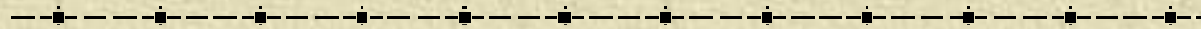
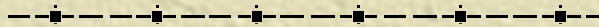


North and Central Coast Salmon Indicator Streams and Abundance Estimates by CU



prepared for

Pacific Salmon Foundation & DFO
24-25 January 2011



Stock Assessment - Purpose

-
- ✦ to compile the best available estimates for escapement, catch, run size and age composition for each NCCC Statistical Area (SA) and Conservation Unit (CU) to facilitate further analysis to define the lower and upper benchmarks for each CU.



This presentation

✦ Summary of work completed in Oct-Nov 2011

- ◆ General analytical methods
- ◆ Species specific methods and assumptions
- ◆ Examples of results
- ◆ Recommendations



General Analytical Approach

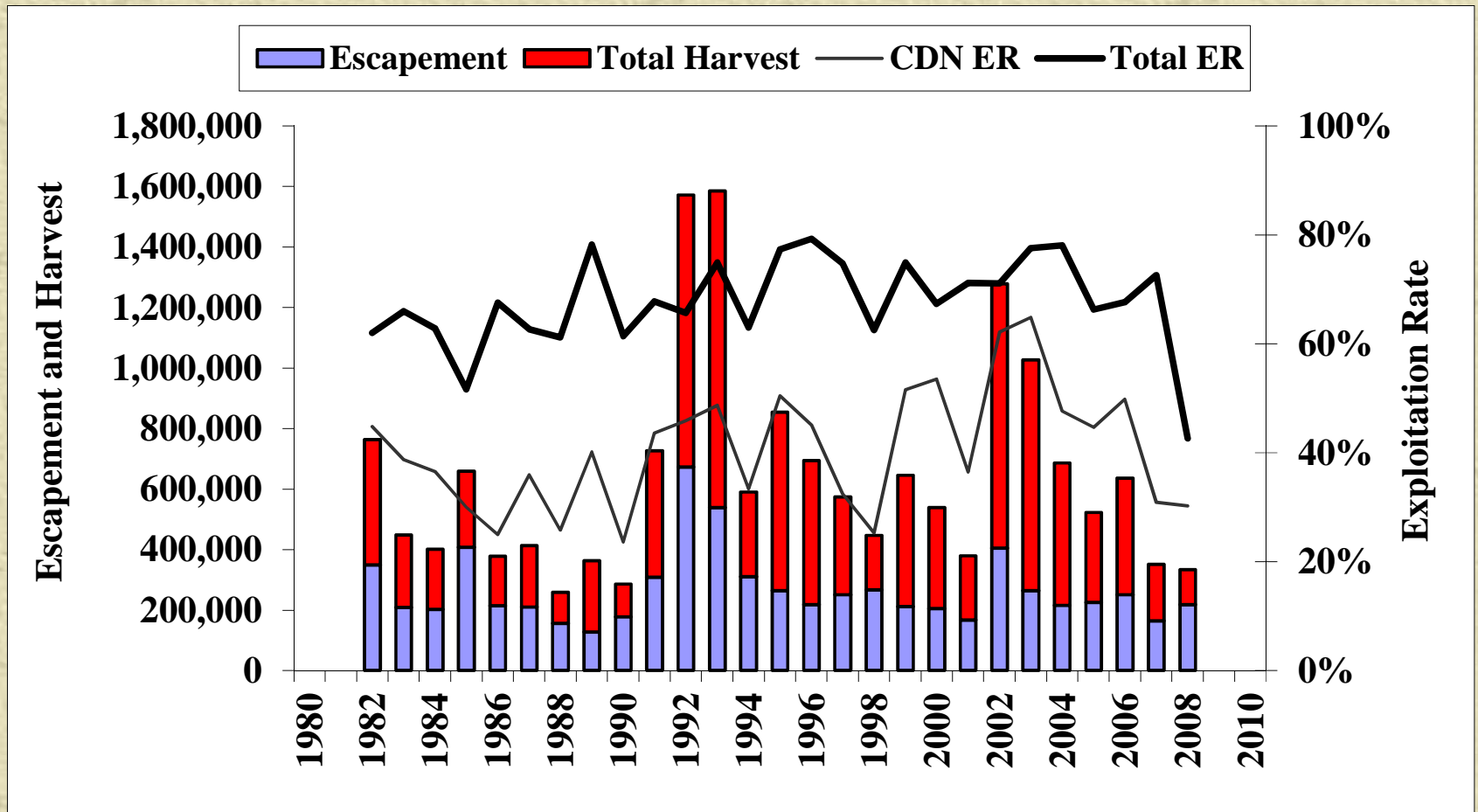
- ✦ Review/update list of indicator streams.
- ✦ Update databases and links between stream and CU lists
- ✦ Derive annual escapement estimates for each Statistical Area (SA) and CU
- ✦ Compile catch, run-reconstruction results and exploitation rate estimates for each species
- ✦ Use above estimates to compute total run size estimates for each SA and CU
- ✦ Use average age comp. to compute returns by brood year

Sockeye Summary

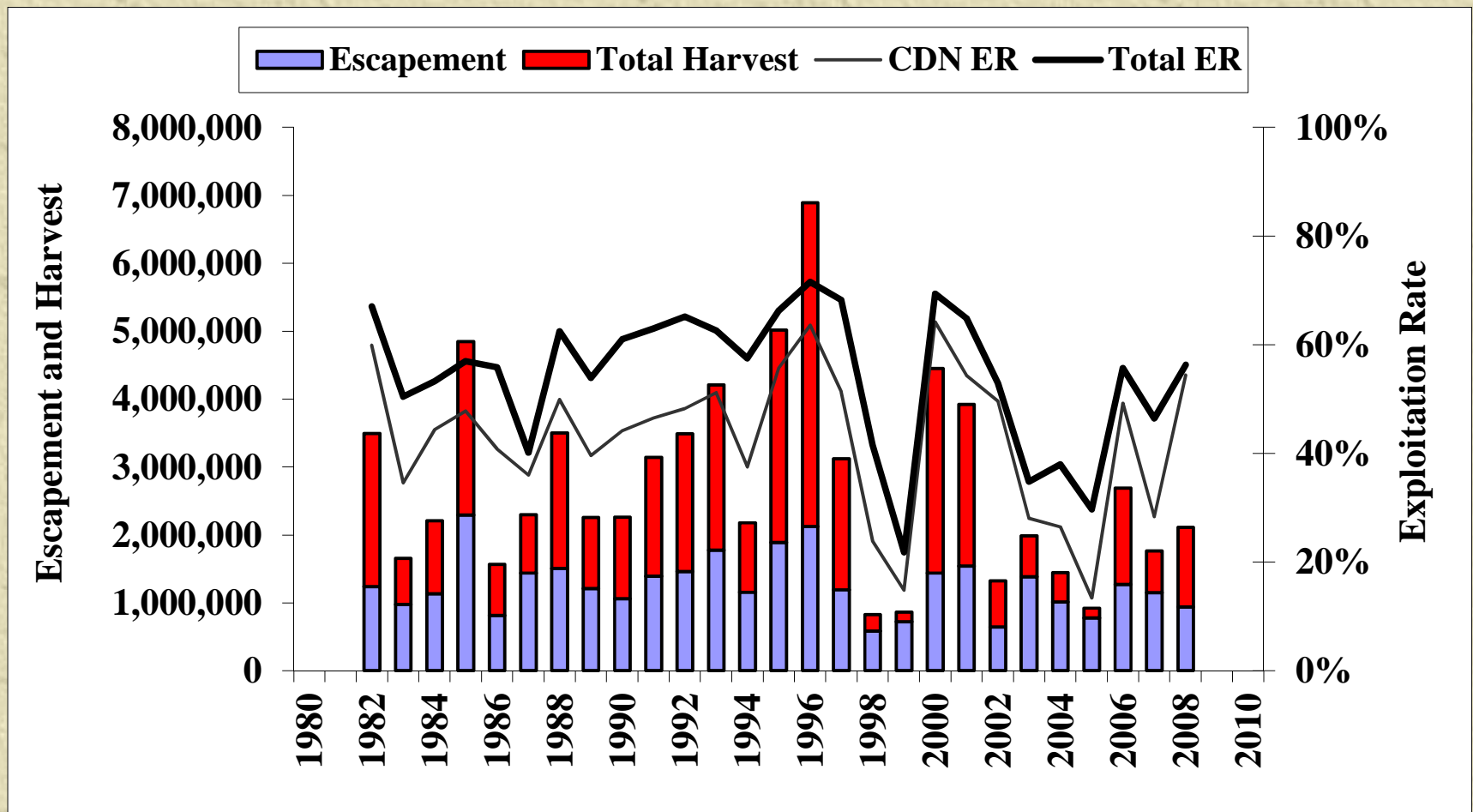
-
- ✦ 57 of 150 CUs have indicator streams
 - ✦ Most CUs outside Skeena have only 1 indicator stream
 - ✦ Area 3-5 ERs based on NB Run Recon Model
 - ✦ CU specific run-timing added to NBRRM to estimate marine ERs by CU



