

Chinook Harvest Management Plan Performance

5+ year assessment

Tools For Assessment of Harvest

- FRAM
- Coded Wire Tag (CWT) recoveries
- Reconstruction of run thru fisheries and escapement

What is FRAM?

- Fishery Regulation Assessment Model
- Computer model used for fishing season decision-making during annual management processes and postseason evaluation of management actions.
- Tool to evaluate different stock abundances and fishing season scenarios against stock conservation management objectives

What does FRAM measure?

- For each fishing year:
 - Landed catch and total mortality by stock and fishery
 - Exploitation rates by stock and fishery
 - Estimates of hatchery and natural stock escapement

What FRAM doesn't measure?

- Long-term, multi-generation rebuilding or recovery projections
- Effects on abundance and productivity from the other three H's (habitat, hatcheries, hydro)
- Changes to migration patterns and fishery catch rates due to ocean conditions and/or climate change

Other Assessment Tools:

- For FRAM and management performance: CWT analysis by Chinook Technical Committee of Pacific Salmon Commission
- For ceiling ERs and long-term productivity: Spawner-to-adult productivity analysis (“stock-recruitment” — S/R)
- For annual stock abundance accounting: Returns to fisheries and escapement (“Run Reconstruction”)
- For stock composition in selected fisheries: DNA analysis

Evaluations required by 2004 plan

- Annual Chinook Management Report

- Summary of fisheries, catches, non-landed mortalities, escapement, etc.
- Comparisons of pre-season projections and actual results
- Information on CWT & biological sampling

- 5-Year Assessment

5-Year Assessment

- For each population, the 5-year assessment reviewed:
 - Current management objectives
 - Population status/trends
 - Management performance in relation to objectives
 - Comparisons of FRAM post-season rates to pre-season projections and conservation objectives
 - Comparison of FRAM rates to CWT-based estimates
 - Analysis of forecast accuracy

Multi-Year Assessment

- This presentation will focus on:
 - Current management objectives
 - Management outcomes in relation to objectives and pre-season expectations (using FRAM)
 - Population status/trends (using escapement data)
- Data/conclusions are similar to those presented in the 5-year review, but include updated data & analysis where available

Skagit Spring Chinook

- Current conservation objectives

- FRAM Total Exploitation Rate < 38%
- Low Abundance Threshold = 576 spawners
 - Critical Exploitation Rate Ceiling =
Southern United States Exploitation Rate < 18%

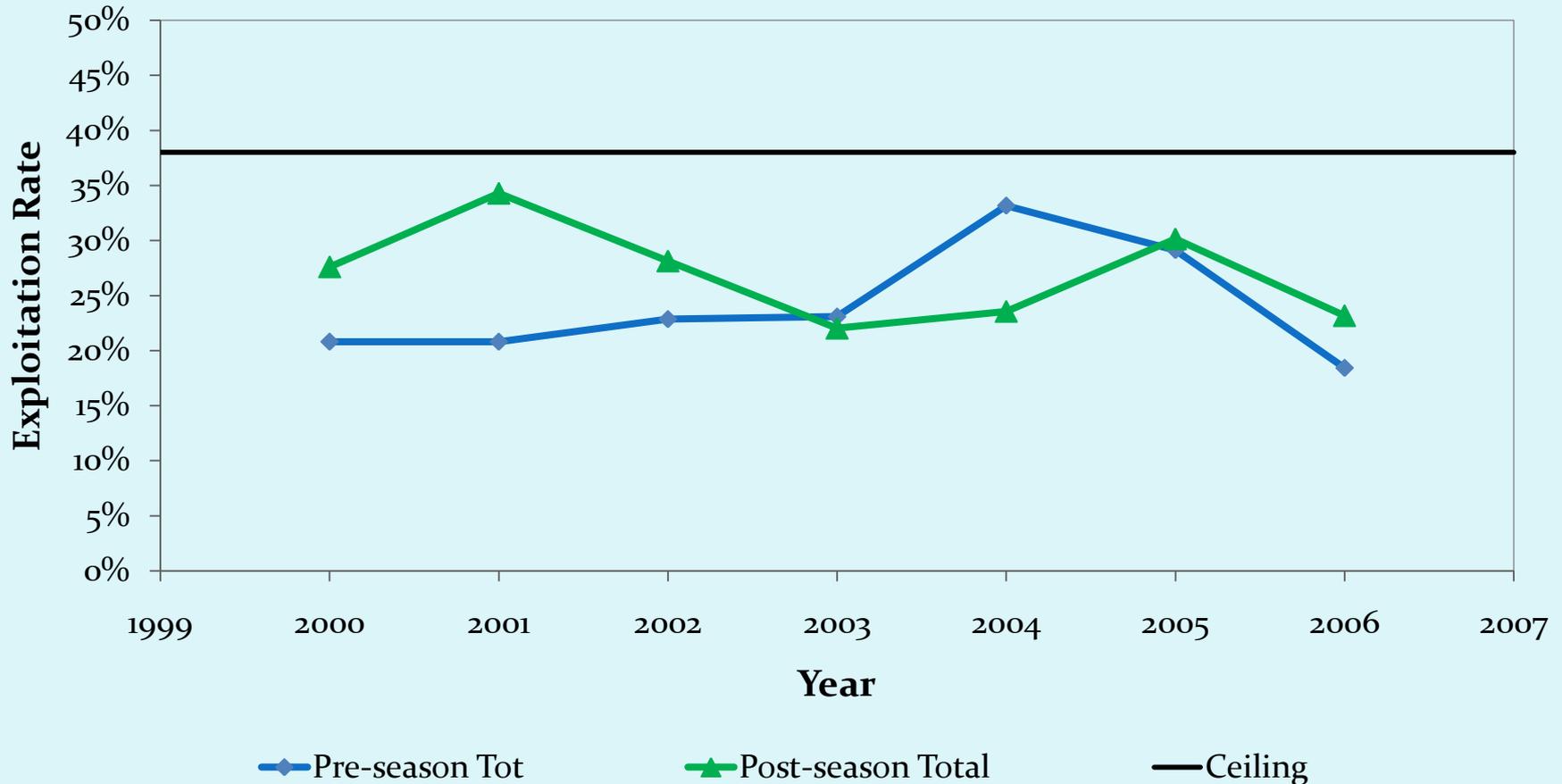
Skagit Spring Chinook

- Management performance

- FRAM post-season ('actual') rates have been < 38% RER since 2000, ranging from 20% to 34%

