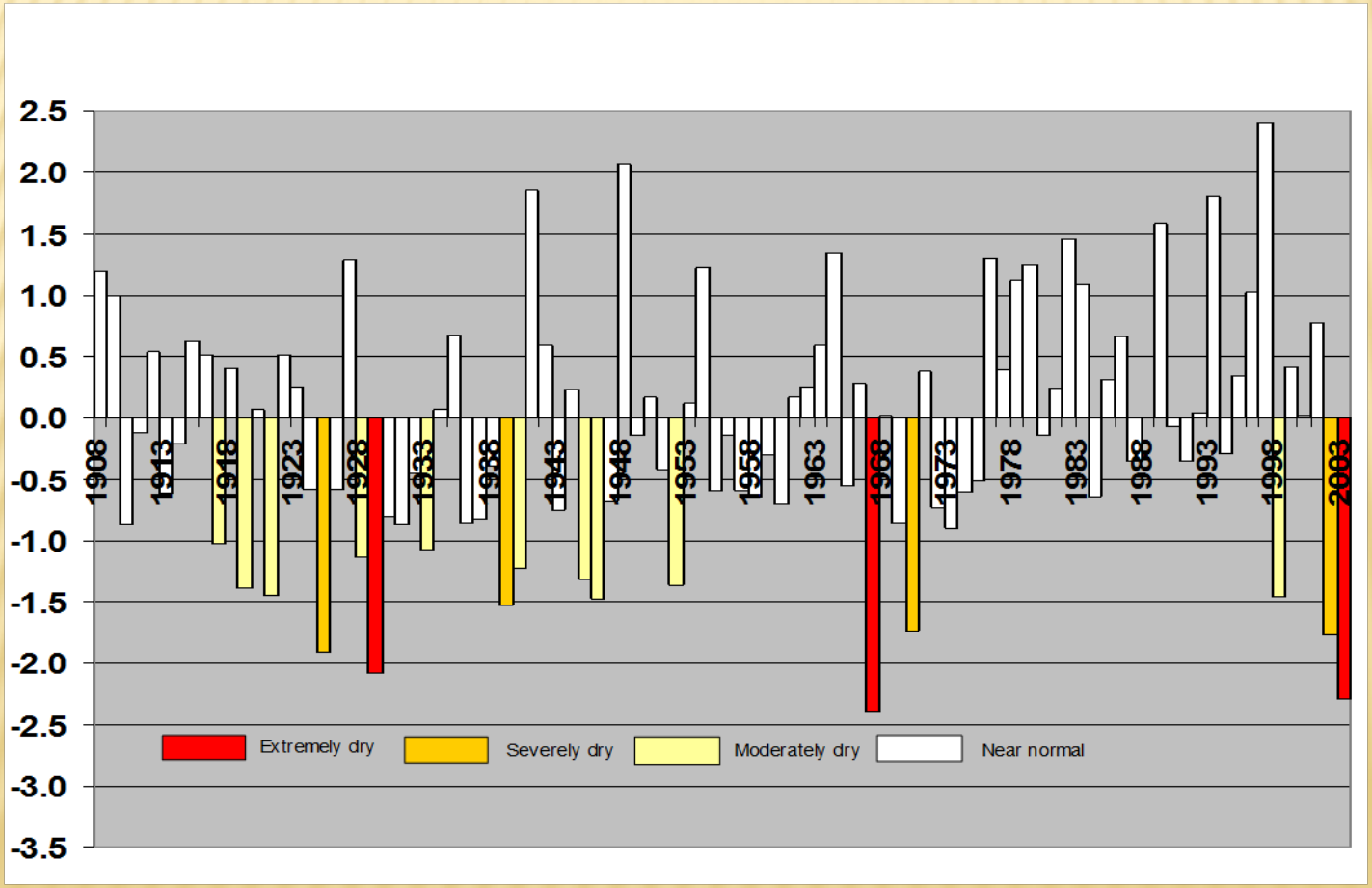
Modeling and Planning Strategies

Ministry of Agriculture

Ted van der Gulik, P. Eng.
Sustainable Agriculture Management Branch
BC Ministry of Agriculture