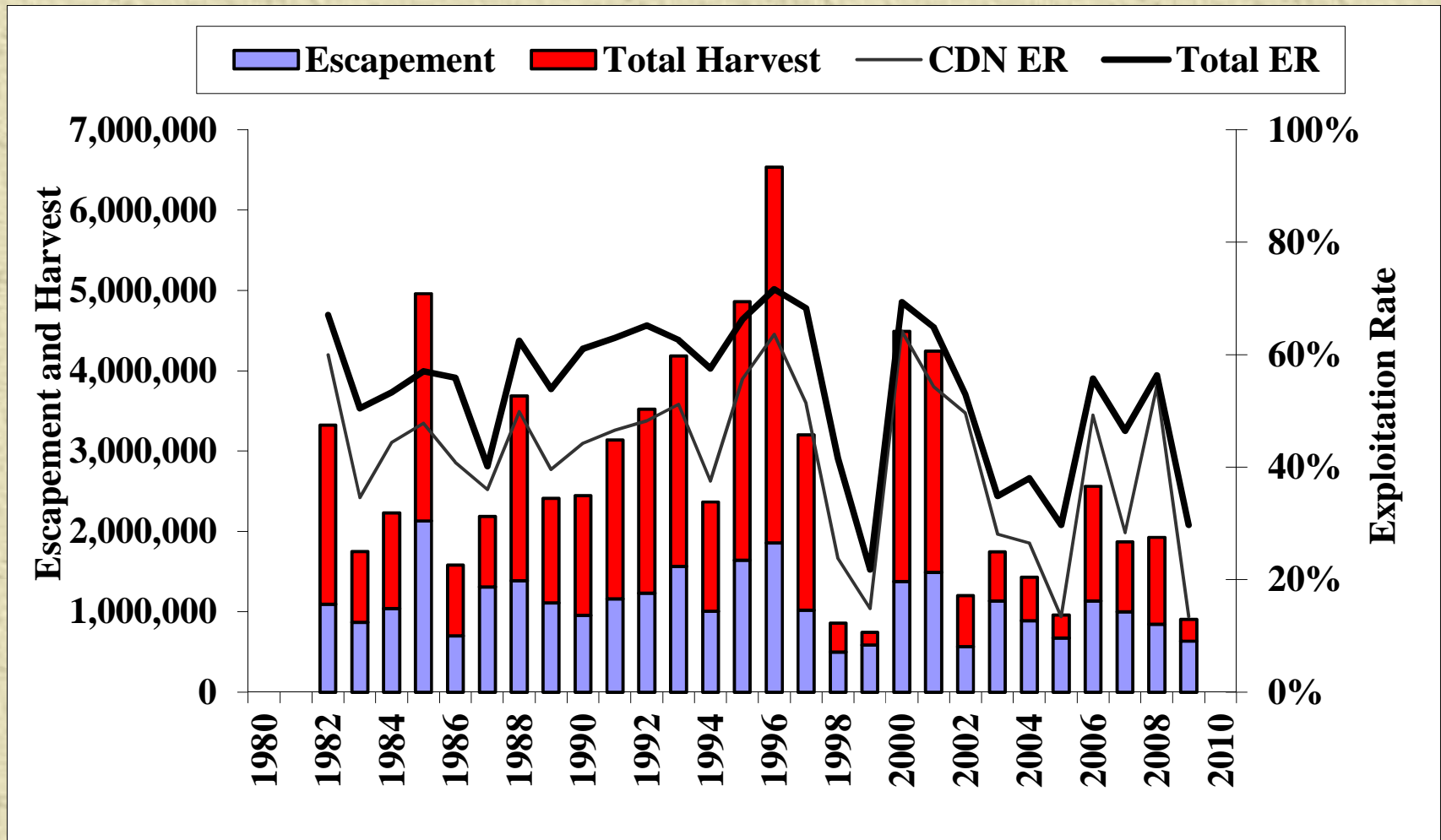
Sockeye – Nass Watershed



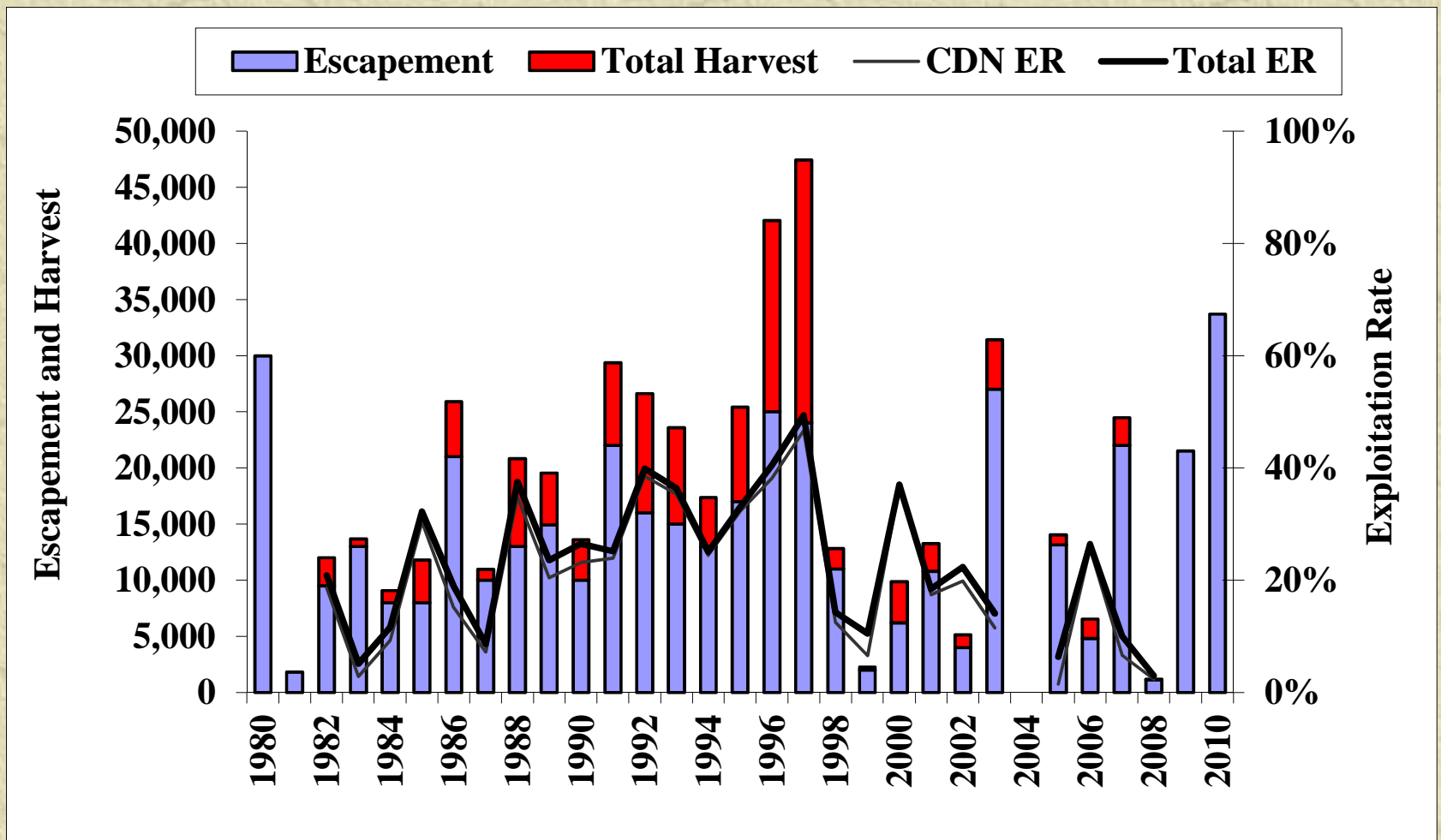
Sockeye – Skeena Watershed



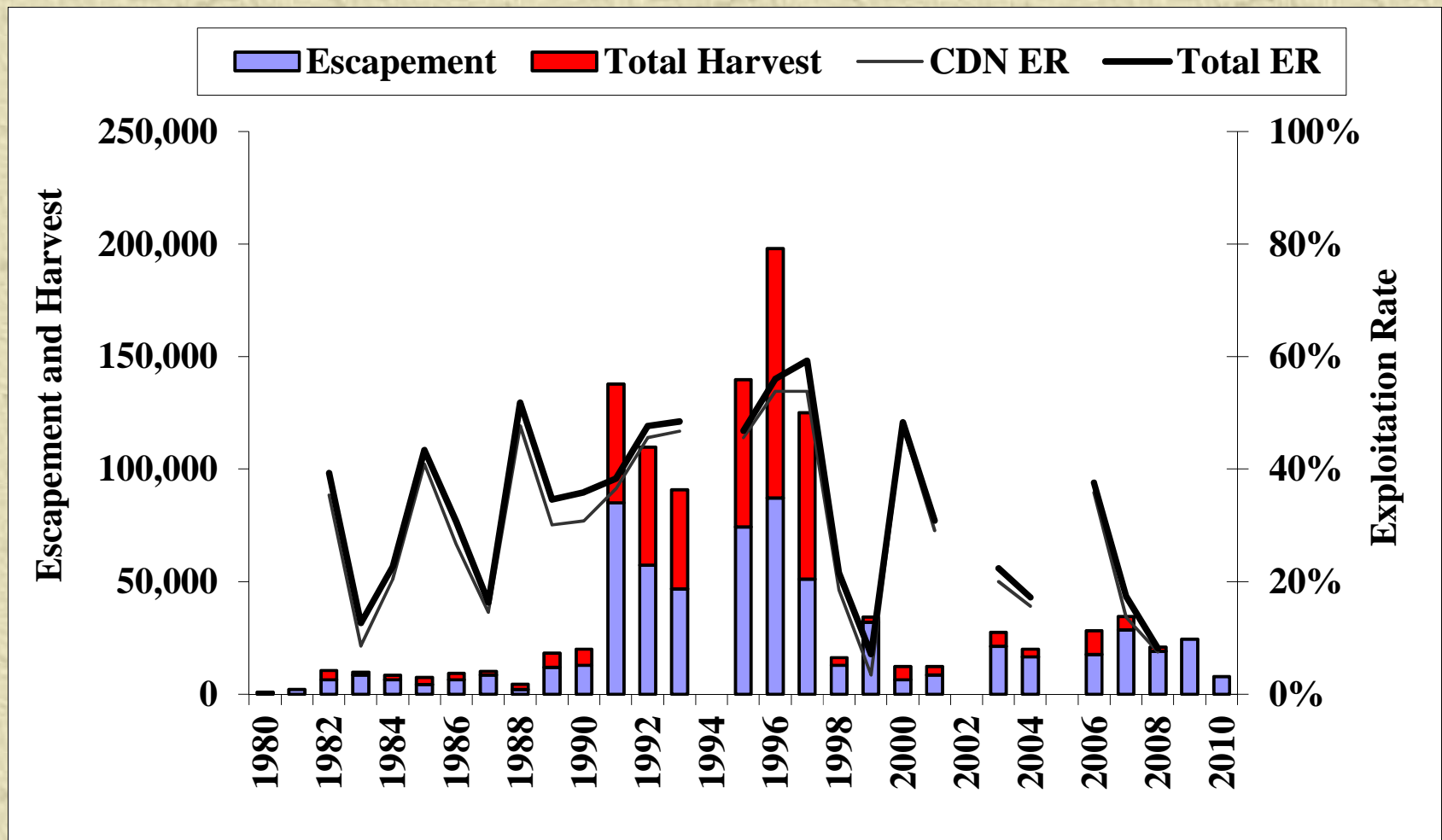
Sockeye – Babine Lake CU



Sockeye – Alastair Lake CU



Sockeye – Morice Lake CU



Pink Summary

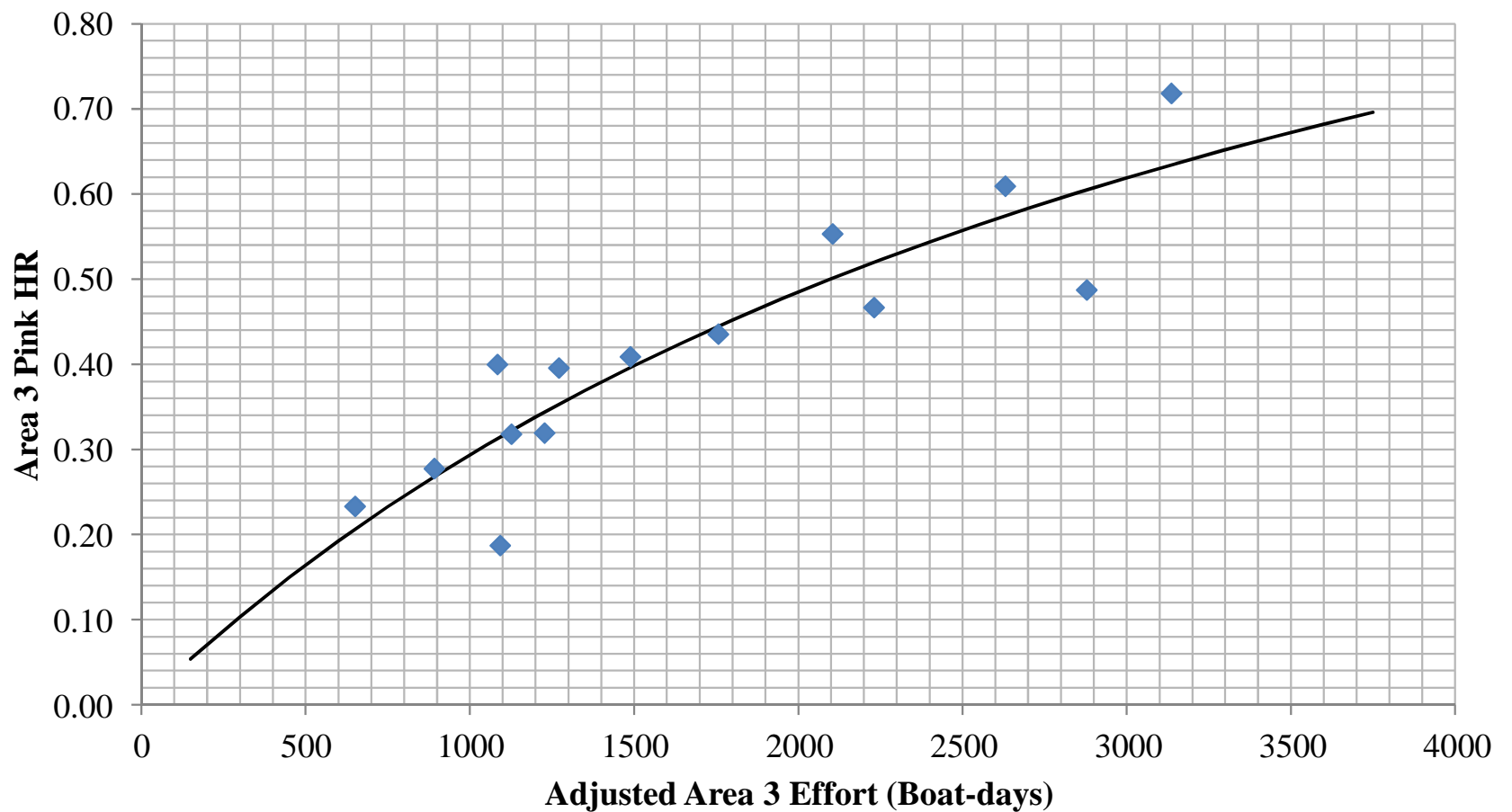
