

# SALTSPRING GROUNDWATER IS LIMITED BY RAINFALL, RUNOFF, EVAPO-TRANSPIRATION, AND POROSITY OF ROCKS

PRECIPITATION 900 mm (minimum 600; maximum 1050)

RUNOFF 310 mm

EVAPO-TRANS 435 mm

RECHARGE 155 mm (available to groundwater)

STORATIVITY 0.0001 (a cubic meter of rock holds 100 ml)

The water is mostly contained in fractures.

**Fracture density and water quality depends on the rock**

# WHAT WE KNOW

Average values for

Precip, runoff, evapotrans, storage, Recharge

Some wells run dry in summer

Some wells have poor quality

Arsenic, sulfur, salty water, bad taste

New geology map (distribution of rock types)

Some wells influence nearby wells

# WHAT WE DON' T KNOW

Is poor production related to rock type?

Is bad chemistry related to rock type?

Are there areas with inadequate water?

Are there places where water is abundant?

Should we regulate groundwater?

Near shorelines (brackish water)

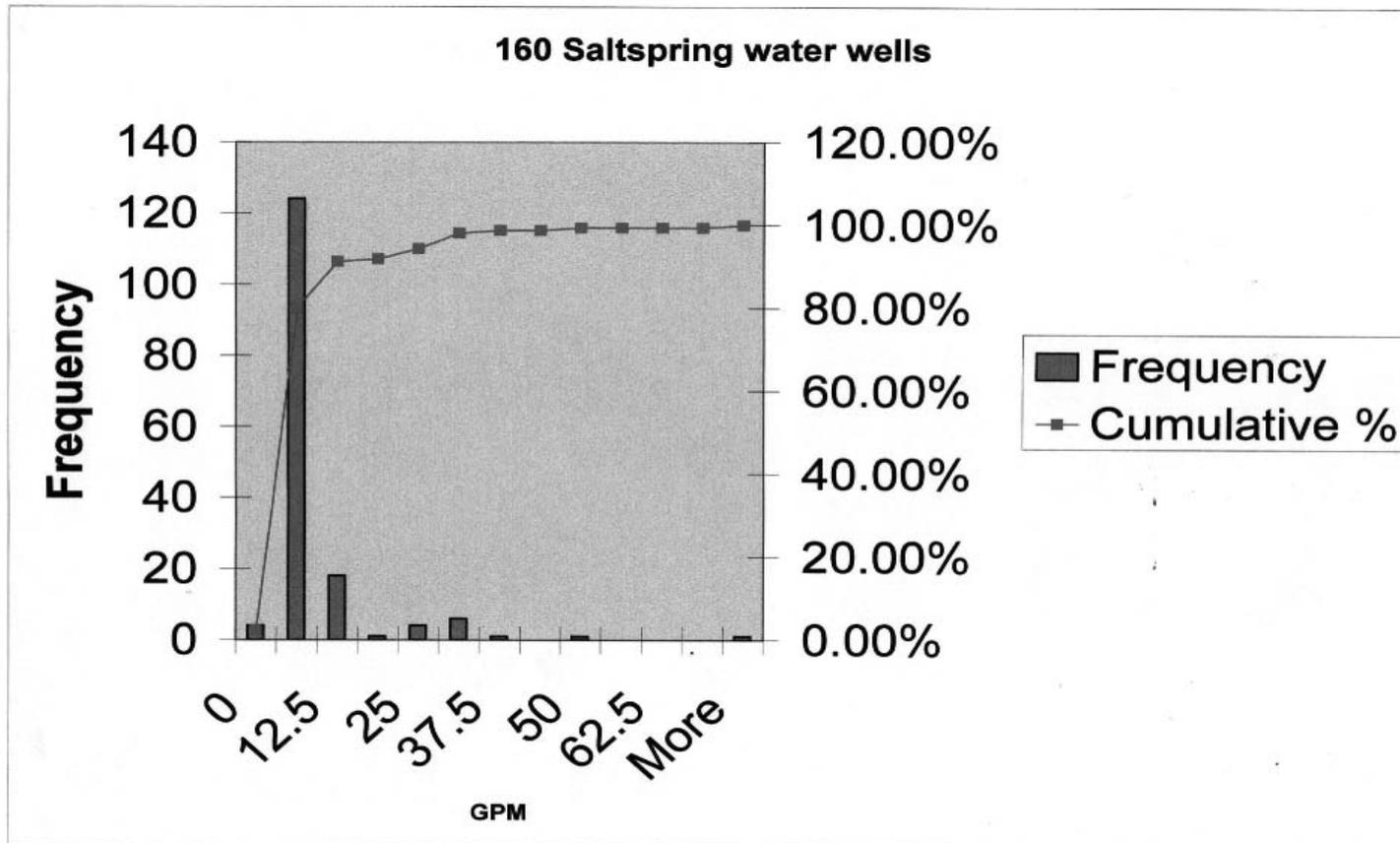
Extraction rate (neighbours, industry)