STANDARDIZED PRECIPITATION INDEX

3-month average departure from long-term mean precipitation (July-Aug-Sept)



Penticton Airport

PLANNING STRATEGIES NEED TO CONSIDER

Over 85% is Used for Outdoor Purposes:

- **~ 65% for Agricultural Irrigation**
- **~ 20% for Turf and Landscape Irrigation**

The Okanagan Water Resources will be fully allocated in less than 10 years

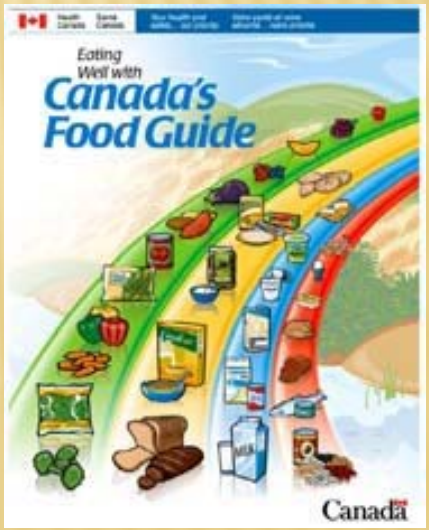
What do we want the Okanagan to look like in 50 years?

FOOD SELF RELIANCE IN BC

Foods Group	BC Consumption Million Kg's	BC Production Million Kg's	% Self Reliance
Dairy	1080	617	57%
Meat	467	298	64%
Vegetables (BC Grown)	764	331	43%
Fruit (grown in BC)	172	273	159%
Grain for Food	315	43	14%
Total – (Grown in BC)	2798	1562	56%
Fruit (not able to grow in BC)	310		
Vegetables (not able to grow in BC)	1		
Sugar	136		
Total - BC	3245	1562	48%

HEALTHY DIET

- If Canada's Food Guide to Healthy Eating is followed – BC's food self- reliance drops to 34%.
- 0.54 hectares of farmland is required to produce the food for one person for one year. (six city lots)
- For British Columbians, 2.15 million hectares of production is required, of which 10% or 215,000 hectares must be irrigated.
- Current estimated irrigated acreage in British Columbia is 190,000 hectares
- In 2025 British Columbia will require 2.78 million hectares, with a total irrigated area of 307,000 hectares – 92,000 hectare increase. (the ALR is over 4 million hectares)
- Farmers will need to increase production by 30% to maintain current level of self reliance.
- Increased production will be concentrated on lands with access to irrigation – typically close to urban centers.