- ✦ 9 odd year CUs, 7 even year CUs
- ✦ Most CUs have >10 indicator streams
- ✦ Area 3-5 ERs derived from historical effort-HR relationships. based on NB Run Recon Model
- ✦ Area 1, 2, 6-10 $ER = TCC / (TCC + E)$



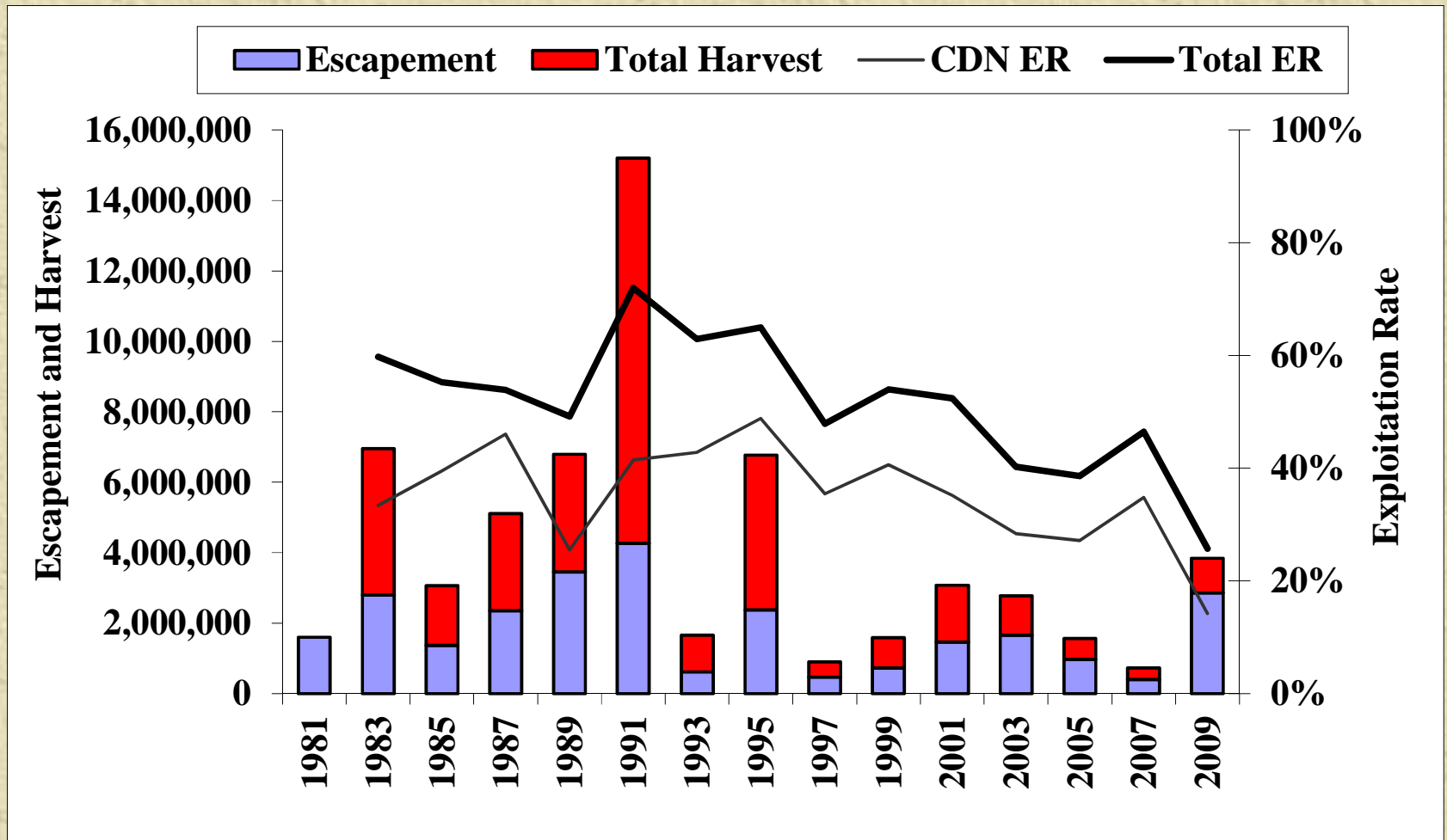
Pink – Area 3 HR Estimates

Area 3 Effort - HR Relationship (1982-95)