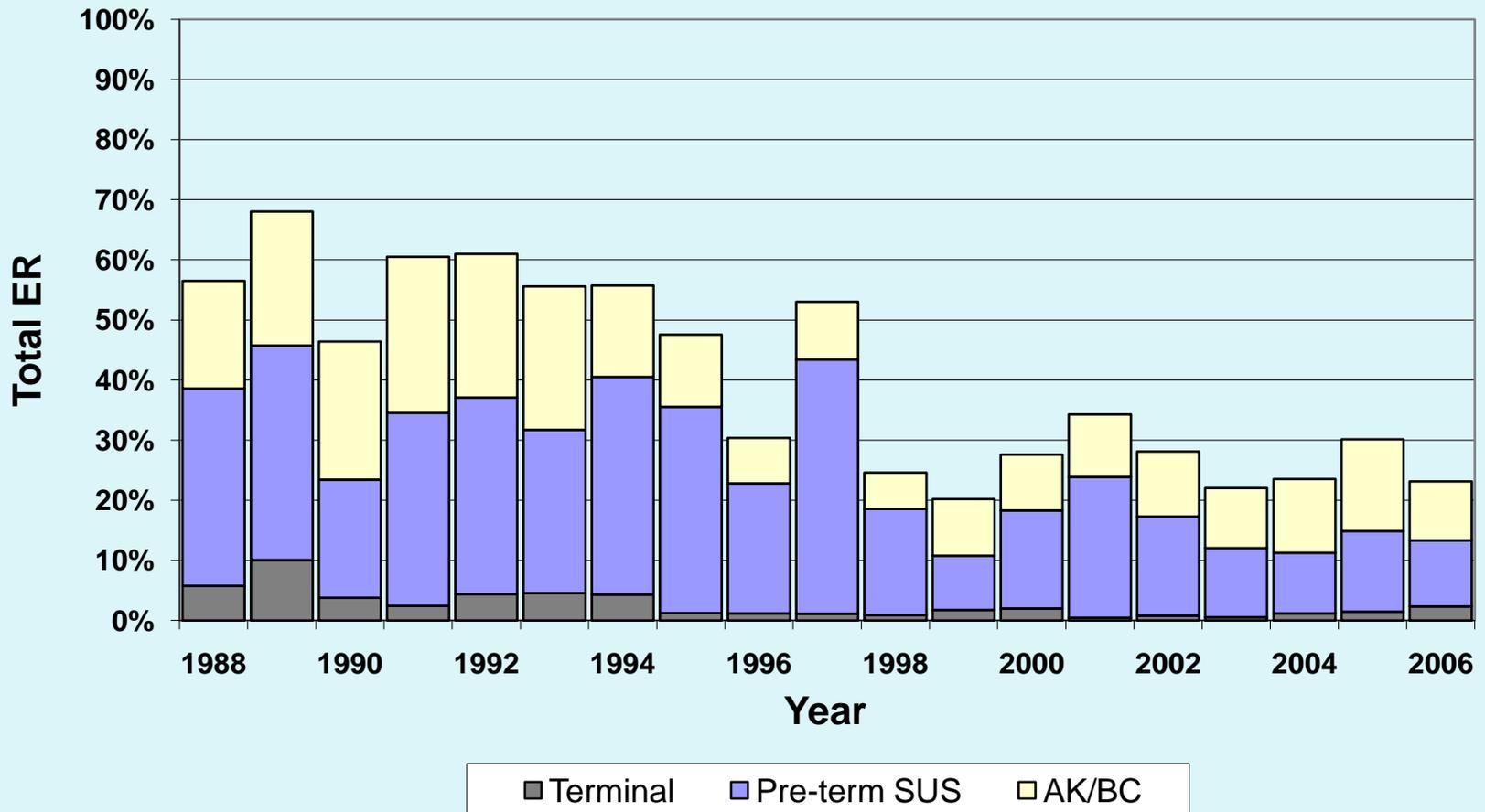
Skagit Spring Chinook

● Pre-season vs. post-season exploitation rates



Skagit Spring Chinook

● Post-season FRAM Exploitation Rates 1988-2006

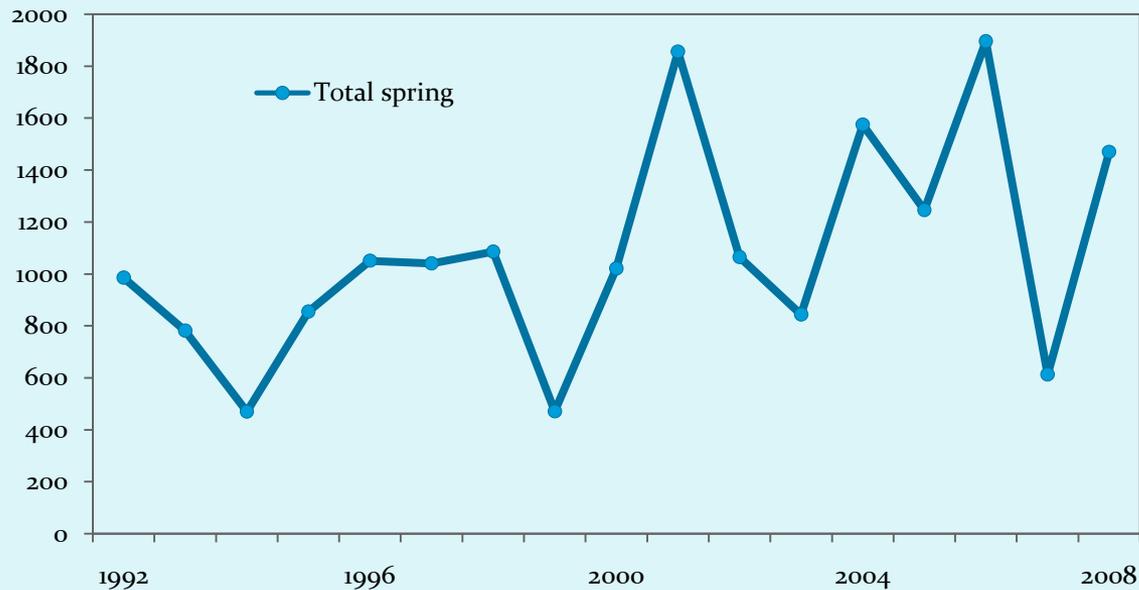


Skagit Spring Chinook

● Population status

- 15-year escapement trends positive for Upper Sauk and Cascade, stable for Suiattle

Skagit Spring Chinook Escapement



Skagit Summer/Fall Chinook

- Current conservation objectives

- FRAM Total Exploitation Rate $< 50\%$
- Low Abundance Threshold = 4,800 spawners
 - Critical Exploitation Rate Ceiling =
Southern United States Exploitation Rate $< 15\%$