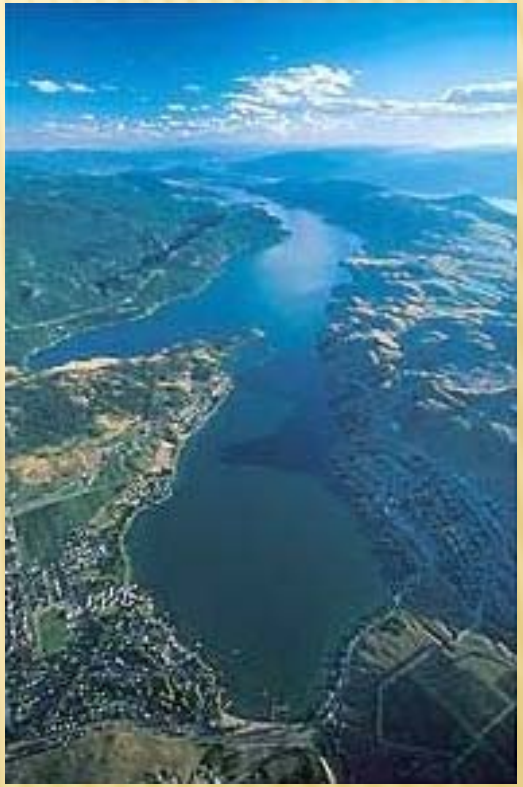


OKANAGAN IRRIGATED AREA

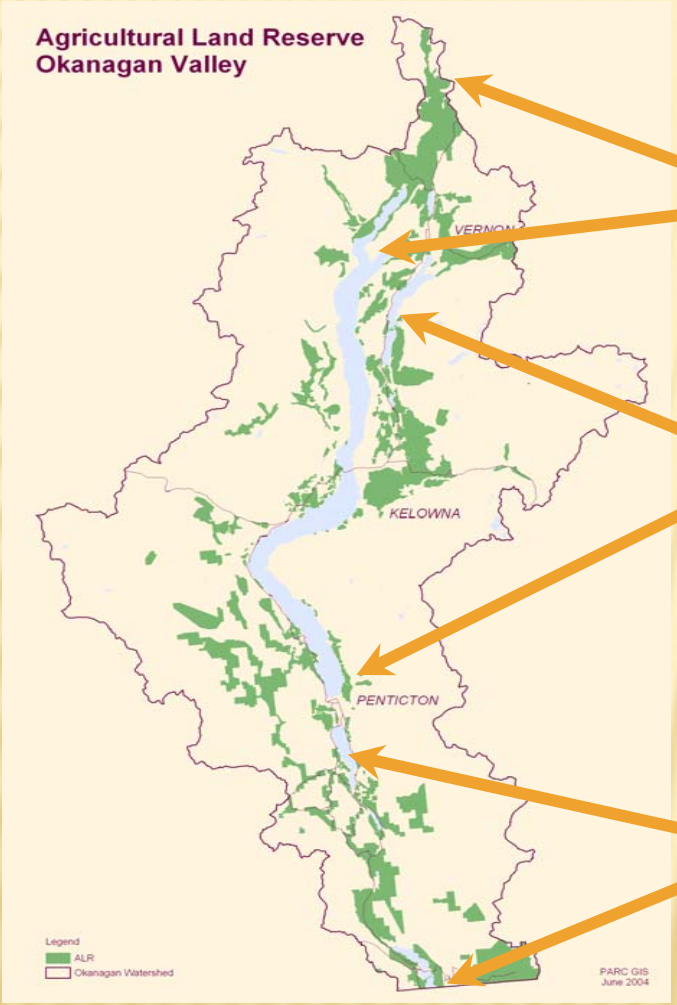
Current agricultural irrigated area in the Okanagan is 20,000 ha

Annual Okanagan water demand in a dry year for all uses is 210 million m3.

Fraser River flows under the Mission Bridge in June 2012 would supply this in 5 hours



OKANAGAN IRRIGATION SUPPLY



Northern Basin

- Peak flow rates 4.5 – 5 gpm/acre
- Annual requirement 16 – 26 inches
  400 – 650 mm

Center Basin

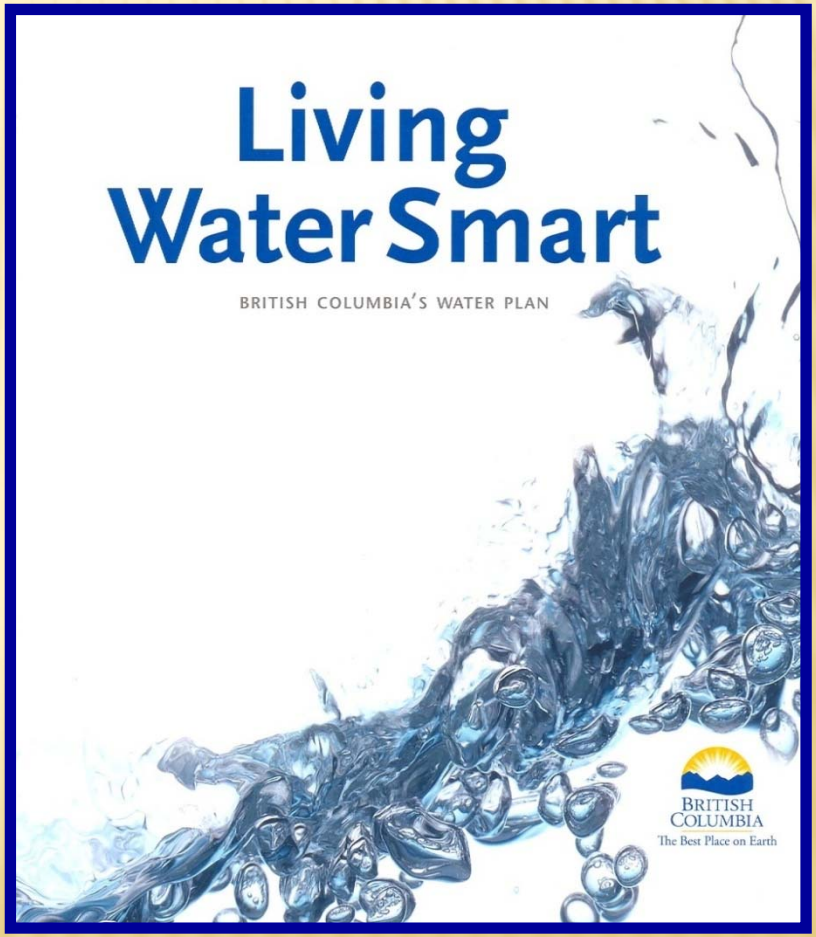
- Peak flow rates 6 – 7.5 gpm/acre
- Annual requirement 20 – 30 inches
  625 – 750 mm