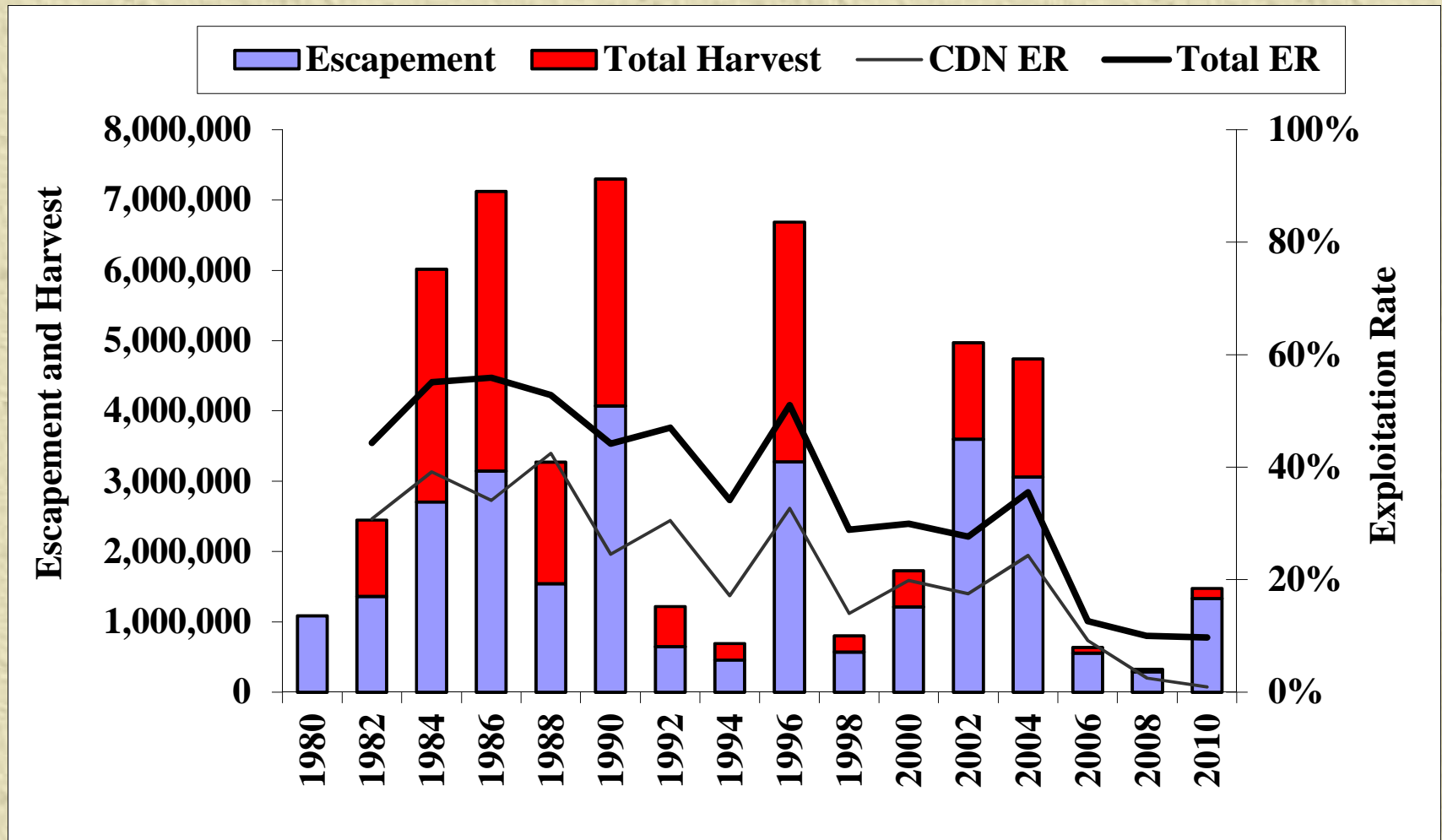
$$HR = 1.388 * \text{Effort} / (\text{Effort} + 3726)$$



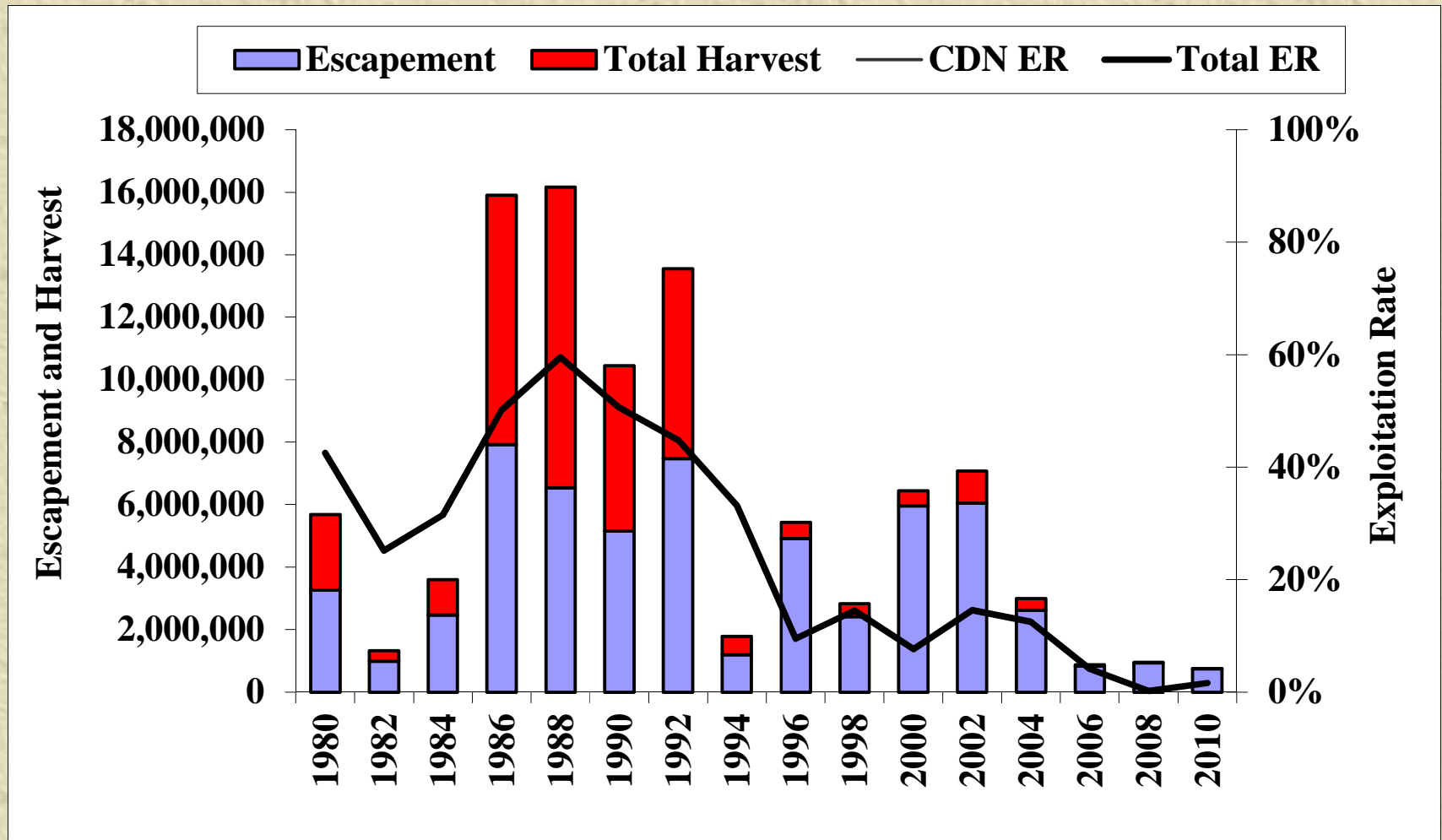
Pink (odd) – Lower Skeena CU (5 indicator streams of 48 total streams)



Pink (even) – Nass-Skeena Estuary (37 indicator streams of 160 total streams)



Pink (even) – Hecate Strait Fjords (70 indicator streams of 146 total streams)