Pollution

# SOME PRELIMINARY ANALYSIS

- 160 well logs examined
  - Depth to production zone, rock type
  - Flow rate
  - Quality
  - Proximity to faults
- 80 wells produce less than 12 GPM
- 60 wells produce 1.0 GPM or less
- 10 wells are essentially dry





128 produce 12 GPM or less

60 produce 1.0 GPM or less

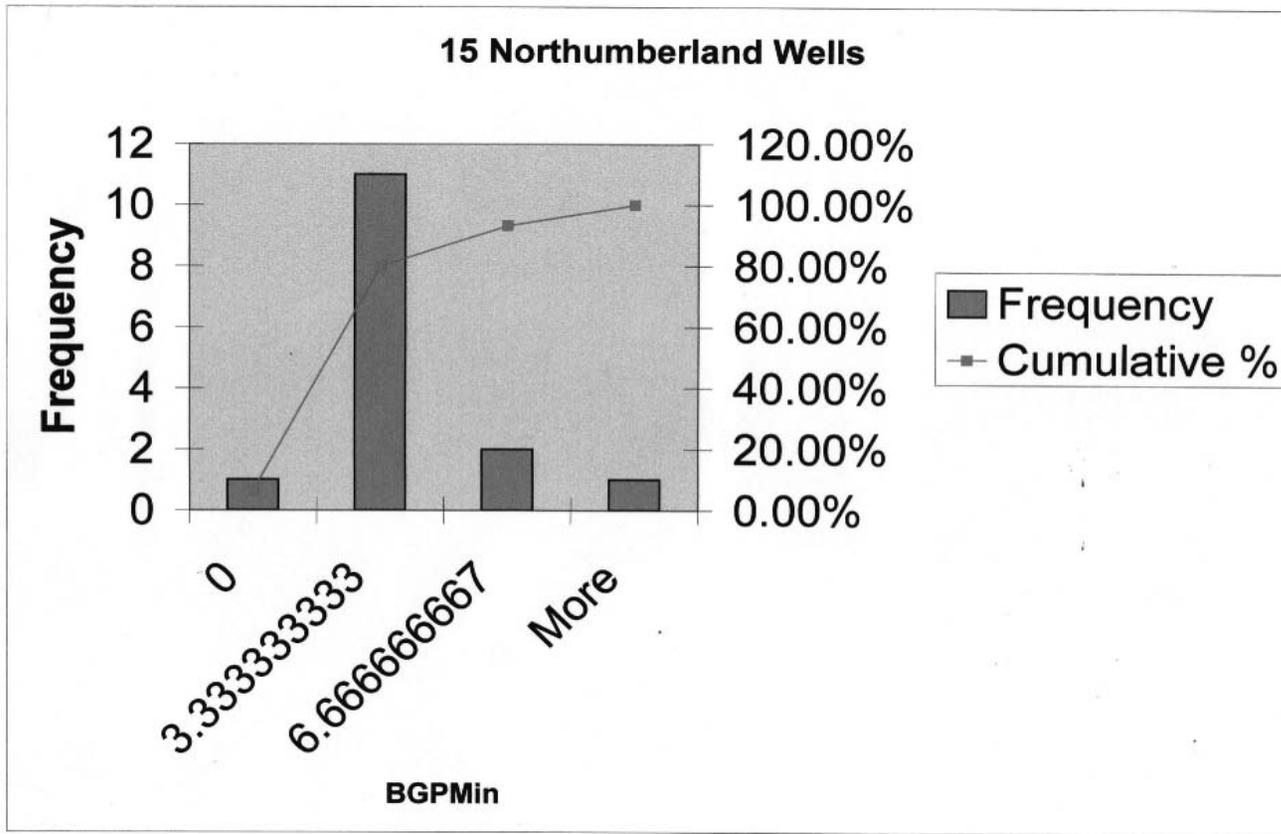
33 produce 0,5 GPM or less

10 are dry or almost dry producing less than 0.1 GPM

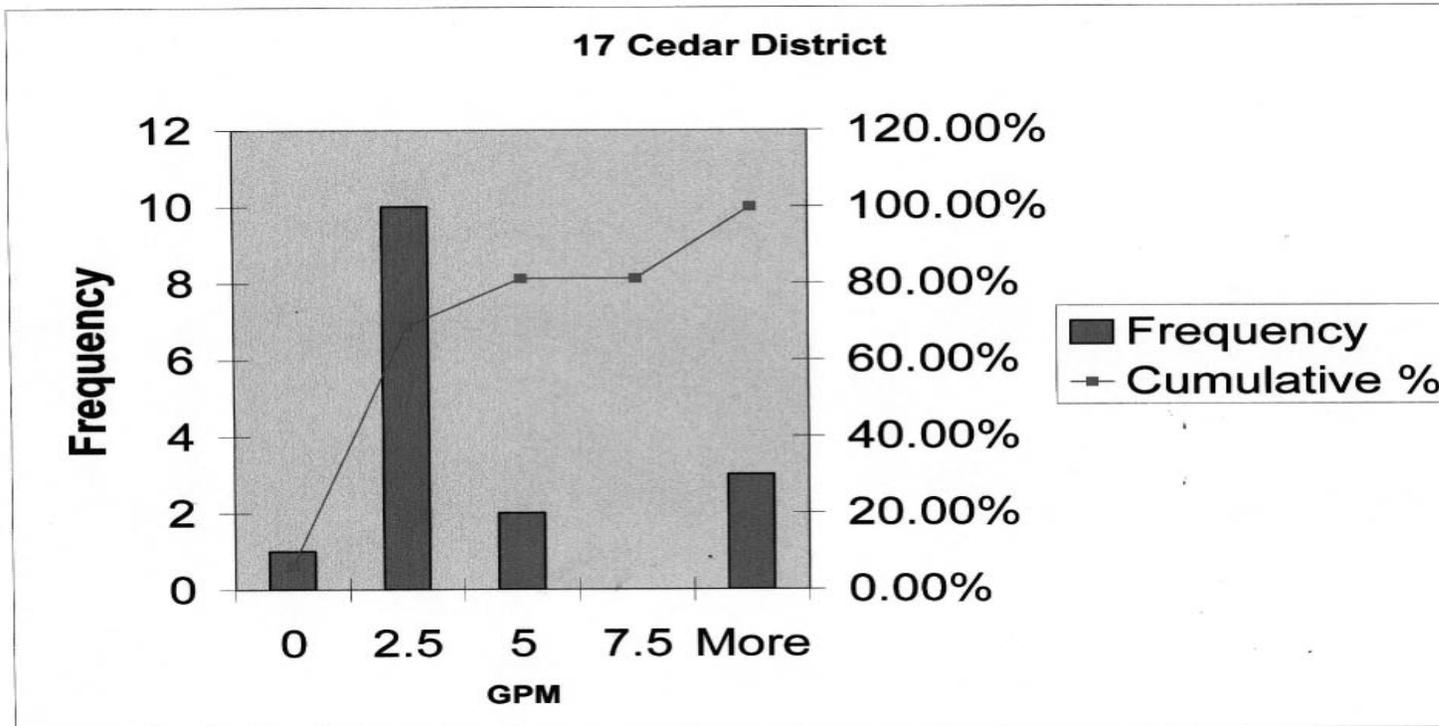