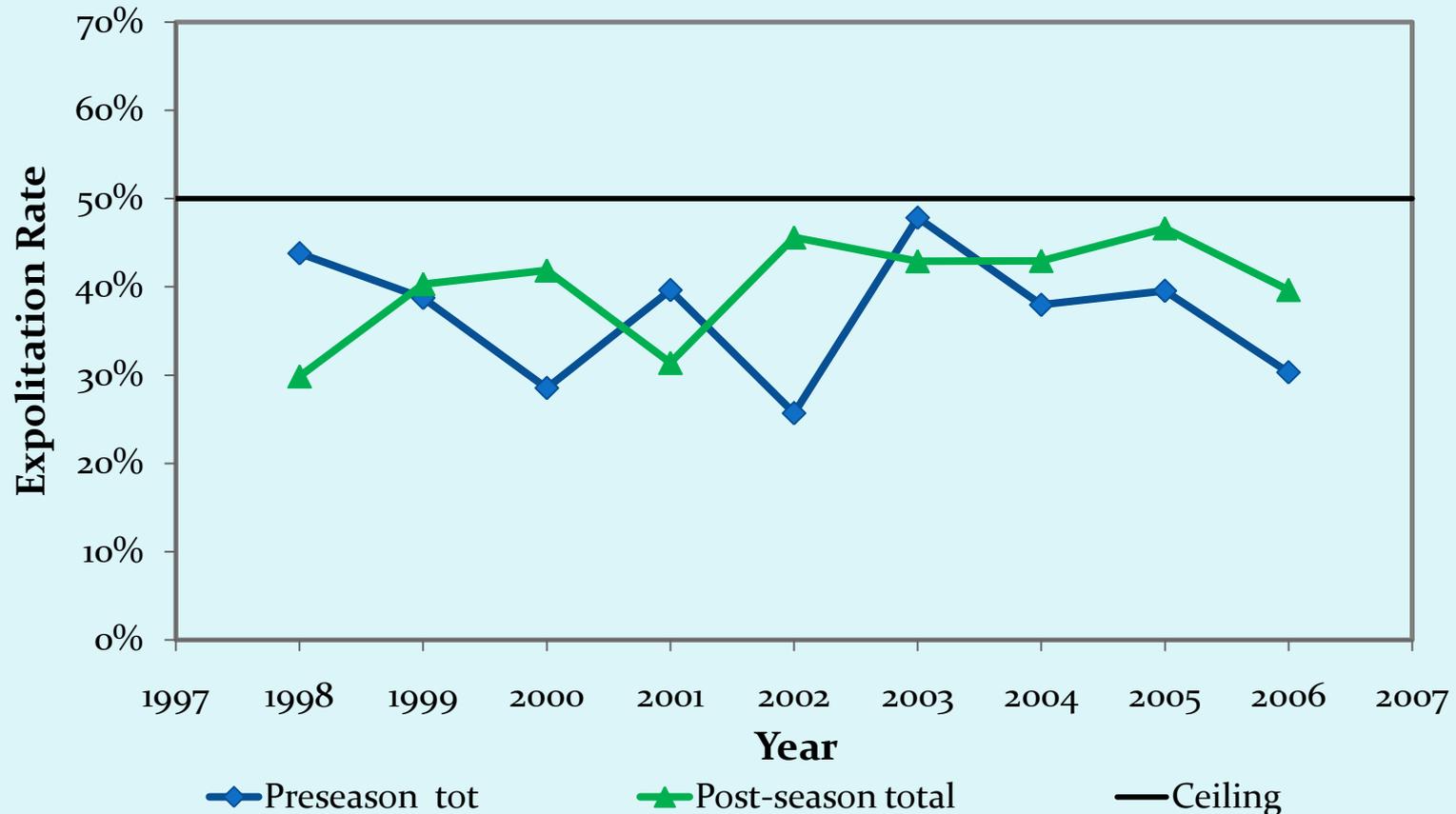
Skagit Summer/Fall Chinook

- Management performance

- FRAM post-season ER's have ranged from 42% - 47% from 2000-2006, below 50% RER

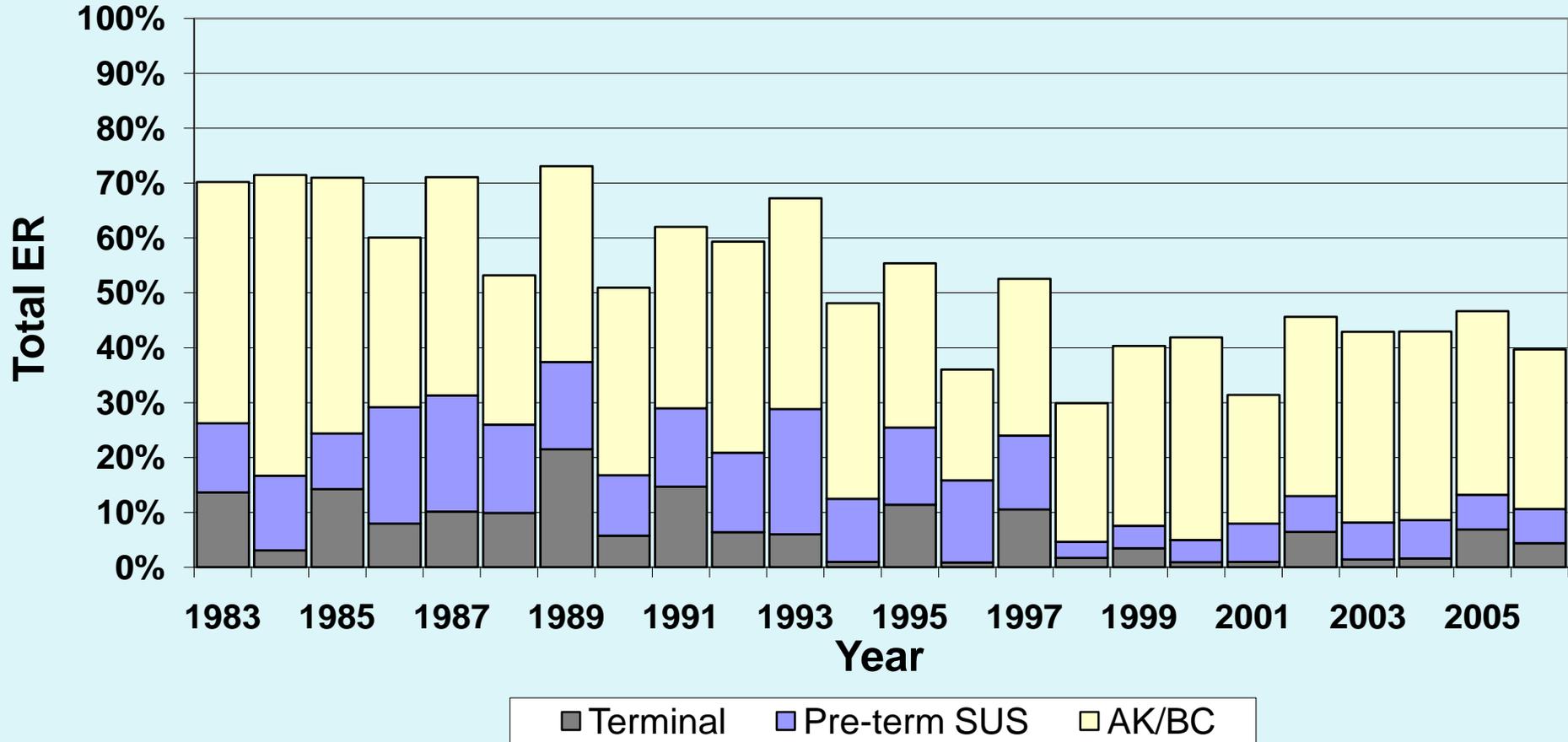
Skagit Summer/Fall Chinook

● Pre-season vs. post-season exploitation rates



Skagit Summer/Fall Chinook

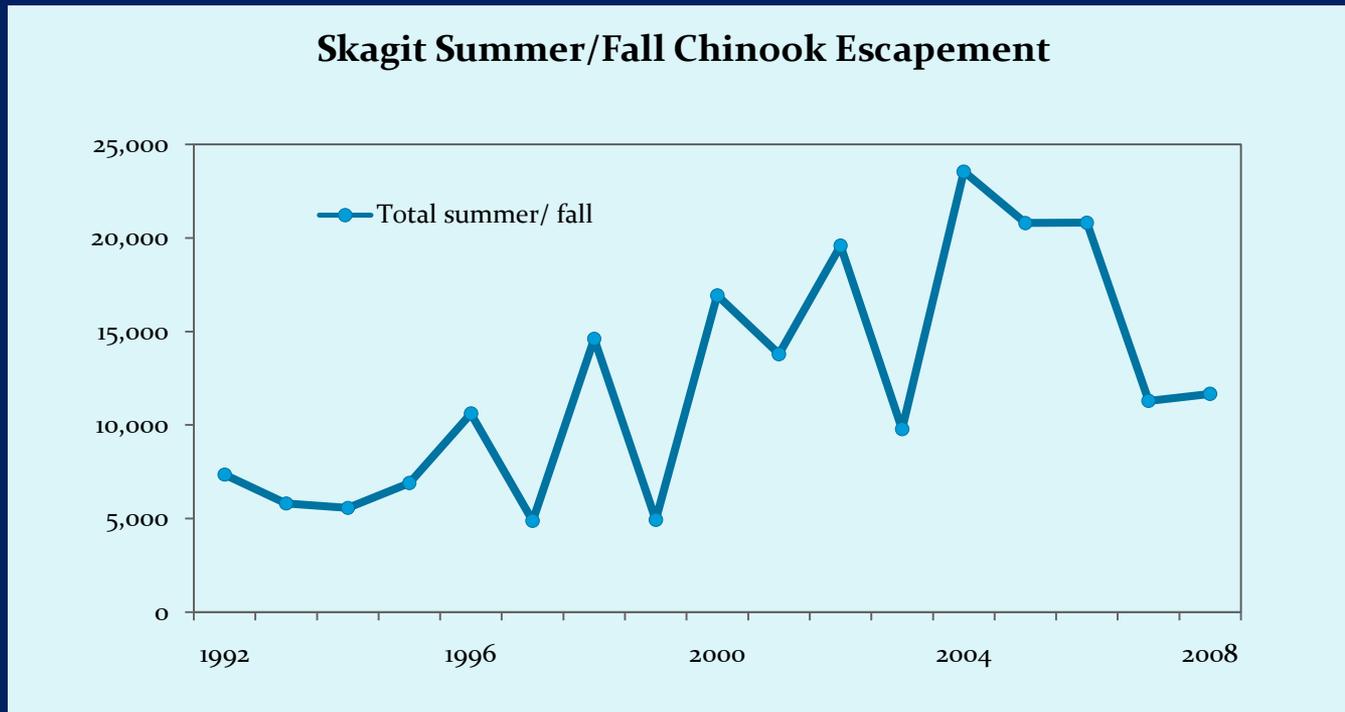
● Post-season FRAM Exploitation Rates 1983-2006



Skagit Summer/Fall Chinook