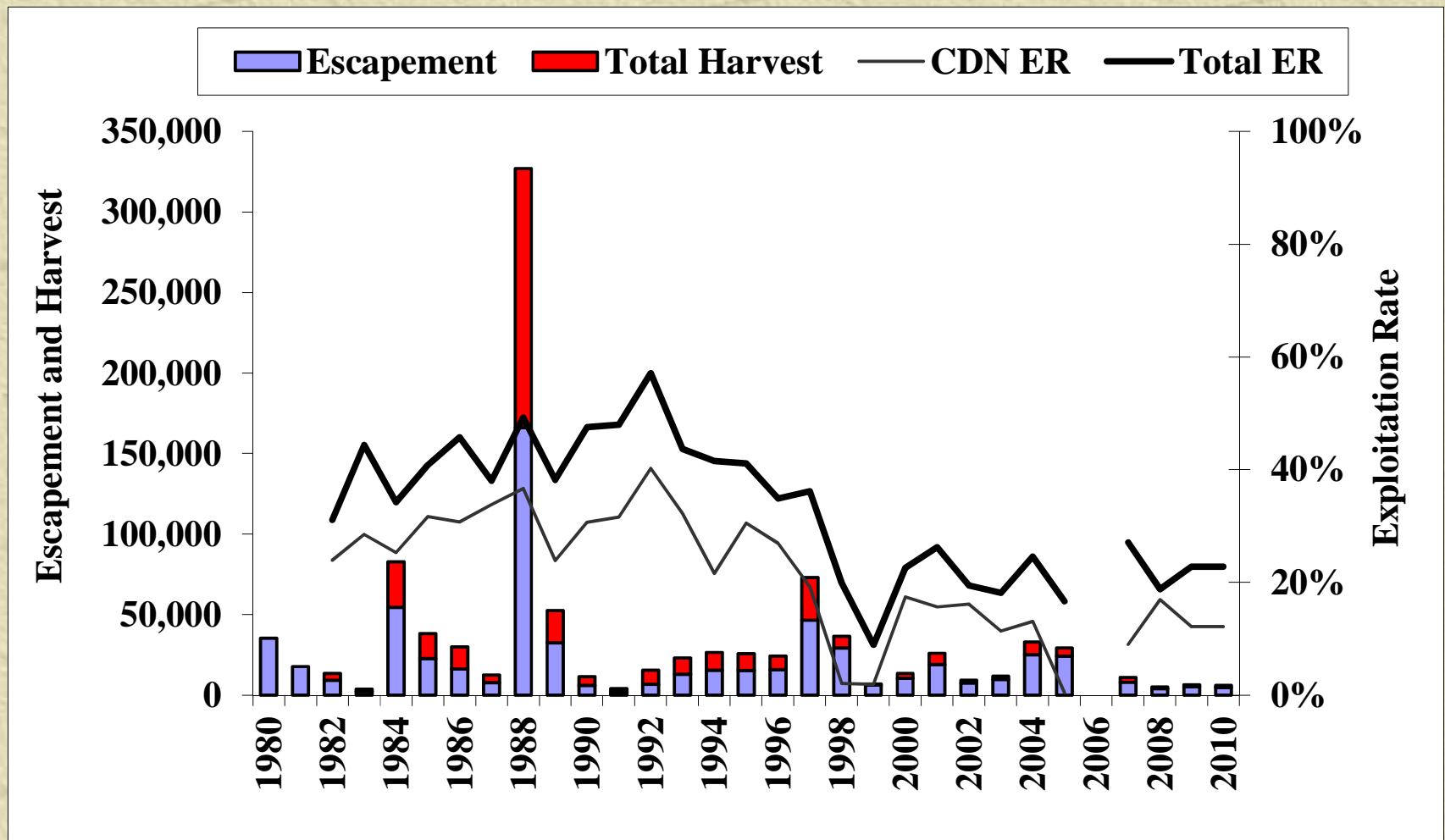
Chum Summary

- ✦ 18 CUs, 232 Indicator Streams
- ✦ Area 2 and 6-8 CUs (>10 indicator streams/CU)
- ✦ Limited escapement data for Areas 3-5
- ✦ Area 3-5 ERs derived from weekly sockeye HRs from NB Run Recon Model + chum run timing
- ✦ Area 1, 2, 6-10 $ER = TCC / (TCC + E)$

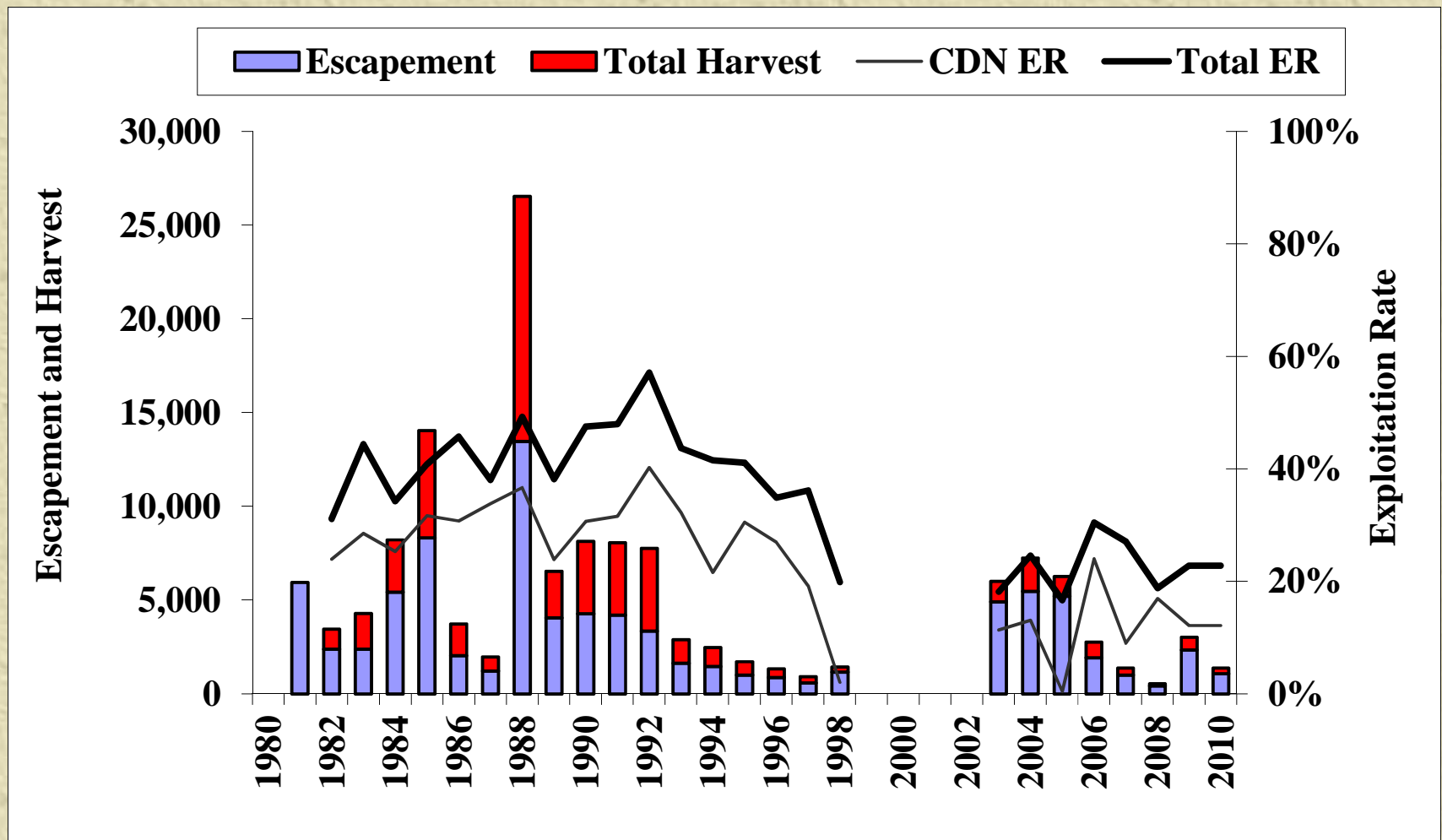


Chum – Lower Skeena CU

(6 indicator streams of 32 total streams)