South Basin

- Peak flow rates 8 - 9 gpm/acre
- Annual requirement 30 – 40 inches
  750 – 1000 mm

BRITISH COLUMBIA'S WATER PLAN

- Plan requires increase in efficiency of 33% by 2020.
- Reserve water for agriculture
- Measure and report large water use by 2012
- 50% of new municipal use will be achieved through conservation
- Establish a process for Watershed Management Planning



MODELING AND PLANNING COMPONENTS

- Based on an area or region – watershed
- Determine water supply – hydrology
- Determine use and needs
  - Land use
  - Recreational
  - Domestic
  - Environmental and fish

Biggest need is good data

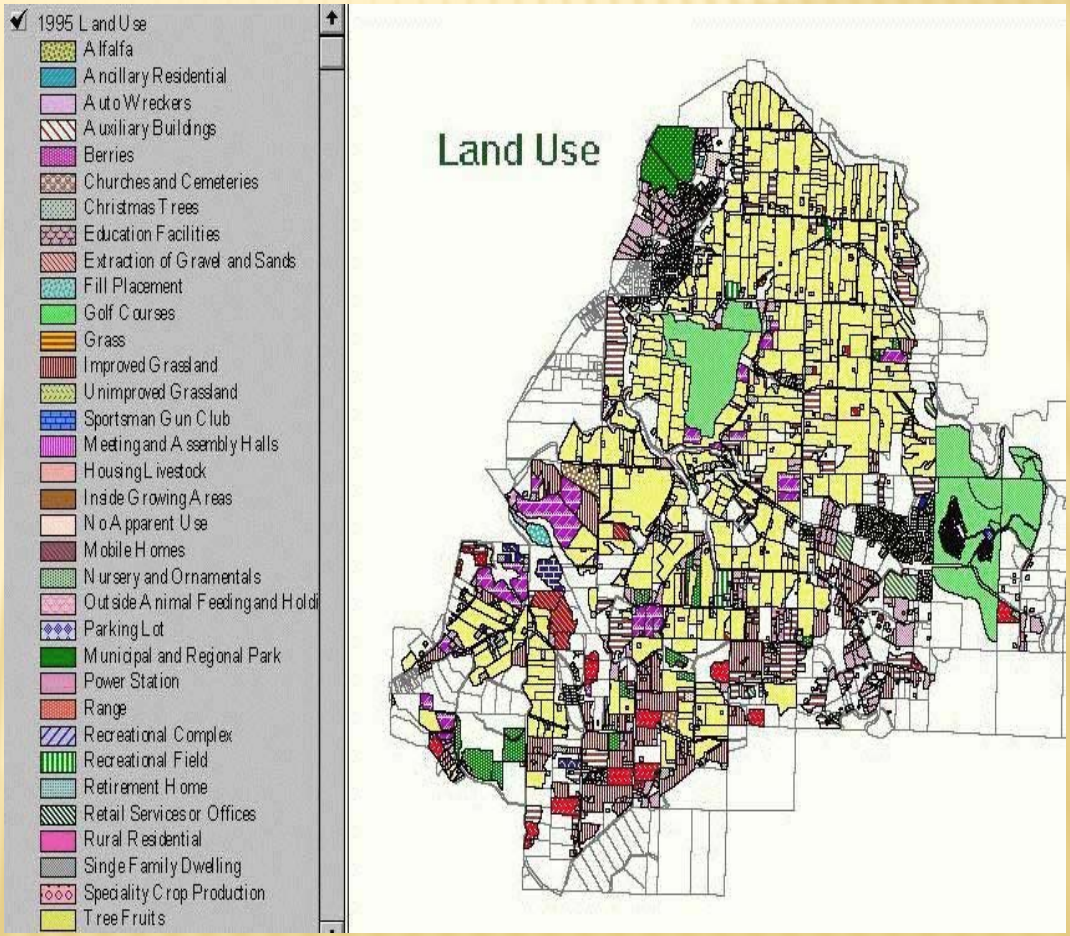
LAND USE INVENTORY

GIS is the tool that can provide much of the data requirements - spatially

Forms the basis of work done by Agriculture Water Demand Model And Okanagan Water Supply and Demand Study

GIS MAPPING - CROP TYPE

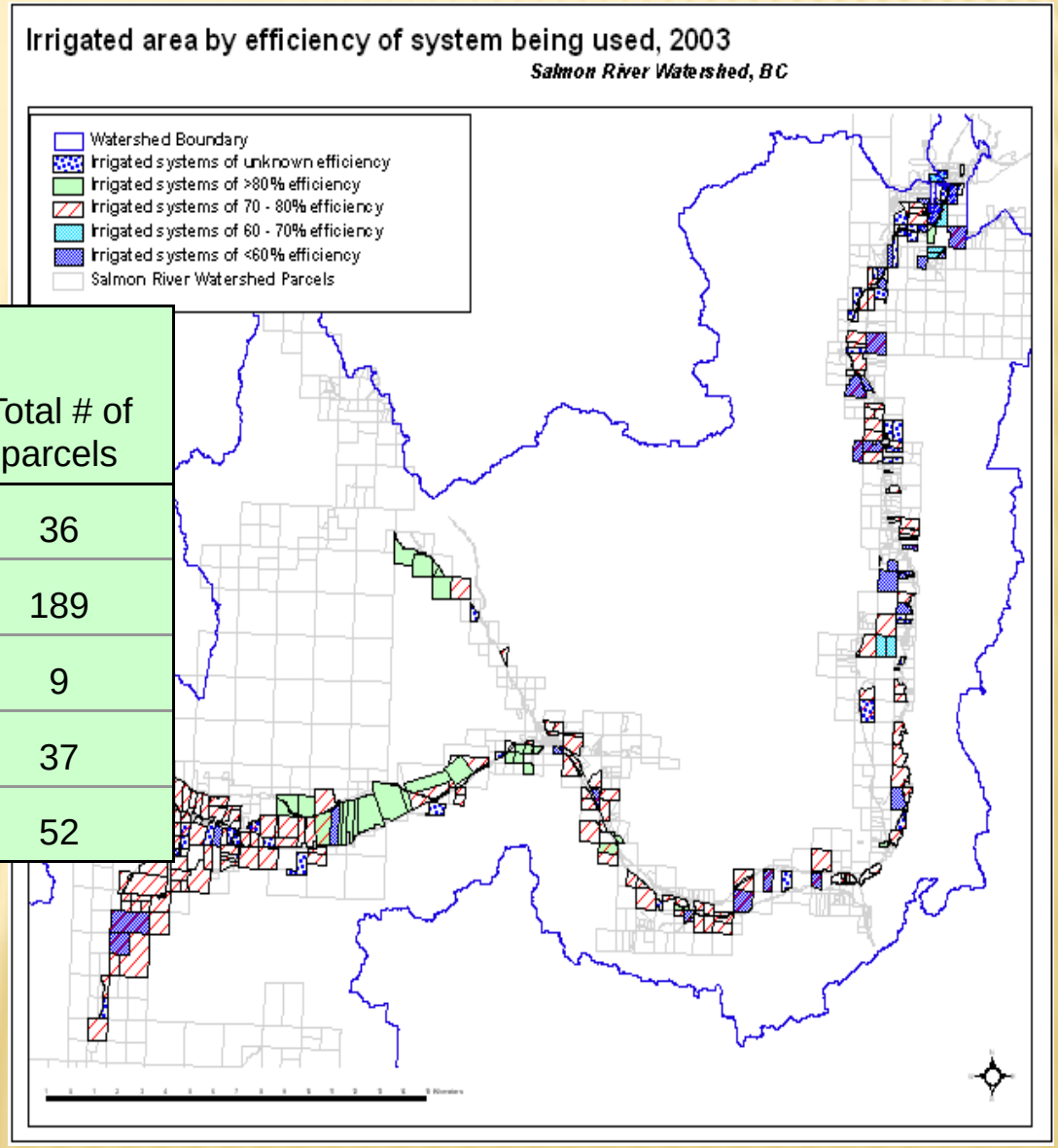
Visually assess data collected; land use, irrigation systems, location of infrastructure, etc.



