

# Mountain Goat Status and Inventory Needs in British Columbia



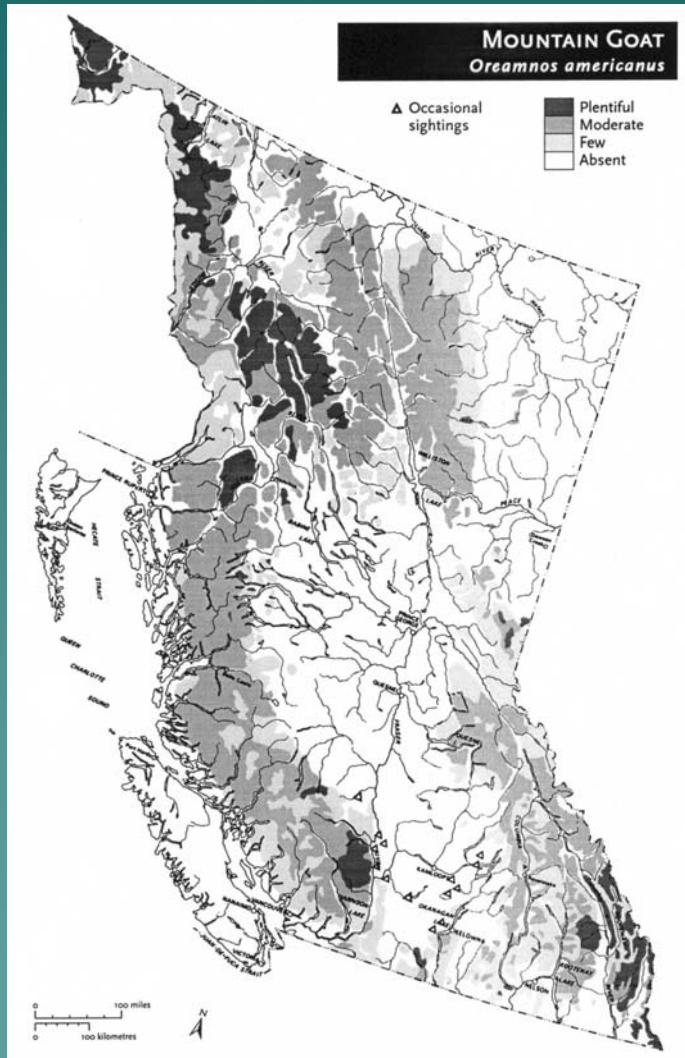
Photo: L. R. Ramsay

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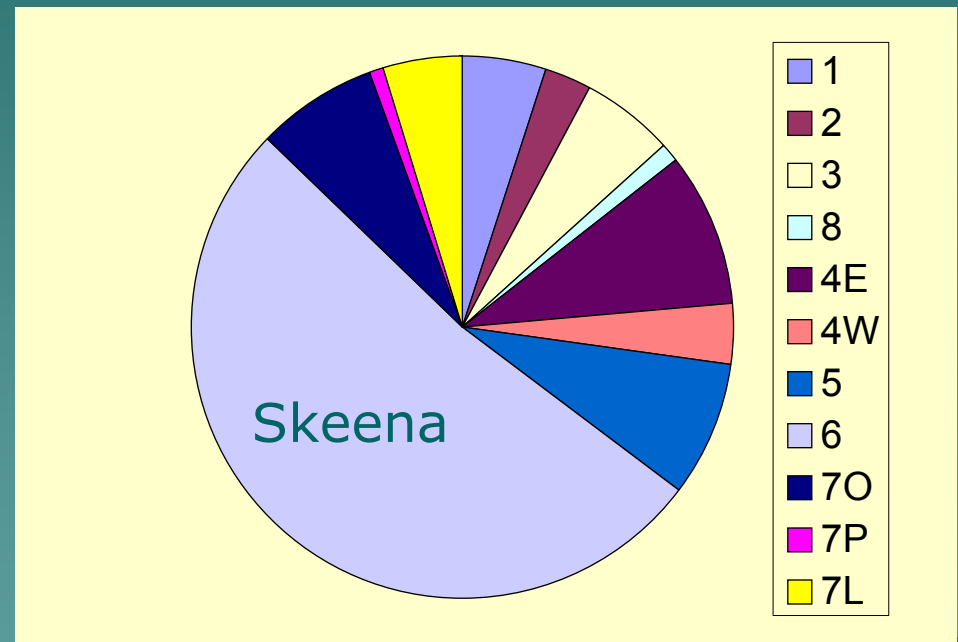
Presented at:  
BC Goat Workshop  
Prince George