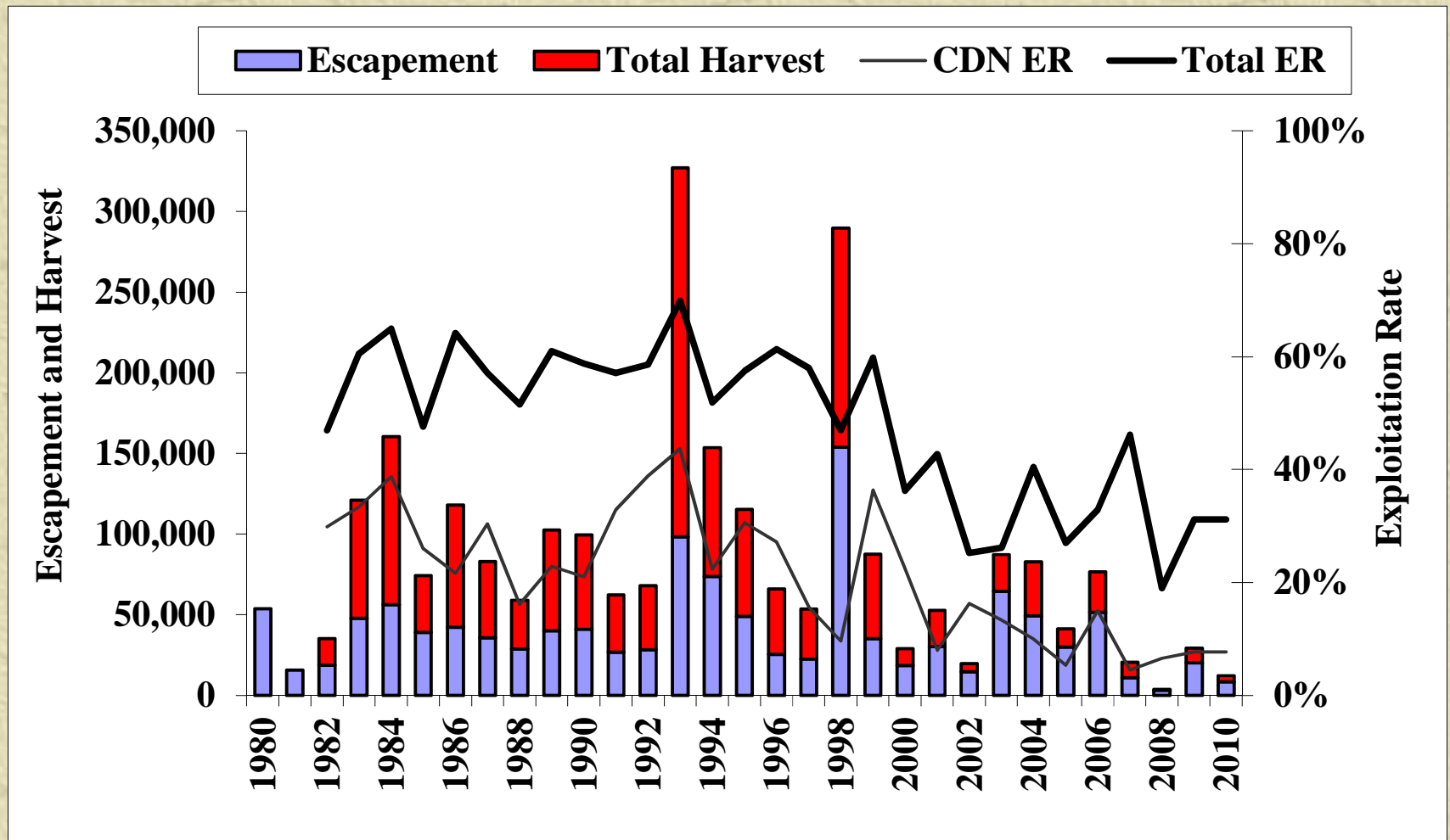


Chum – Middle Skeena CU (2 indicator streams of 16 total streams)



Chum – Portland Canal

(6 indicator streams of 15 total streams)



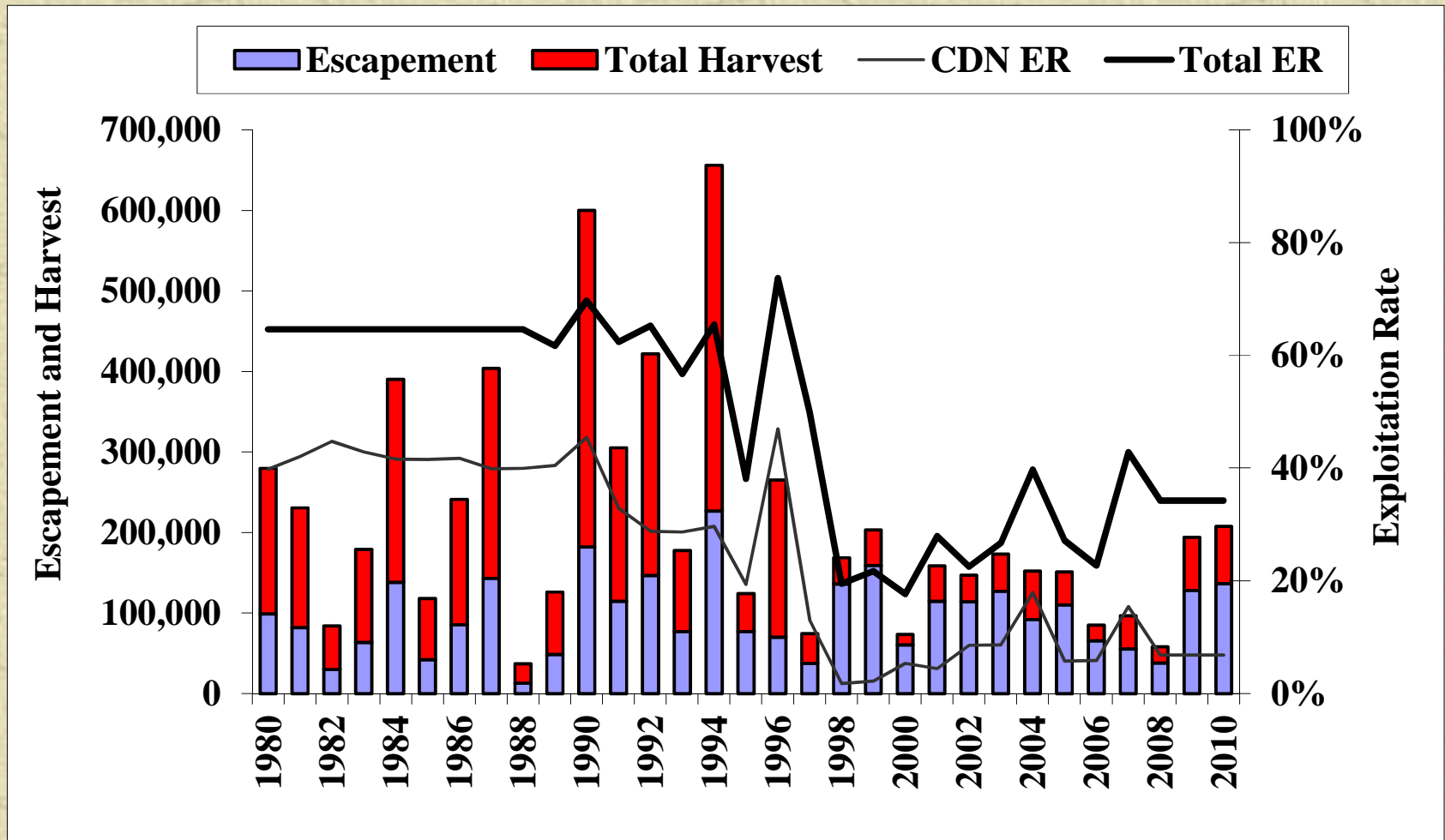
Coho Summary

- ✦ 18 CUs, 98 Indicator Streams
- ✦ <10 indicator streams for most CUs
- ✦ Most escapement estimates are underestimates
- ✦ ERs derived from CWT data and NCCC Coho Model
- ✦ Alaska ERs derived from CWT data for Area 3 and 4 stocks.



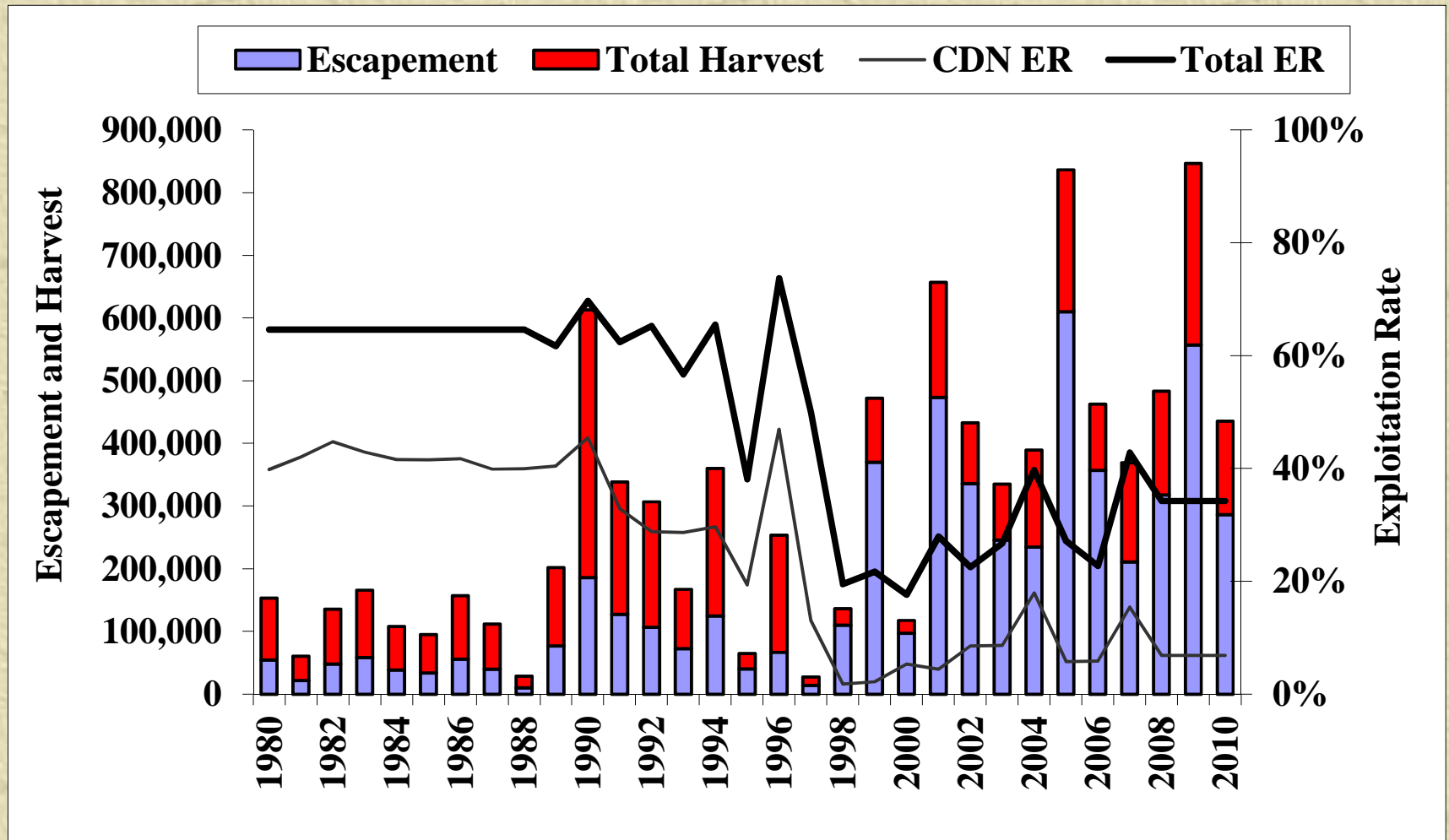
Coho – Lower Skeena CU

(11 indicator streams of 84 total streams)