## Distribution of low producers

GPM less than 0.5      GPM between 1.0 and 0.5

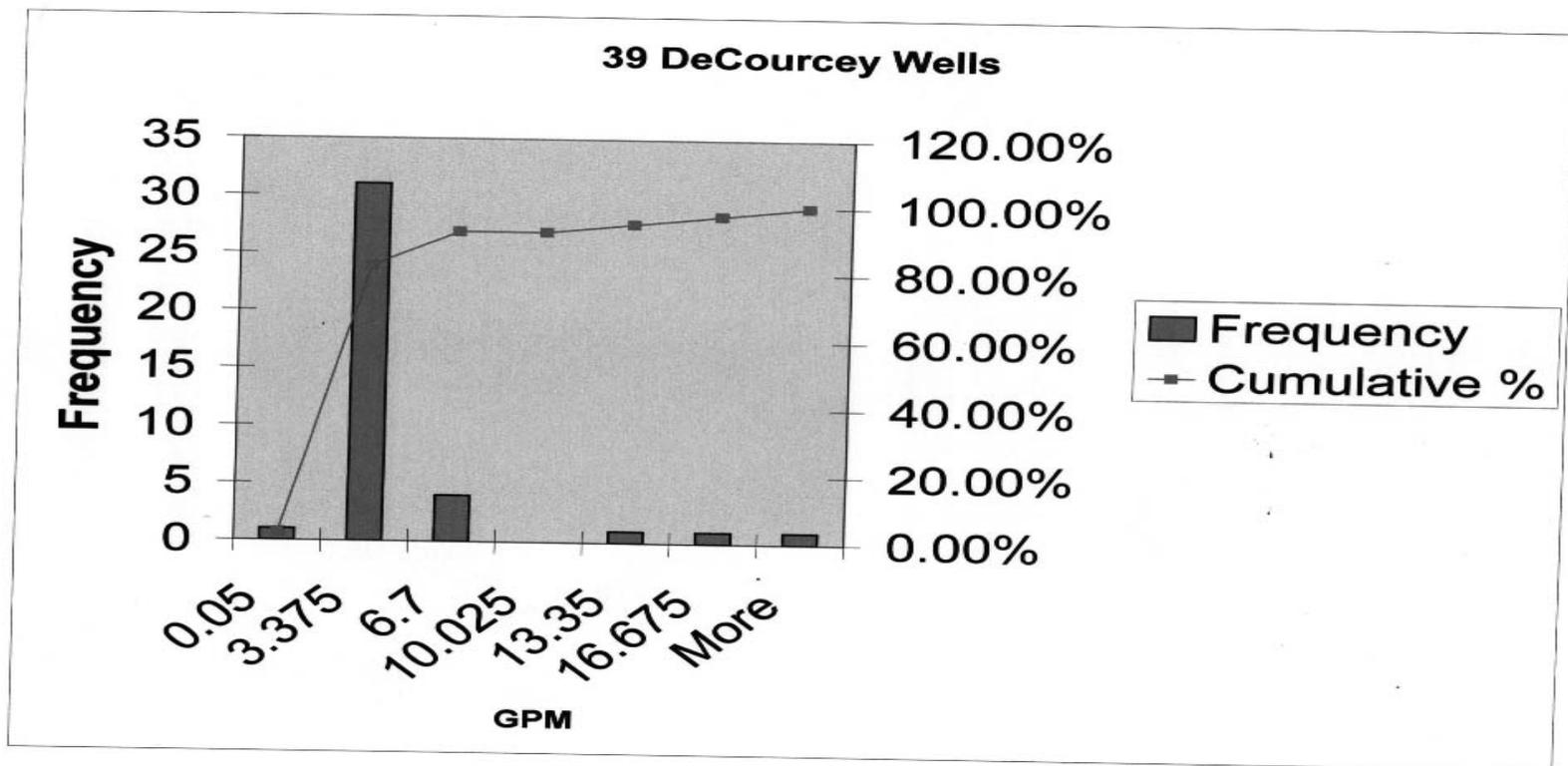
1	Protection sandstone	4
4	Cedar District sandstone,shale	3
11	DeCoursey sandstone	10
8	Ganges shale	8
5	Haslam shale	2
4	Northumberland shale	3