March 2, 2005

# Mountain Goat Distribution

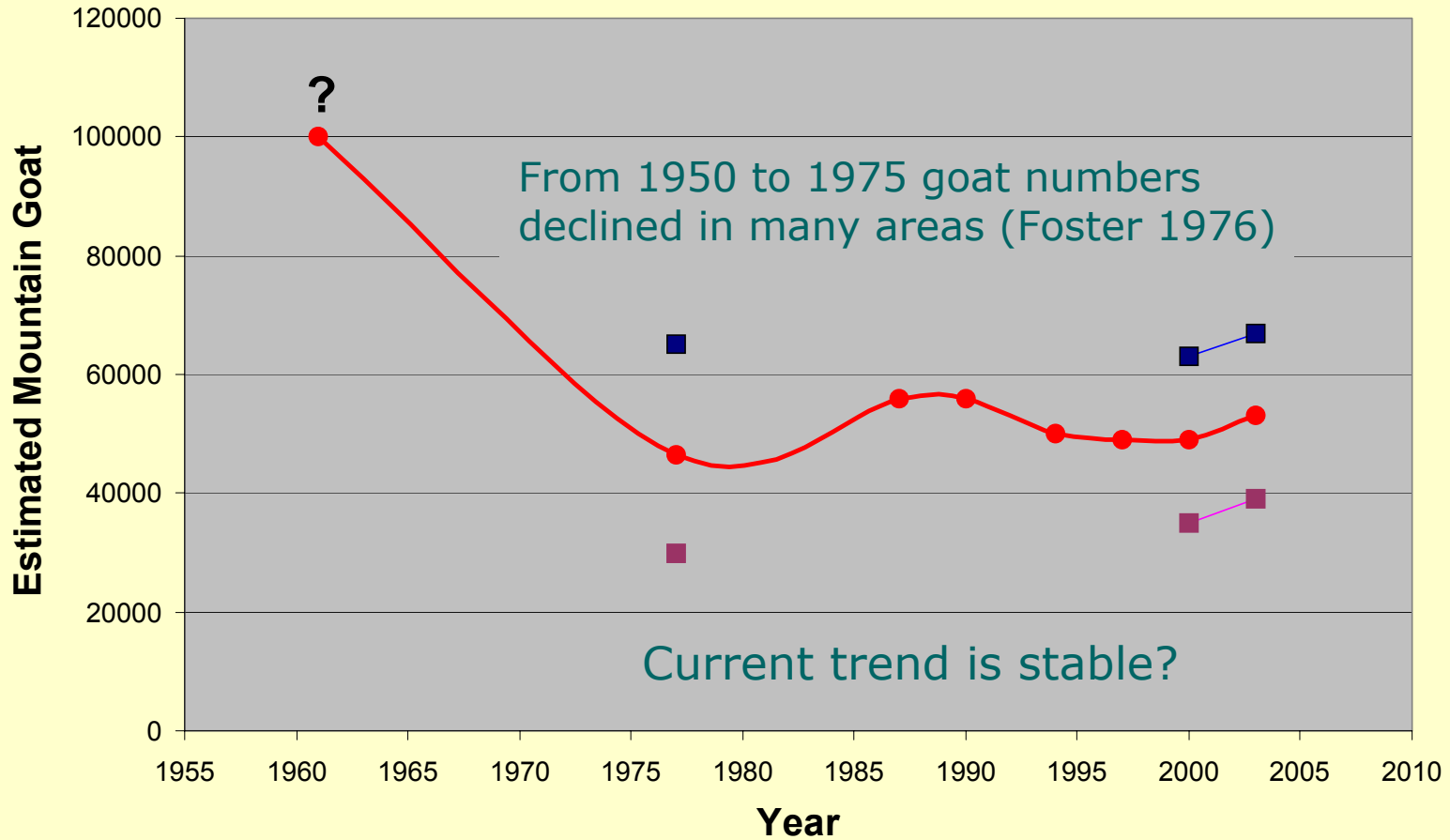


## Relative Abundance of Mountain Goats by Region

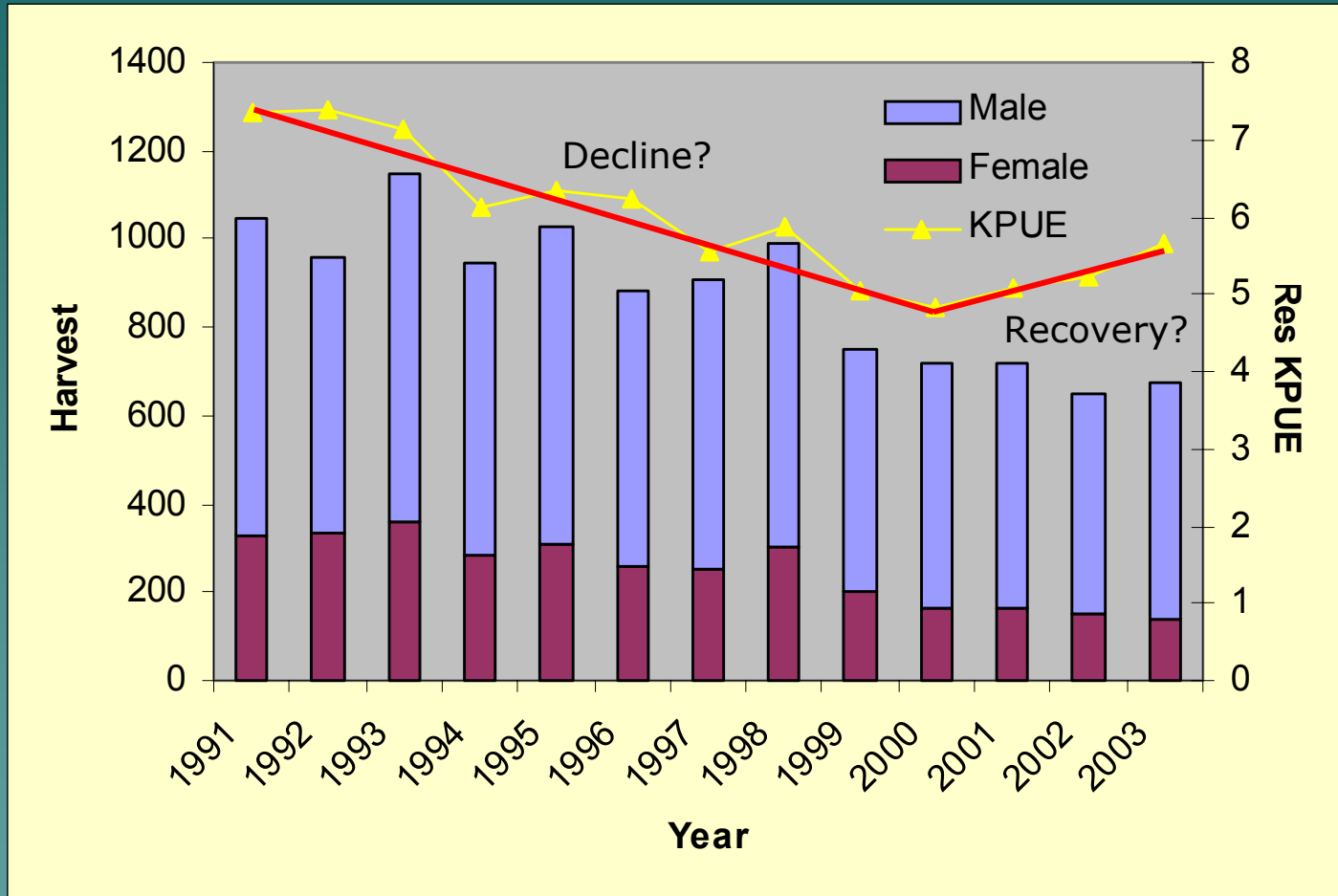


Current Estimate: 39,000 to 67,000  
 Status: G5, S4, Yellow  
 BC has 90% of the Mtn Goats in Canada

# Mountain Goat Population Trends



# Mountain Goat Harvest Trends



# Coarse Filter Status Assessment

- ◆ “I believe the future trend in stock assessment will be to base management decisions on simple results that are more often data-based rather than model-based, while the complex models will serve primarily to evaluate the robustness of these decision rules”

(Hilborn 2000)