● Population status

- Escapements for all three populations (Upper Skagit, Upper Sauk, Lower Skagit) have shown increasing trends over the past 15 years



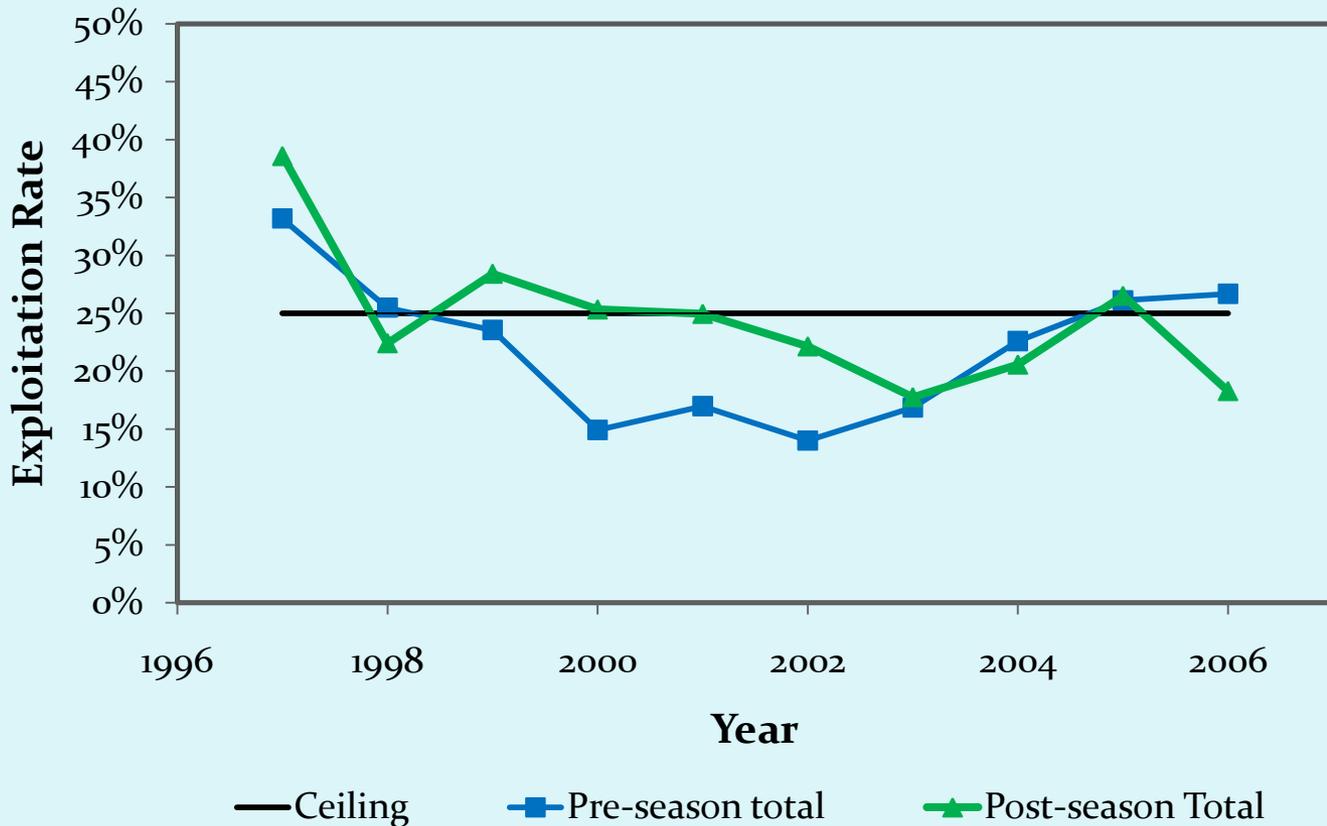
Stillaguamish Summer/Fall Chinook

- Current conservation objectives

- FRAM Total Exploitation Rate <25%
- Low Abundance Threshold = 650 spawners
 - Critical Exploitation Rate Ceiling =
Southern United States Exploitation Rate < 15%