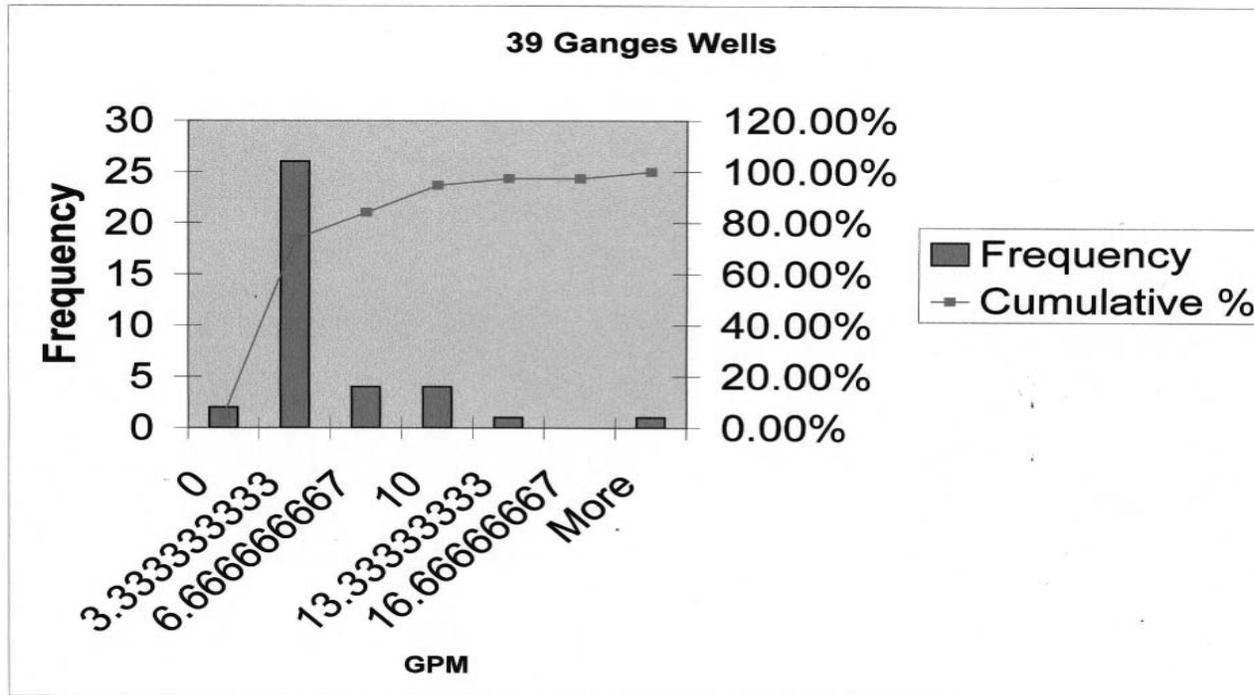
**80% produce 3 GPM or less**



**Most of the production is from wells producing 2.5 GPM or less.**

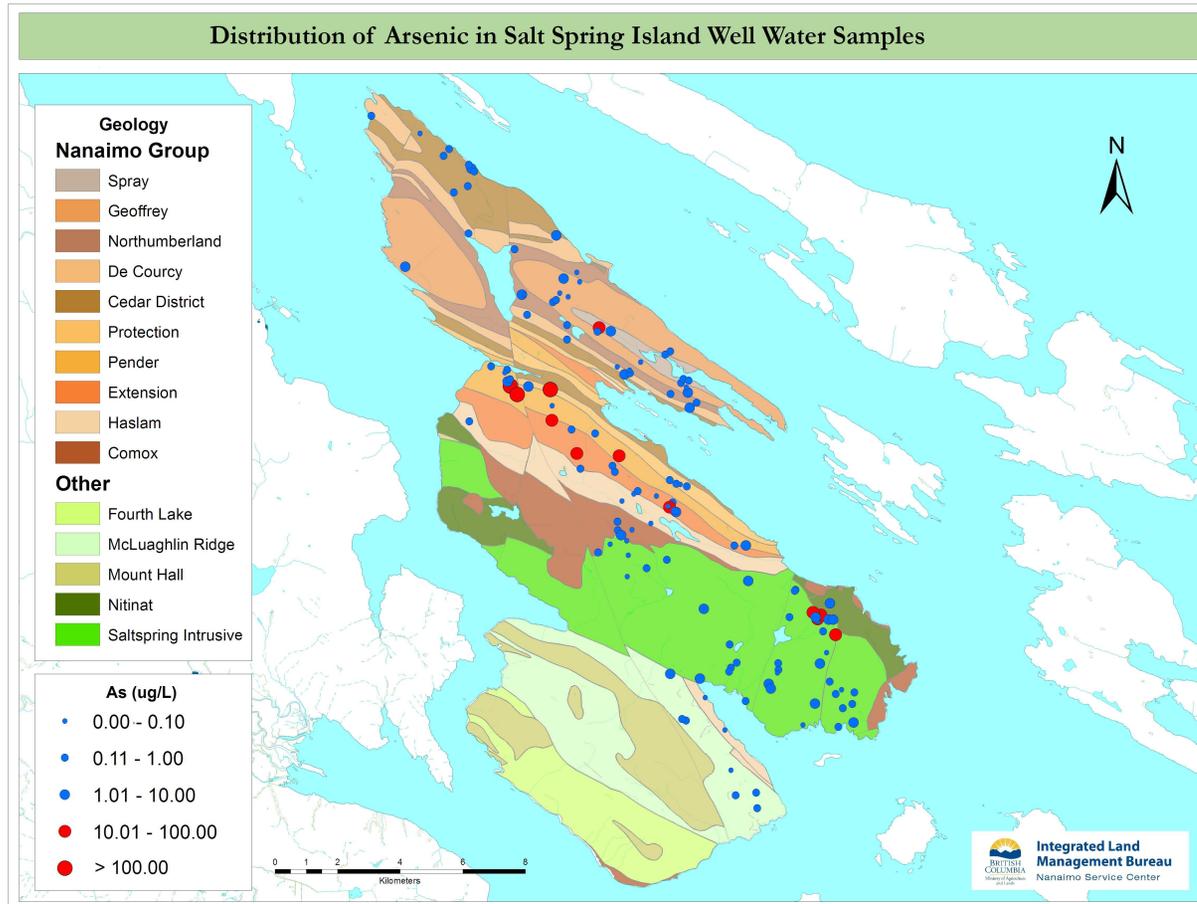


**Of these DeCourcey wells 85% produce 4.0 GPM or less  
 3 wells produce more than 10 GPM.  
 30 wells produce 1.0 GPM or less and four are  
 essentially dry.**



**80% of these wells produce less than about 3.0 GPM**  
**The biggest fraction of these produce less than about 1.5 GPM.**  
**Four wells are essentially dry.**

# Arsenic in wells



The highest values of arsenic in the wells studied are from wells collared in the Extension and Pender Formations.

## Correlation of low flow rate, Quality, and Rock Unit

Flow Rate GPM Remarks	Formation	Quality
• 0.50	Haslam shale	H <sub>2</sub> S, close to tidewater
• 0.5	Ganges shale	Salty, close to seashore
• 0.5	Ganges shale	H <sub>2</sub> S
• 0.0	Ganges shale	salty
• 1.0	DeCourcey sandstone	salty, close to seashore
• 1.0	DeCourcey sandstone	salt water
• 1.5	Northumberland shale	salty, St. Mary Lake shore
• 0.33	Northumberland shale	salty
• 1.50	Geoffrey sandstone	High Iron content
• 3.25	Spray (shale)	H <sub>2</sub> S dries in summer
• 1.0	Ganges shale	Bad smell (H <sub>2</sub> S ?)
• 1.0	Ganges shale	H <sub>2</sub> S
<p>• <b>Shale units tend to have poor chemistry, strong sulfur odour, and low productivity</b></p>		

# Proximity to Faults

Most of the very high producers ( more than 10 to 15 GPM) are close to known faults, particularly St. Mary Lake and Fulford Valley faults

A well producing from the Northumberland Formation near the shoreline of St Mary lake has salty water.

This well is close to St. Mary Lake fault (east branch). The same fault passes close to the Salty Springs Resort, suggesting sea water access along the fault.

## WHAT' S NEXT?

- There appear to be some problems
- Management requires information
- We have some preliminary data
  - But we need more for decision-making
  - An integrated hydro-geology study
  - A graduate thesis cost \$41,000 (2 yrs)
  - A professional consultant (much more)
  - WISE MANAGEMENT REQUIRES DATA