Coho – Middle Skeena CU

(15 indicator streams of 74 total streams)

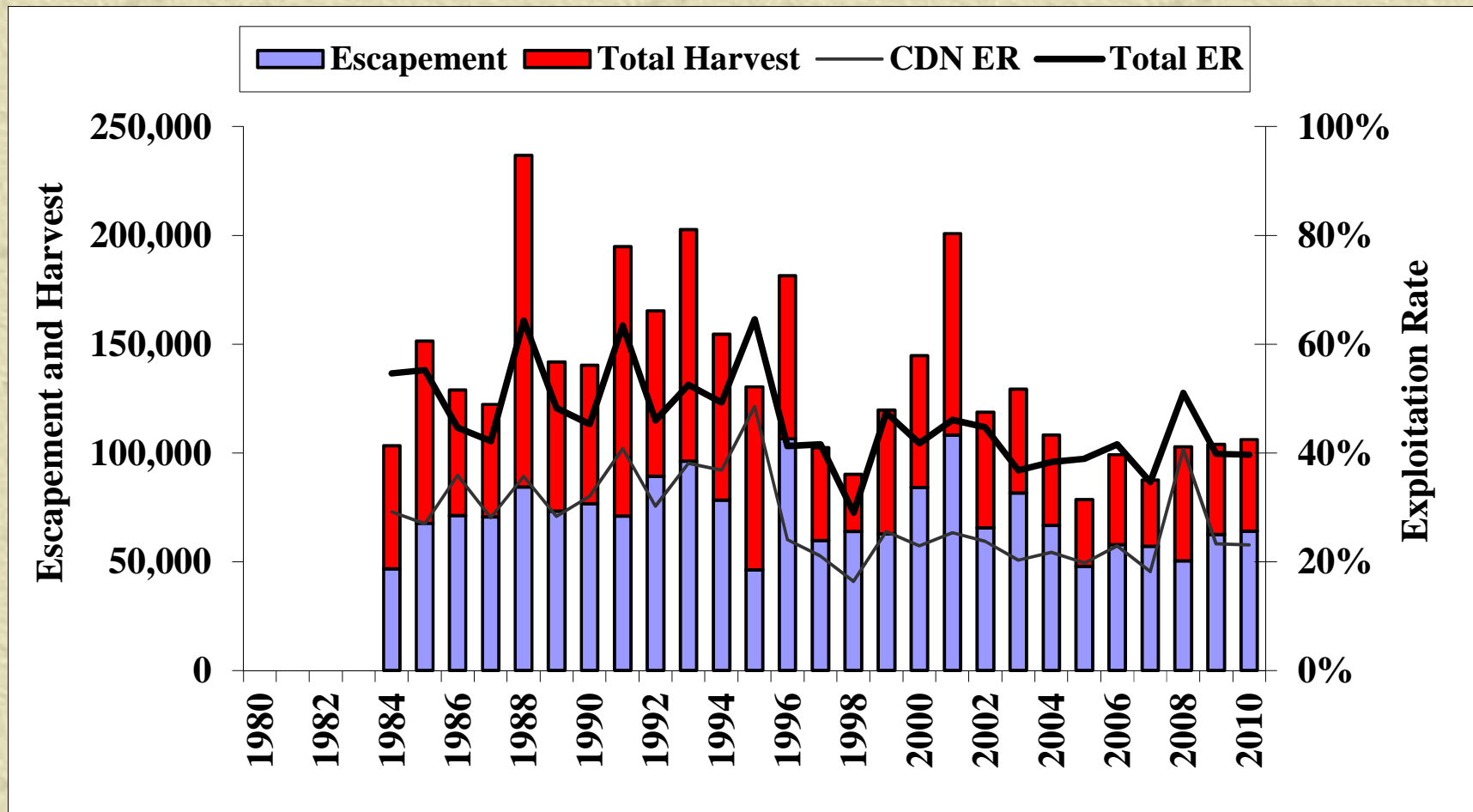


Chinook Summary

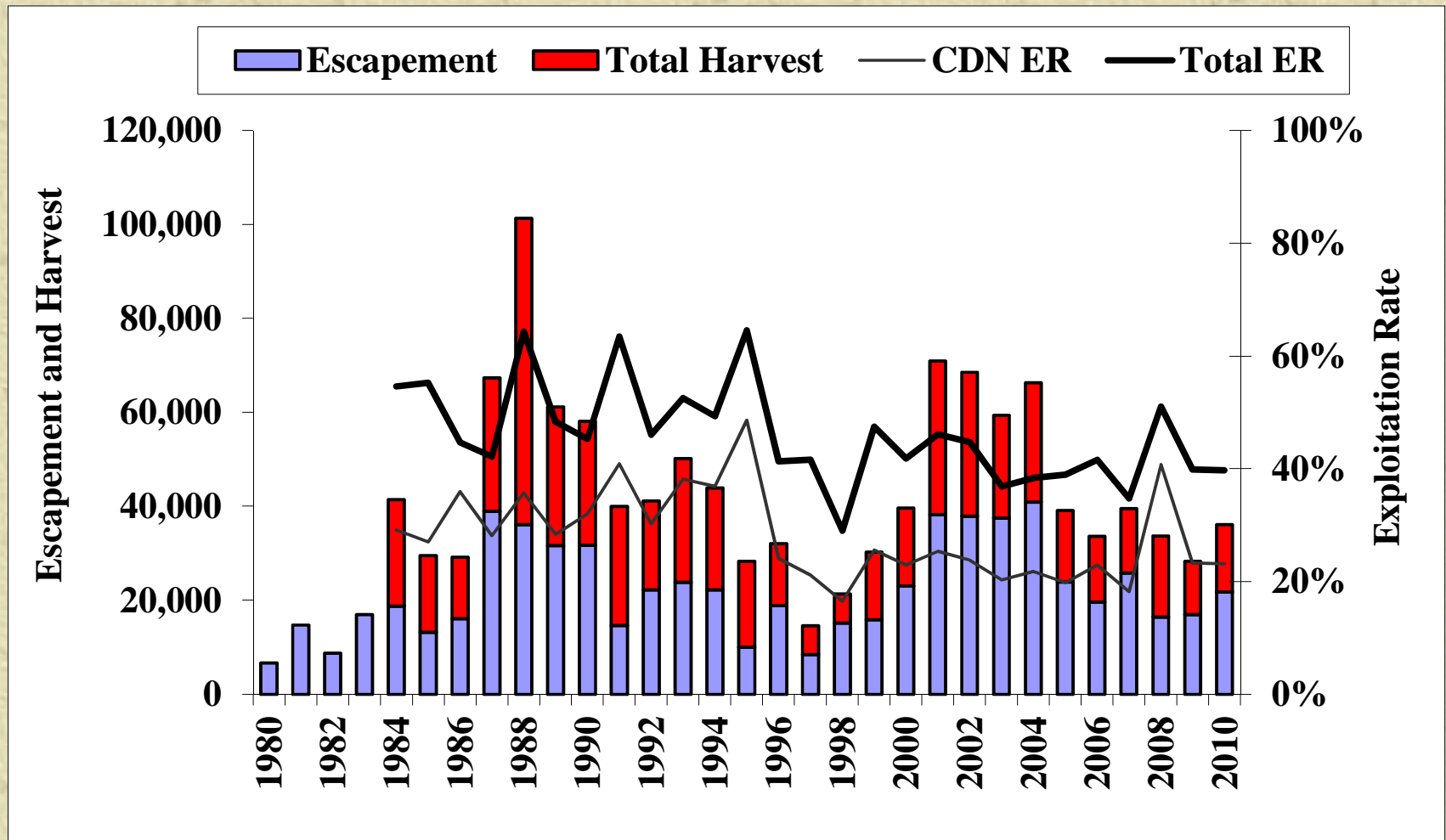
- ✦ 18 CUs, 36 Indicator Streams
- ✦ 1-5 indicator streams for most CUs
- ✦ Wide range in quality of escapement estimates
- ✦ ERs derived from CWT data, catch in terminal areas and some DNA data
- ✦ Alaska ERs for Area 3 stocks from recent DNA data, Area 4 stocks from CWT data.