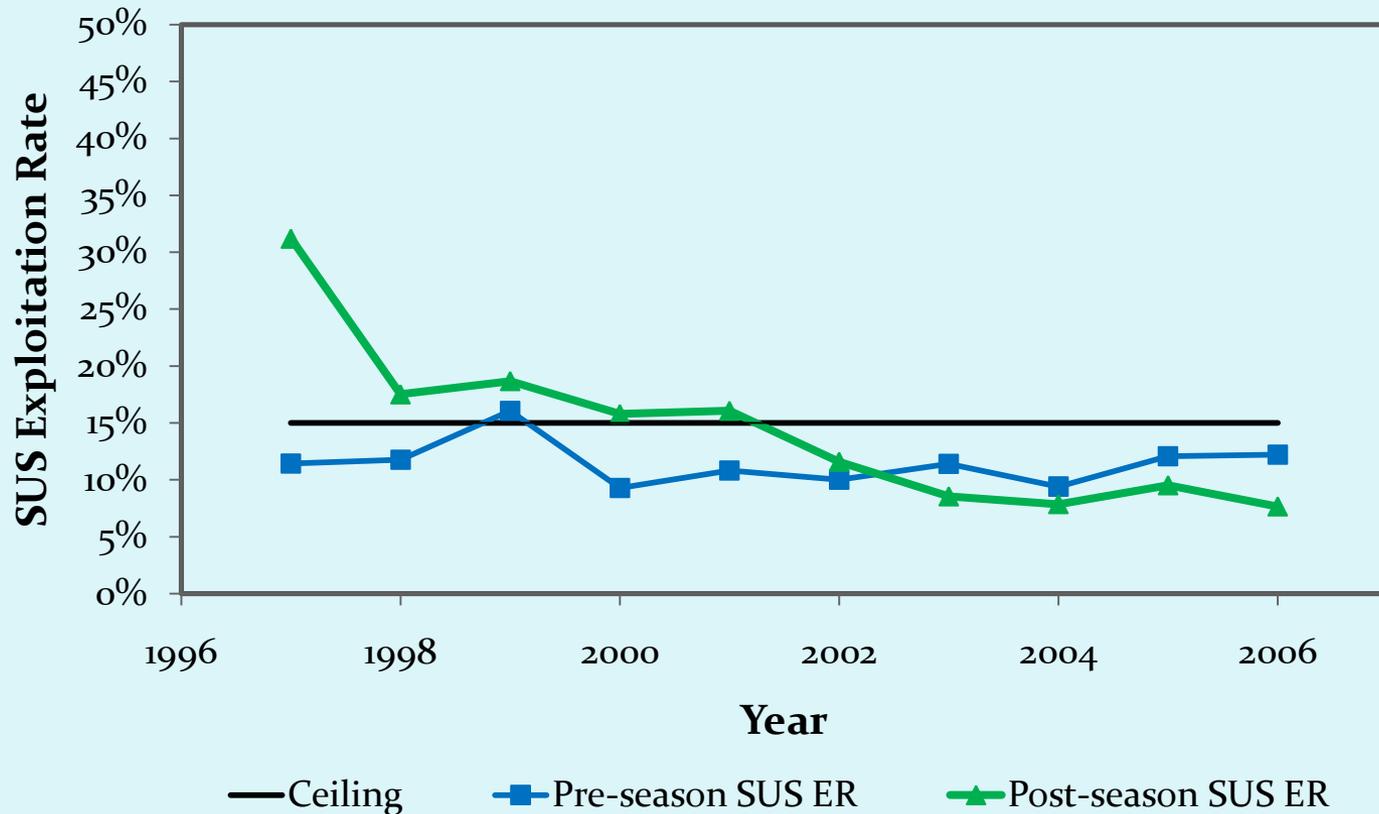
Stillaguamish Summer/Fall Chinook

Pre-season vs. post-season exploitation rates



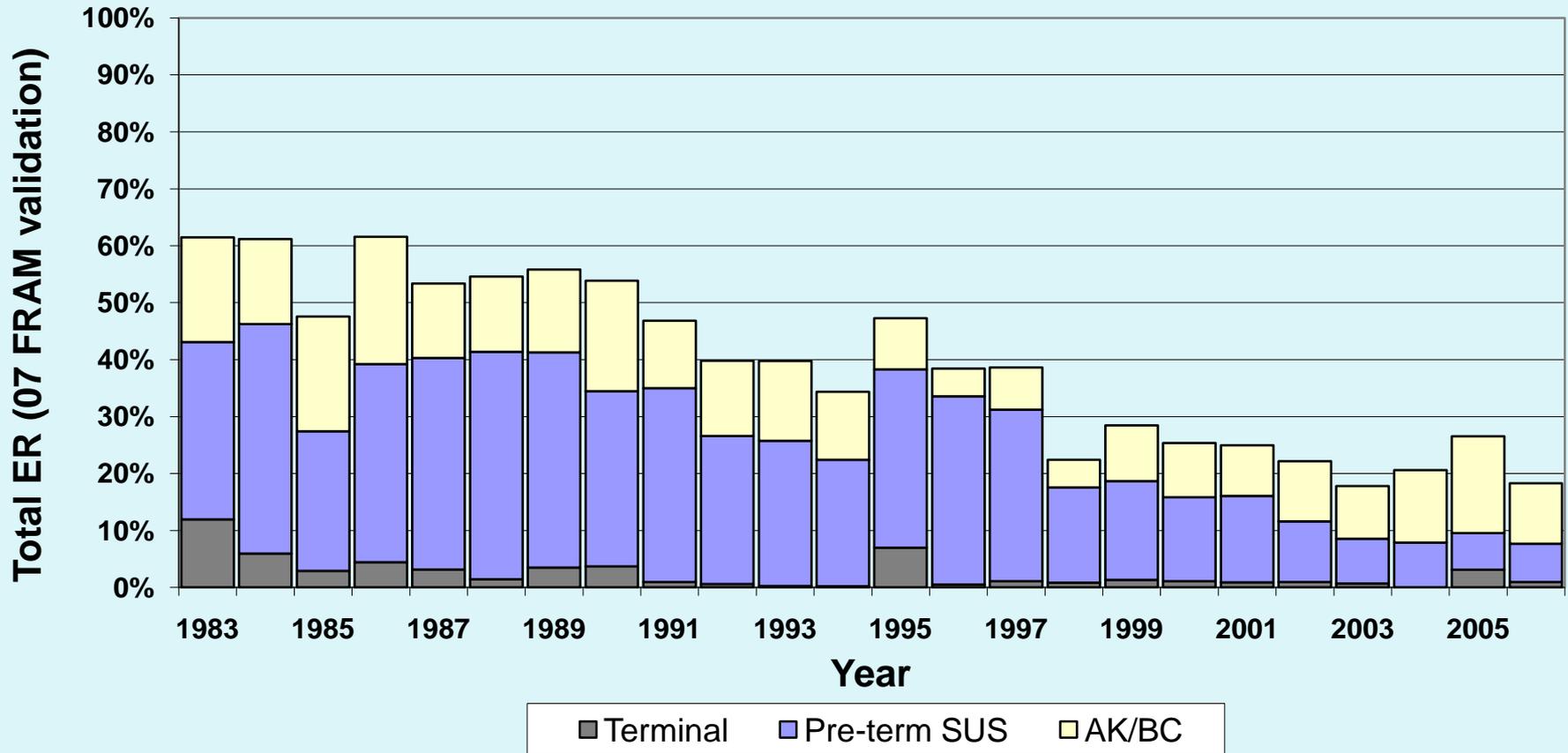
Stillaguamish Summer/Fall Chinook

Pre-season vs. post-season SUS exploitation rates



Stillaguamish Summer/Fall Chinook

Post-season FRAM Exploitation Rates 1983-2006

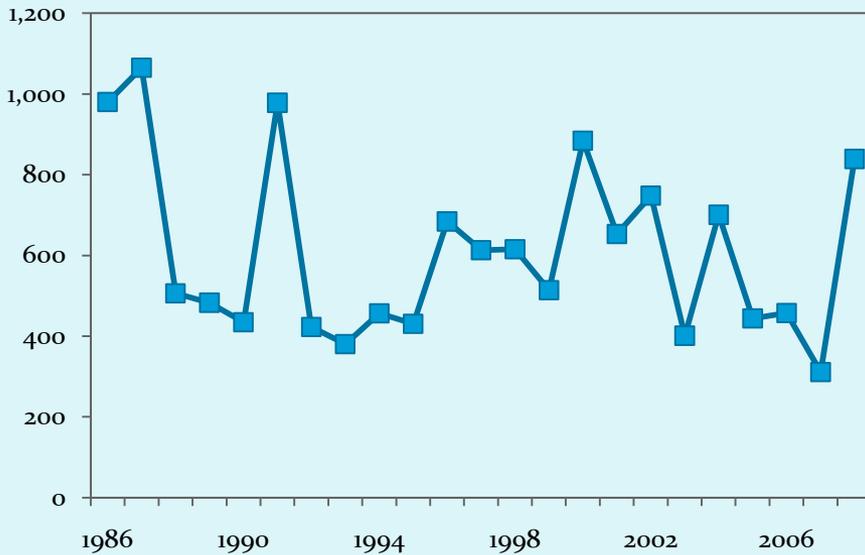


Stillaguamish Summer/Fall Chinook

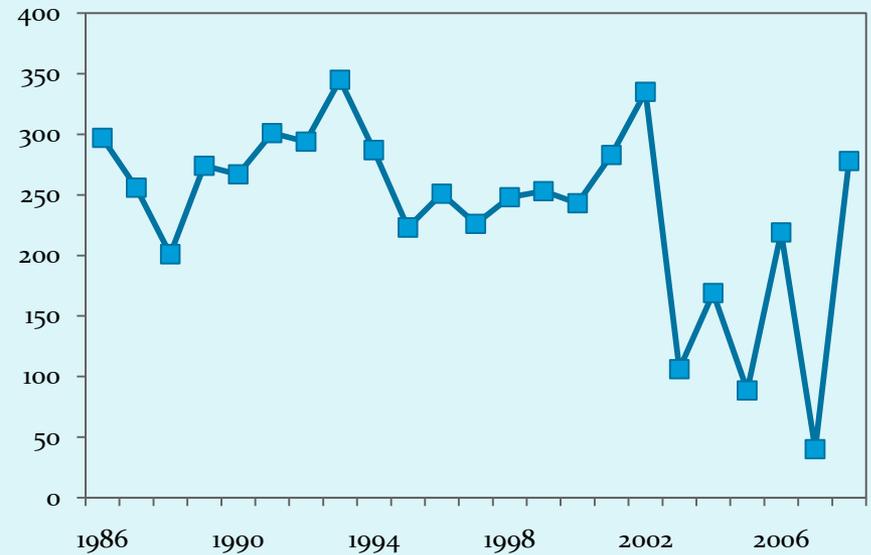
● Population Status

- NF and SF escapements stable/decreasing