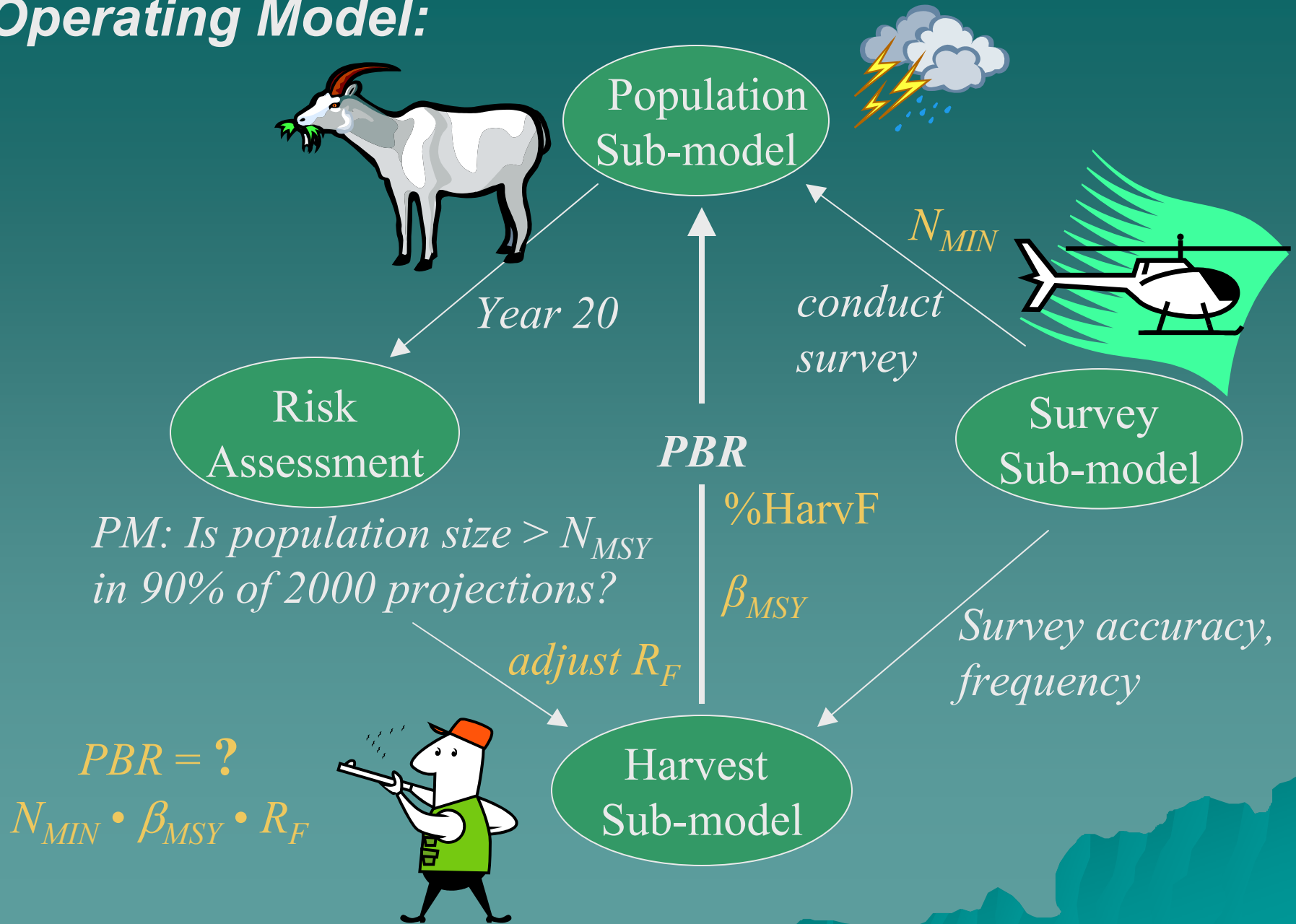
## *Simple Status Assessment – PBR Model –*