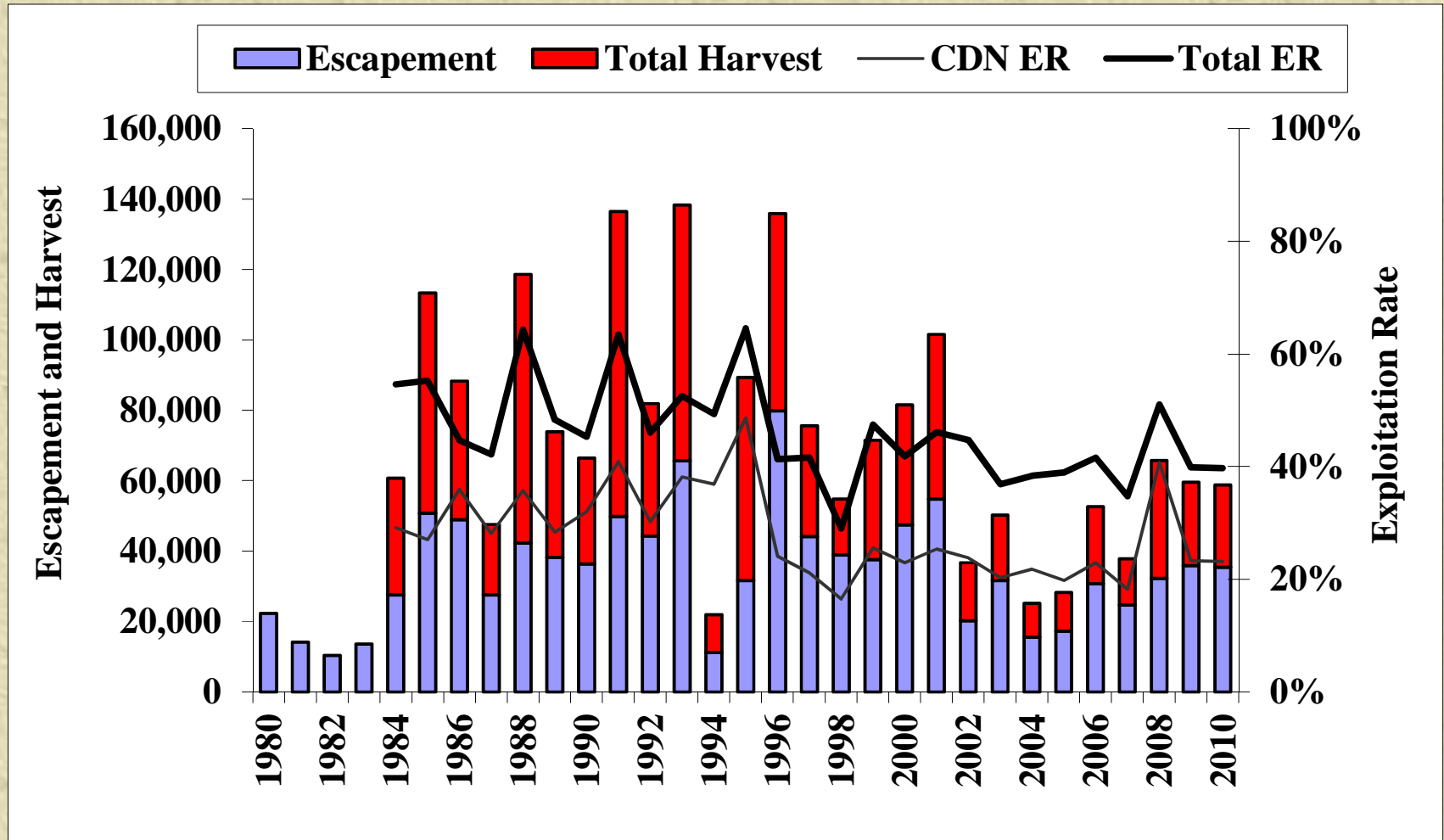
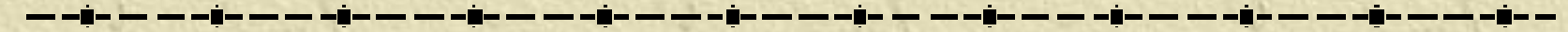
Chinook – Skeena Watershed



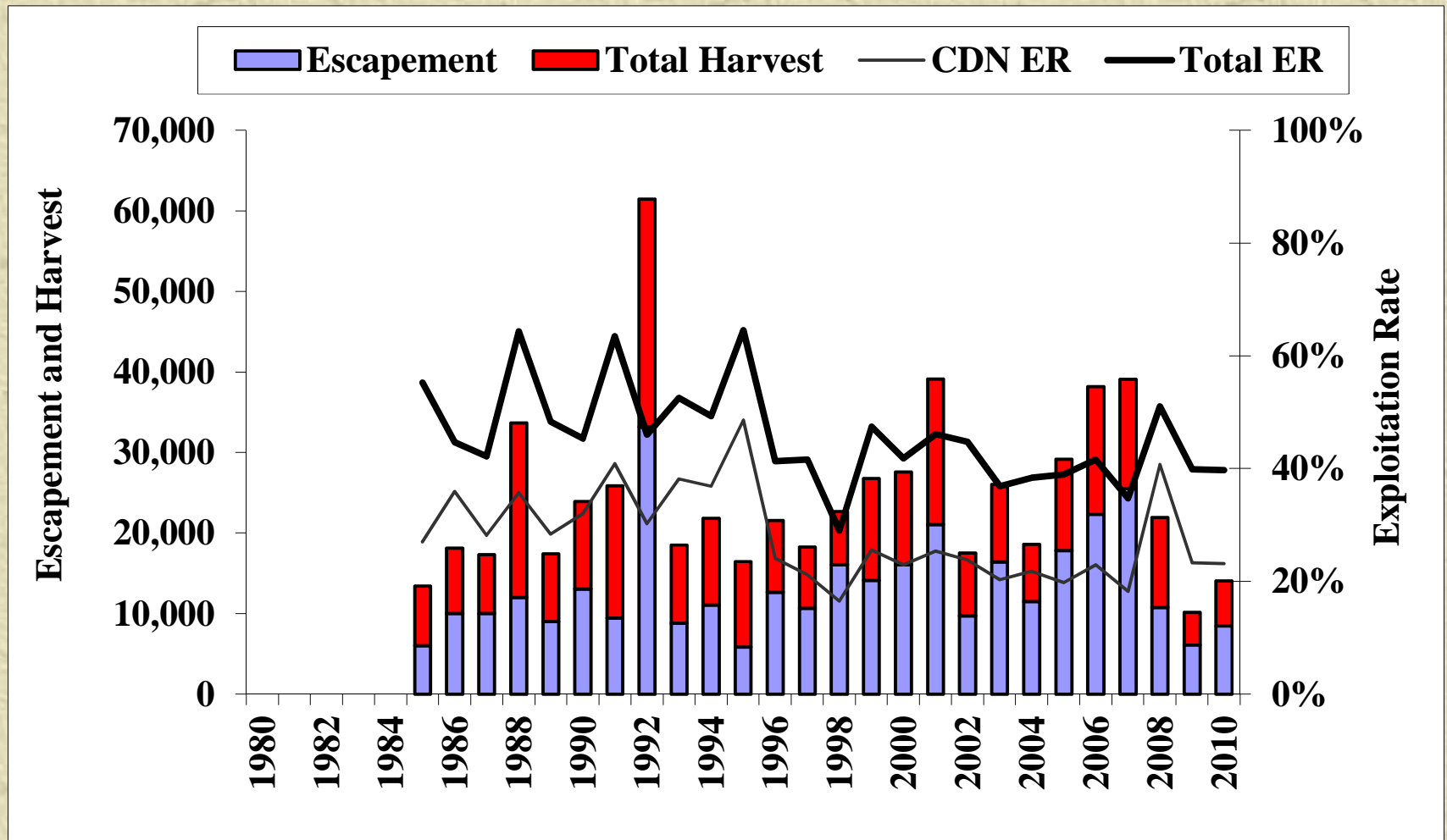
Chinook – Kalum-Late CU



Chinook – Middle Skeena Large Lakes (5 indicator streams of 12 total streams)



Chinook – Middle Skeena Tribs (3 indicator streams of 24 total streams)



Escapement Indicator Stream Summary

- North and Central Coast (Areas 1-10)



Species	Number of CUs	Total Streams	Indicator Streams	Survey Quality Ratings				
				1	2	3	4	5
Sockeye salmon	57	219	84	17	36	24	3	2
Pink salmon (odd)	9	582	140	14	70	51	5	0
Pink salmon (even)	7	744	191	17	85	74	15	0
Chum salmon	18	647	232	29	117	73	13	0
Coho salmon	18	807	98	16	48	27	6	1
Chinook salmon	18	175	36	10	16	7	3	0
Total	127	3174	781	103	372	256	45	3
Percentage				13%	48%	33%	6%	0%

North and Central Coast Recommendations

- ✦ Streamline nuSEDS data updating process
- ✦ Establish a new database to house all exploitation rates
- ✦ Upgrade DFO catch databases and make more accessible to DFO staff
- ✦ Further review of run timing for Nass and Skeena sockeye stocks and associated sensitivity analysis
- ✦ Stock-recruitment analysis
 - Limited age composition data
 - Use results with caution