Stillaguamish Chinook - NF NOR



Stillaguamish Chinook - SF NOR



Nisqually Fall Chinook

- Management objectives

- Natural spawning escapement goal of 1,200 Chinook (hatchery and wild-origin)

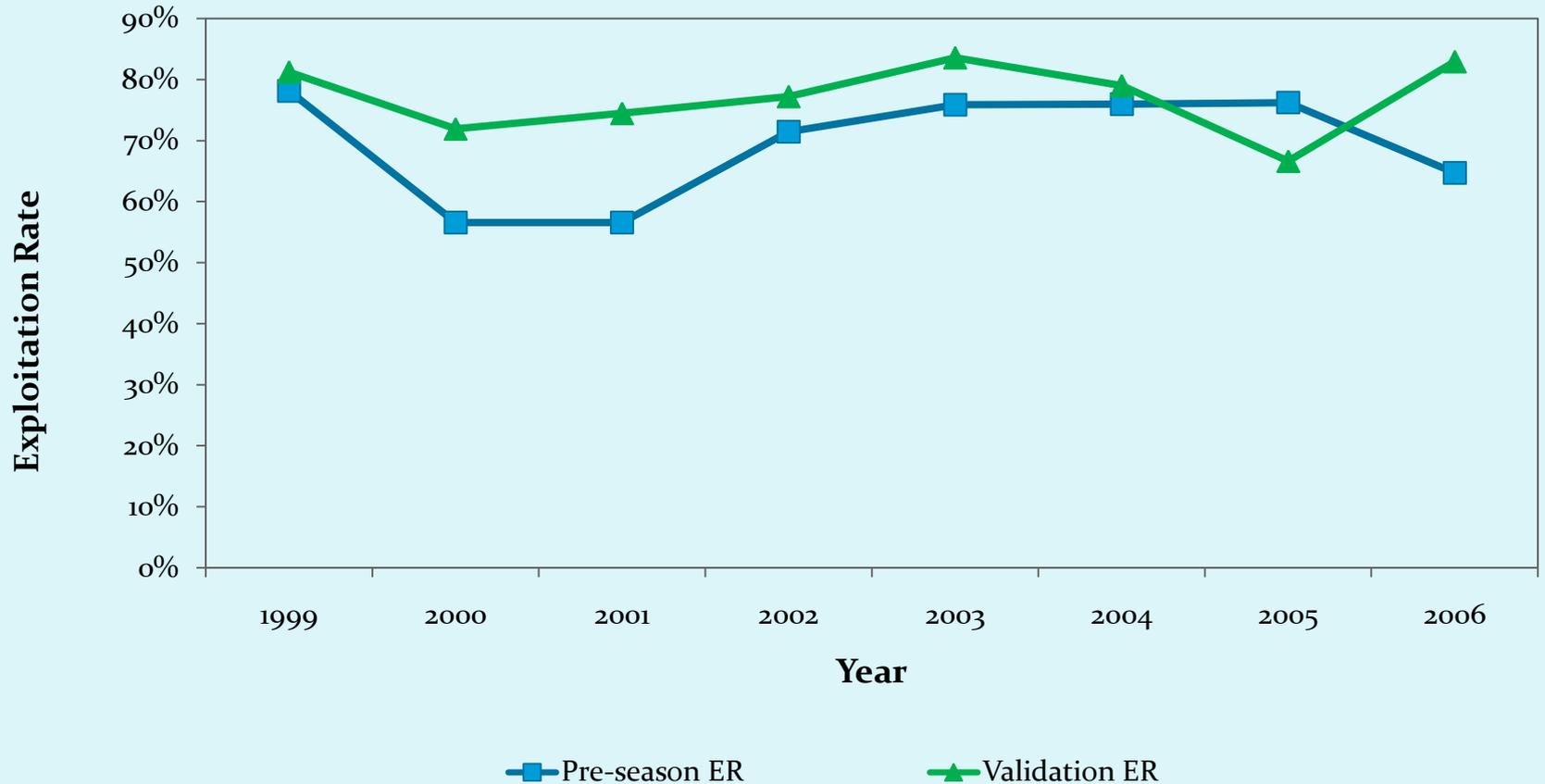
Nisqually Fall Chinook

● Management performance

- Since 2000, the fixed escapement goal was met in 7 of 9 years
- FRAM post-season rates have been consistently higher than pre-season FRAM rates, with both Northern and SUS fisheries exceeding predictions
- FRAM post-season rates have averaged 75% since 2000