$$PBR = N_{MIN} \cdot \beta_{MSY} \cdot R_F$$

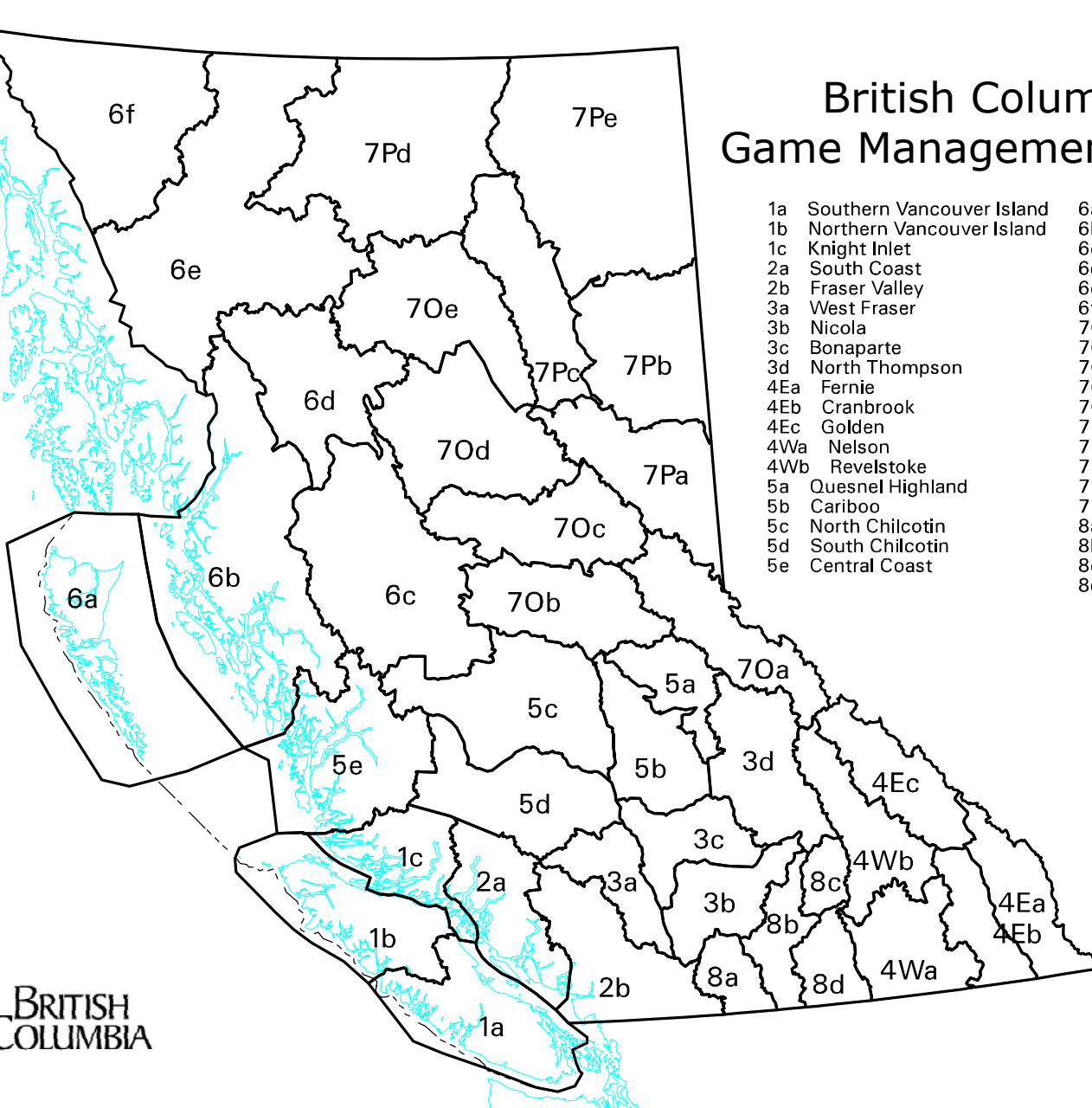
- $PBR$  = Pot. Biol. Removal
- $N_{MIN}$  = Min. Pop. Estimate
- $\beta_{MSY}$  = Harv. Rate at MSY
- $R_F$  = Risk Factor (0 - 1)
  - ◆ Environmental Variation
  - ◆ Harvest Composition

(Wade, 1998)