GIS ASSESSMENT – IRRIGATION TYPES

Salmon River Watershed

Irrigated system efficiency	Crop Area (ha)	Total # of parcels
> 80% efficiency	894.7	36
70-80% efficiency	2457.5	189
60-70% efficiency	154.2	9
< 60% efficiency	561.1	37
unknown efficiency	597.8	52



TOOLS AVAILABLE OR BEING DEVELOPED

- Agriculture Water Demand Model
- Water Balance Model

- Irrigation Scheduling Tool

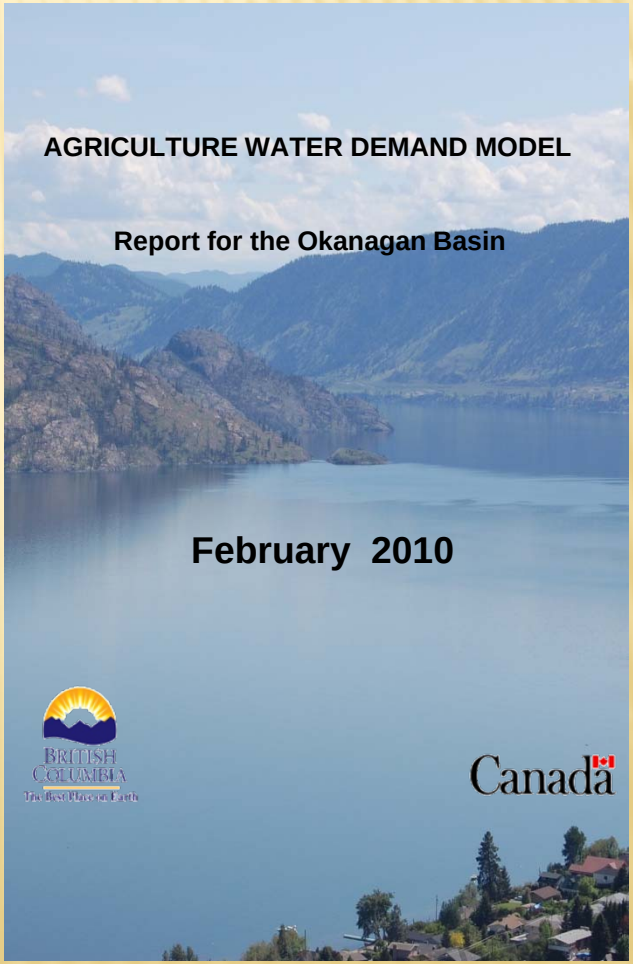
AWDM Reports available at
www.waterbucket.ca

AGRICULTURE WATER DEMAND MODEL

Objective:
Develop a model that calculates agriculture's water needs by purveyor, municipality, district and sub-watershed.