Nisqually Fall Chinook

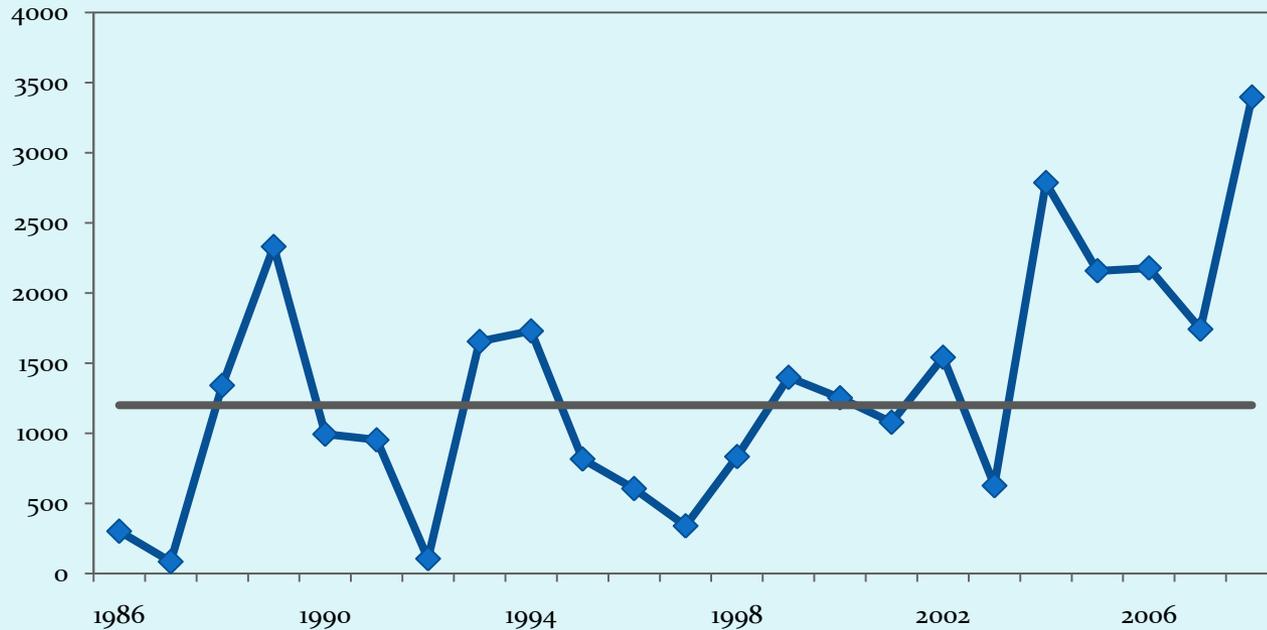
● Pre-season vs. post-season exploitation rates



Nisqually Fall Chinook

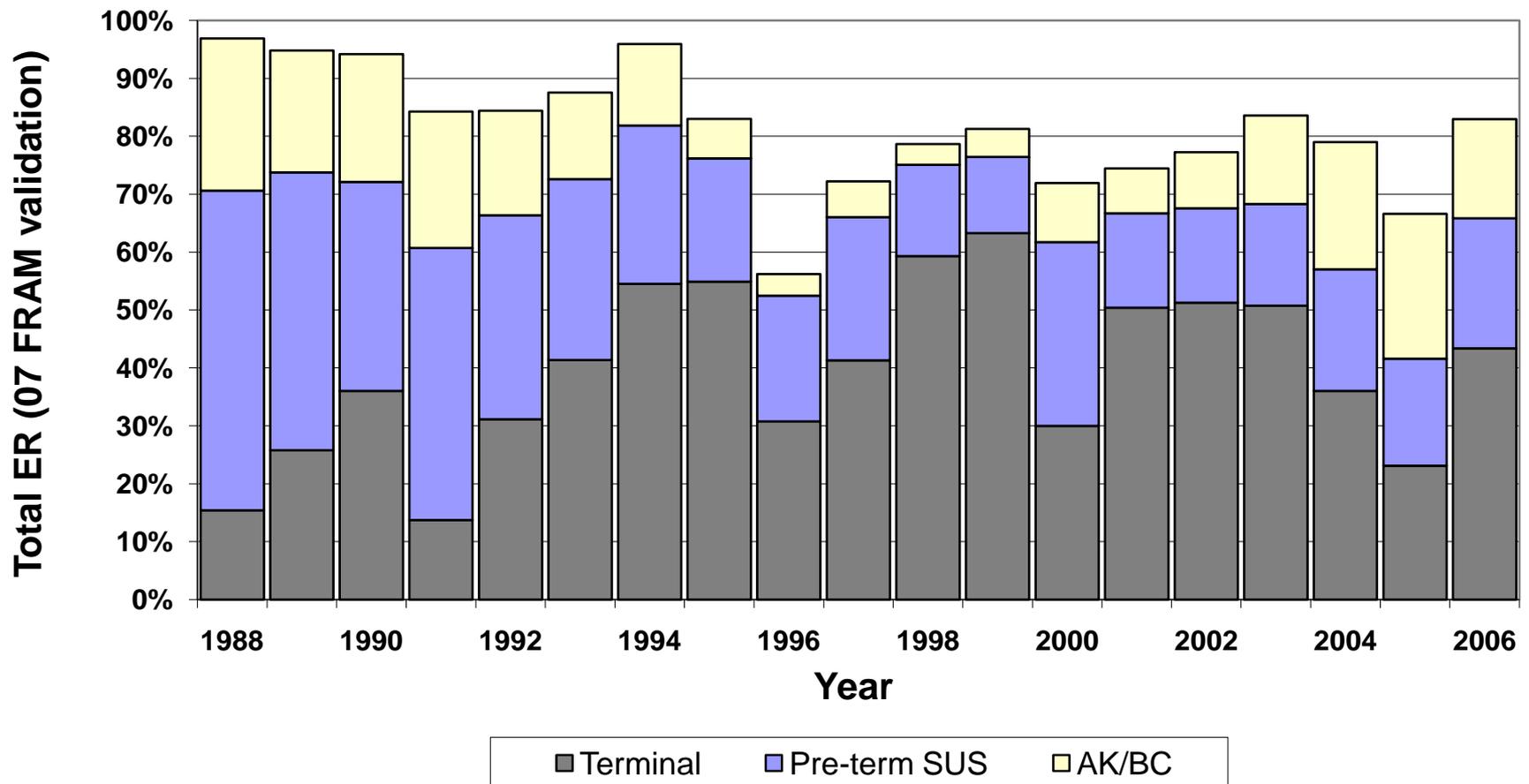
● Management performance

Nisqually Fall Chinook Escapement



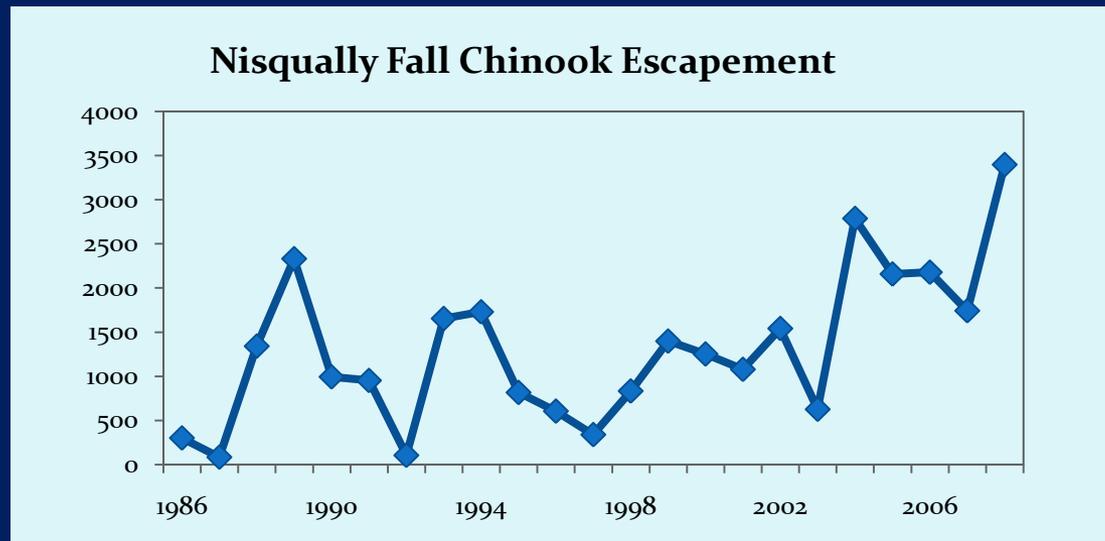
Nisqually Fall Chinook

● Post-season FRAM Exploitation Rates 1983-2006



Nisqually Fall Chinook

● Population status



- 15-year escapement trend is positive
- Part of increase is increased survey effort in Mashel
- Part of increase due to increased hatchery production – HOR's accounted for 60% - 75% of escapement in recent years