# Operating Model:



# British Columbia Game Management Zones



- |     |                           |     |                   |
|-----|---------------------------|-----|-------------------|
| 1a  | Southern Vancouver Island | 6a  | Queen Charlotte   |
| 1b  | Northern Vancouver Island | 6b  | North Coast       |
| 1c  | Knight Inlet              | 6c  | Upper Nechako     |
| 2a  | South Coast               | 6d  | Upper Skeena      |
| 2b  | Fraser Valley             | 6e  | Stikine           |
| 3a  | West Fraser               | 6f  | Atlin             |
| 3b  | Nicola                    | 70a | Upper Fraser      |
| 3c  | Bonaparte                 | 70b | Fort George       |
| 3d  | North Thompson            | 70c | McLeod Lake       |
| 4Ea | Fernie                    | 70d | Omineca           |
| 4Eb | Cranbrook                 | 70e | Upper Finlay      |
| 4Ec | Golden                    | 7Pa | South Peace       |
| 4Wa | Nelson                    | 7Pb | North Peace       |
| 4Wb | Revelstoke                | 7Pc | Northeast Rockies |
| 5a  | Quesnel Highland          | 7Pd | Liard             |
| 5b  | Cariboo                   | 7Pe | Fort Nelson       |
| 5c  | North Chilcotin           | 8a  | Similkameen       |
| 5d  | South Chilcotin           | 8b  | Okanagan          |
| 5e  | Central Coast             | 8c  | Monashee          |
|     |                           | 8d  | Kettle            |

Estimates of Mountain Goat PBR compared to known Legal Reported Harvest

G M Z	Nbest	Nmin	1995-99 % HarvF	Rf	PBR	1995-99 ave. Harv	PBR HR
1a	0	0	0.0%	0.000	0	0	0.0%
1b	0	0	0.0%	0.000	0	0	0.0%
1c	2500	1763	53.3%	0.400	40	2	1.6%
2a	685	483	13.3%	0.625	17	2	2.5%
2b	665	469	30.0%	0.500	13	1	2.0%
3a	1650	1164	37.4%	0.450	30	39	1.8%
3b	55	39	0.0%	0.000	0	0	0.0%
3c	30	21	0.0%	0.000	0	0	0.0%
3d	1155	815	49.2%	0.400	19	7	1.6%
4E a	5510	3886	27.6%	0.500	111	111	2.0%
4E b	1565	1104	32.2%	0.475	30	28	1.9%
4E c	1865	1315	42.3%	0.425	32	44	1.7%
4W a	665	469	41.3%	0.425	11	10	1.7%
4W b	1200					25	1.9%
5a	780					7	2.0%
5b	0					0	0.0%
5c	110					0	0.0%
5d	2110					28	1.9%
5e	1900					11	2.1%
6a	0					0	0.0%
6b	6700					49	1.8%
6c	3505	2472	34.3%	0.475	67	53	1.9%
6d	2750	1940	27.0%	0.500	55	17	2.0%
6e	3150	2222	21.0%	0.525	66	86	2.1%
6f	3875	2733	16.8%	0.575	89	58	2.3%
7O a	855	603	29.8%	0.500	17	23	2.0%
7O b	10	7	0.0%	0.000	0	0	0.0%
7O c	130	92	0.0%	0.000	0	0	0.0%
7O d	535	377	28.0%	0.500	11	14	2.0%
7O e	1580	1114	23.4%	0.525	33	58	2.1%
7P a	450	317	32.2%	0.475	9	16	1.9%
7P b	0	0	0.0%	0.000	0	0	0.0%
7P c	1260	889	25.6%	0.500	25	33	2.0%
7P d	2040	1439	17.6%	0.575	47	80	2.3%
7P e	150	106	0.0%	0.000	0	0	0.0%
8a	235	166	41.7%	0.425	4	4	1.7%
8b	85	60	0.0%	0.625	2	1	2.5%
8c	85	60	0.0%	0.000	0	0	0.0%
8d	200	141	50.0%	0.400	3	2	1.6%
	50040	35293			972	809	1.9%