Methodology:
Determine Property-by-Property water use

Result:
Planning Tools that secure water for current and future agricultural needs

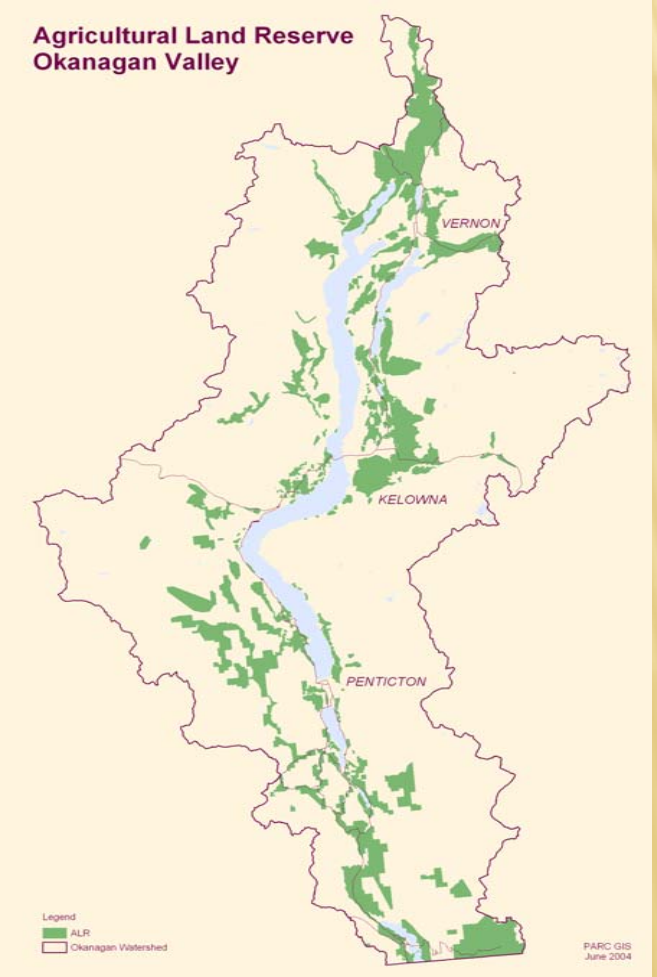


AGRICULTURE WATER DEMAND MODEL

Model calculates demand based on

- Crop, soil and irrigation combinations
- Uses a gridded climate data set

- Determines current and future farm irrigation water demand



RESULTS BY CROP 2003

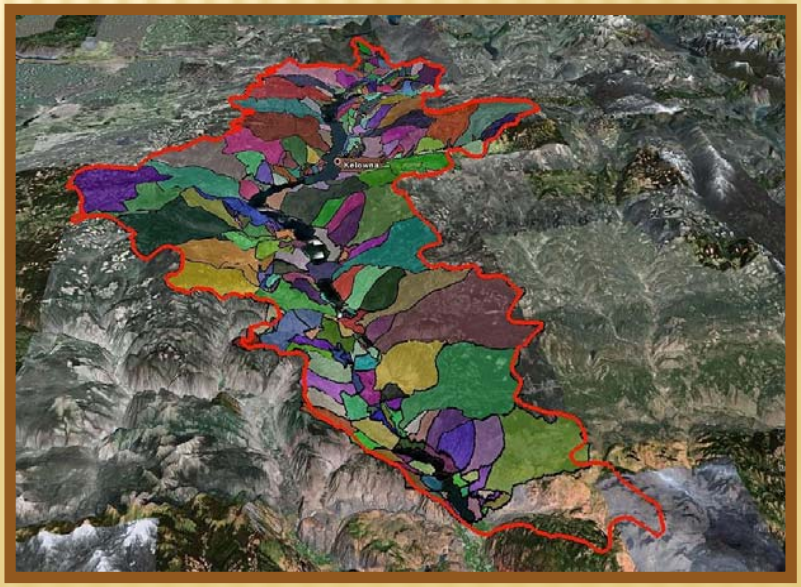
Current Demand

Future Demand

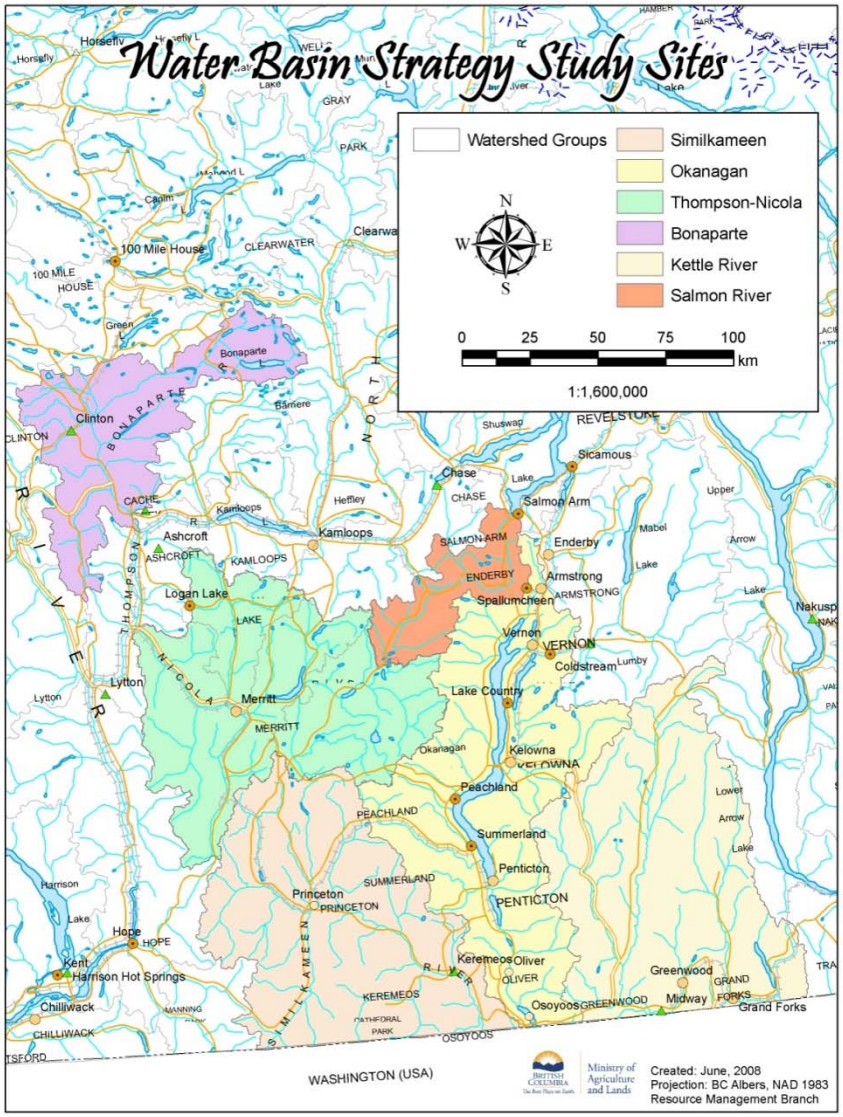
Crop Group	Irrigated Area (ha)	Irrigation Demand (mm)
Apple	4,281	717
Berry	62	651
Cherry	1,119	759
Forage	7938	892
Fruit	894	822
Golf	1,061	1005
Grape	2,733	427
Landscape Turf	607	977
Nursery	565	859
Turf Farm	106	966
Vegetables	507	706
Total =	**20,083**	**796**

IRRIGATION BY WATER SOURCE

Water Source	Irrigated Area (ha)	Irrigation Demand (m^3)
Water License	1,672	11,455,582
Water Purveyor	14,966	107,930,320
Groundwater	3,445	21,695,142
Total	**20,083**	**141,081,043**



OPERATIONAL WATERSHEDS IN BC



Okanagan
Kettle
Similkameen
Nicola
Bonaparte
Salmon River Valley
Metro Vancouver

Good Planning → Modeling → Data