Trends in other Chinook MUs

● Nooksack early Chinook

- Management objective of SUS ER <7% consistently met
- SF NOR escapement remains critically low, insufficient data for trend analysis

● Snohomish summer/fall Chinook

- Management objective of SUS <15% consistently met
- Skykomish & Snoqualmie NOR escapements increasing

● Lake Washington

- Management objective of PTSUS ER <15% consistently met
- Cedar River escapement increasing
- North Lake Washington tributary escapement trend stable (large HOR contribution to natural spawning)

Trends in other Chinook MUs

● Green River Fall Chinook

- Management objective of PTSUS ER <15% consistently met
- Natural escapement goal of 5,800 met in 8 of 9 years since 2000
- Escapement (NOR + HOR) stable

● White River spring Chinook

- Management objective of total ER <20% met in 6 of 7 years (2000-2006)
- Escapement increasing

● Puyallup fall Chinook

- Management objective of 50% total ER consistently exceeded
- Escapement (NOR + HOR) shows negative trend (not significant with 07-08 data)

Trends in other Chinook MUs

● Skokomish Chinook

- Management objective of PTSUS ER <15% consistently met
- Natural escapement goal of 1,200 met in 5 of 9 years since 2000
- Escapement trend (NOR + HOR) stable

● Mid Hood Canal summer/fall Chinook

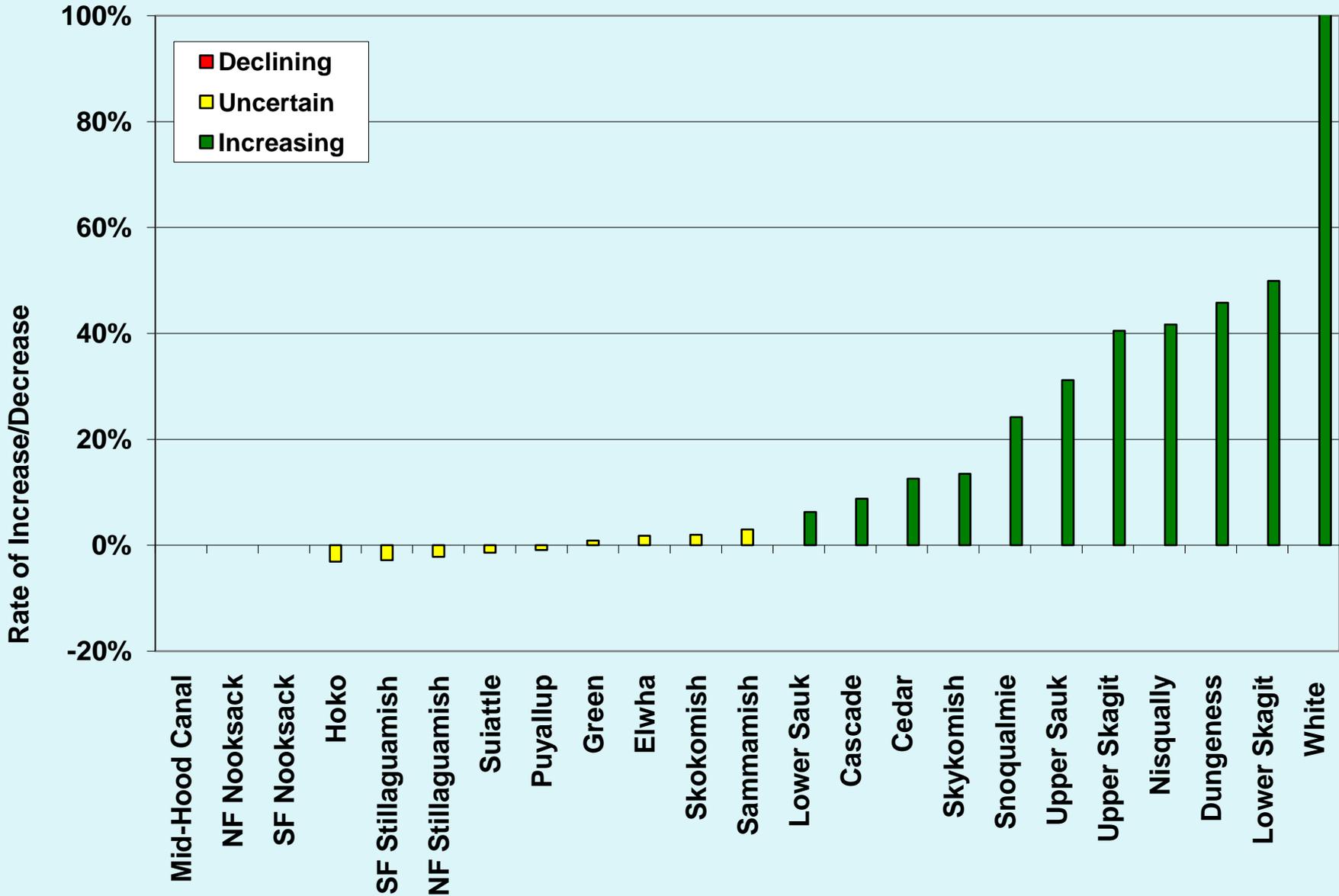
- Management objective of PTSUS ER <15% consistently met
- CERC objective of PTSUS ER <12% consistently met
- Escapement <200 fish in 6 of last 7 years, insufficient data for trend analysis

Trends in other Chinook MUs

● SJF Management Units

- Management objectives consistently met (SUS ER's 0% to 4%)
- Elwha and Hoko escapement stable
- Dungeness escapement was increasing, but largely due to supplementation program – escapement decreased rapidly in 2007 and 2008

15-year Escapement Trends for Puget Sound Chinook Populations



Summary

- Exploitation rate ceilings have been consistently met for all management units except Puyallup
- For MU's with fixed escapement goals, variable success in meeting fixed objectives
- No consistent bias in pre-season vs. post-season total exploitation rates
 - For many MU's post season rates in northern fisheries tended to be higher than expected, and post season rates in SUS tended to be lower than expected

Summary

- Escapement trends for most populations stable or positive
 - SF Nooksack, NF Nooksack, Mid Hood canal populations have insufficient data for trend analysis, but SF Nooksack and MHC remain at low abundances
 - Implications of positive trends in “Category 2” populations are clouded by natural escapement of hatchery-origin adults
 - Escapement trends are not exclusively attributable to harvest actions – must consider effects of habitat, hatcheries, survival conditions, etc.