$$PBR = N_{MIN} \cdot \beta_{MAX} \cdot R_F$$

$$N_{MIN} \sim .7 * \text{Best Est.}$$

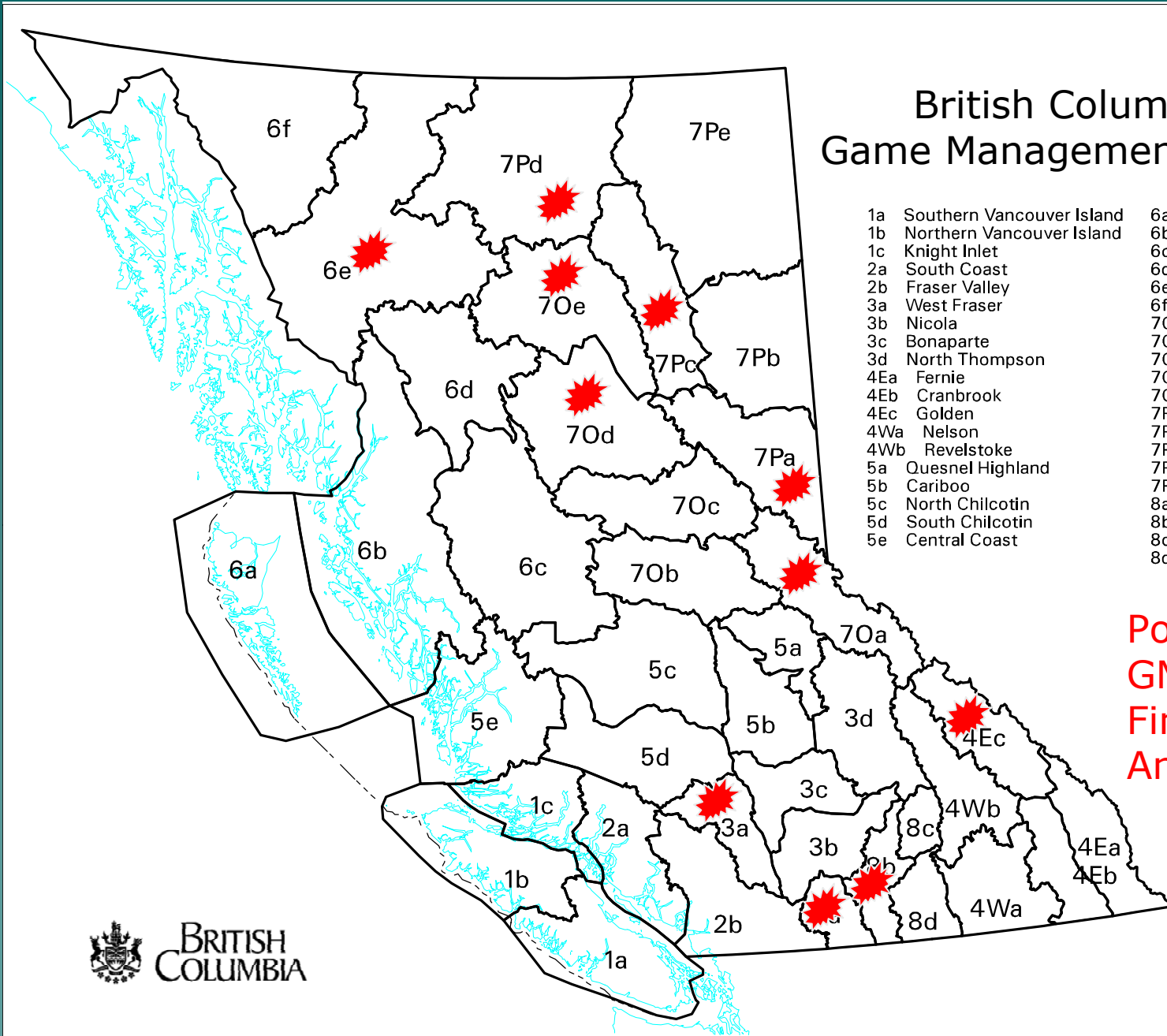
$$\beta_{MSY} = 5.7\%$$

$$R_F = 0 - 1$$

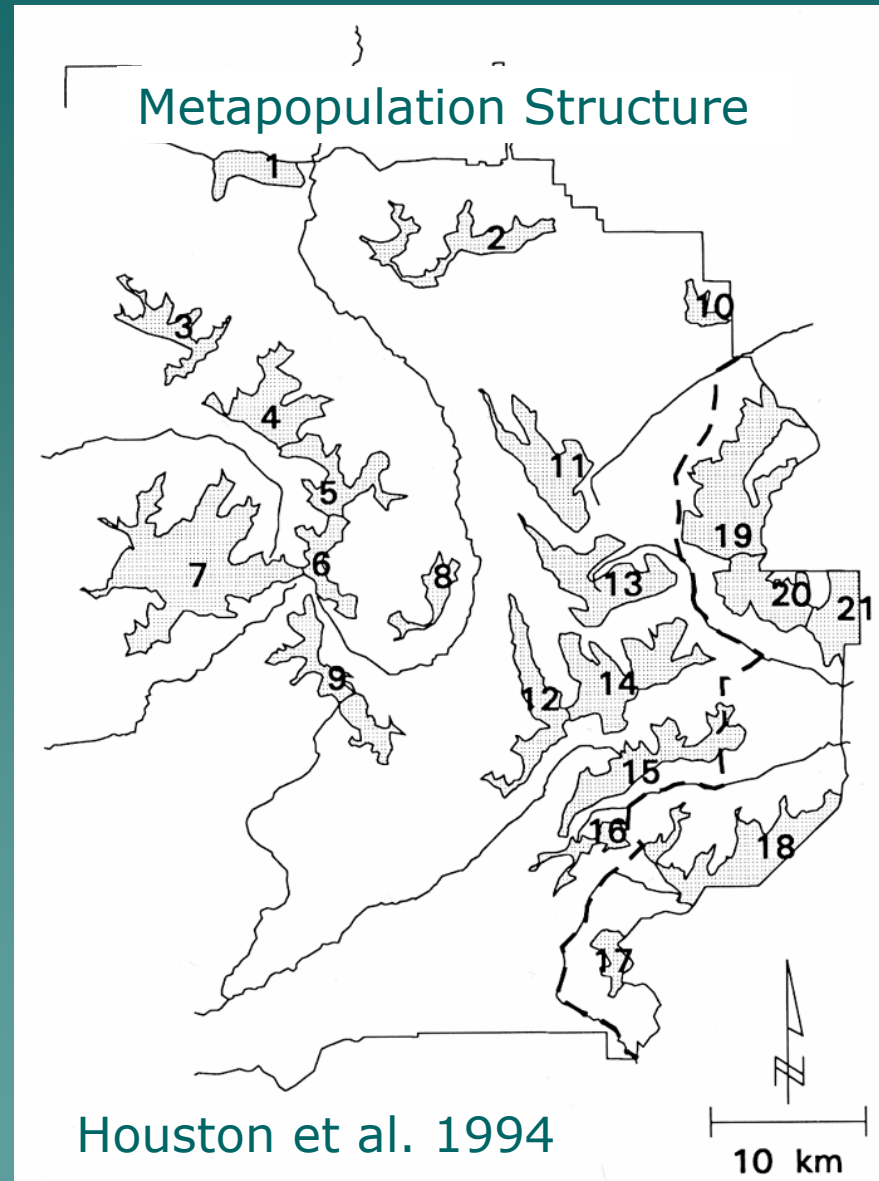
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Potential  
GMZ's for  
Fine Filter  
Analysis



# Mtn Goat Fine Filter Assessment



# Mountain Goat Assessment Needs

1. Update current population estimates using a provincially standardized methodology.
2. Revisit the coarse-filter assessment based on revised population estimates and 2000-04 harvest.
3. Develop a fine-filter assessment methodology.
4. Develop and monitor provincial standards for data collection, storage, analysis and reporting.
5. Establish benchmark areas for population monitoring.
6. Monitor road distribution and levels of industrial/commercial activity in and near mountain goat ranges.
7. Improve existing provincial-level habitat mapping (BEI) to assess habitat suitability.

# Mtn Goat Inventory Issues and Needs

- ◆ Mountain goat surveys generally have low precision
  - e.g. Robson Valley (Poole et al. 2000): 2100 Goats (95% CI: 1200-3800)
- ◆ Sightability is low and variable (bias)
  - e.g. 55 to 84% (Gonzalez-Voyer et al. 2001).
- ◆ Sex/age classification is unreliable.
- ◆ At best, aerial surveys detect broad population trends over time.
- ◆ Mountain goat populations are surveyed infrequently

## Region 3:

- ◆ “Mountain goat inventory is our highest priority (other than caribou). We have not done complete goat population inventories since the late 1980's.”

## Region 5:

- ◆ “Probably no more than 25-30% of the goat habitat in the region has ever had a population inventory.”

## Region 6:

- ◆ “Goats are a very high priority and definitely have not received the attention they deserve.”

## Region 8:

- ◆ “Mountain goats are a high priority for inventory.”

