Transition Discard Rate Original Methodology

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Discard Methodology Peer Review

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$$TR_I = \alpha^I \cdot SR + (1 - \alpha^I) \cdot \frac{\sum_{i=0}^{I} d_i}{\sum_{i=0}^{I} kall_i}, \_ I = 1 \_ to \_ I_{\max}$$

Where

- TR is the transition rate
- I is the number of observed trips or subtrips within a stratum
- α is the exponential weight
- SR is the seed rate
- i is an observed trip or subtrip within a stratum
- d is the observed discard
- kall is the observed kept-all
- Imax is the maximum number of trips under the transition method before implementing the in-season method fully using observed discard rate data for the current fishing year.

$$TR_I = \alpha^I \cdot SR + (1 - \alpha^I) \cdot \frac{\sum_{i=0}^{I} d_i}{\sum_{i=0}^{I} kall_i}, \_ I = 1 \_ to \_ I_{\max}$$

Exponential Weighting Method

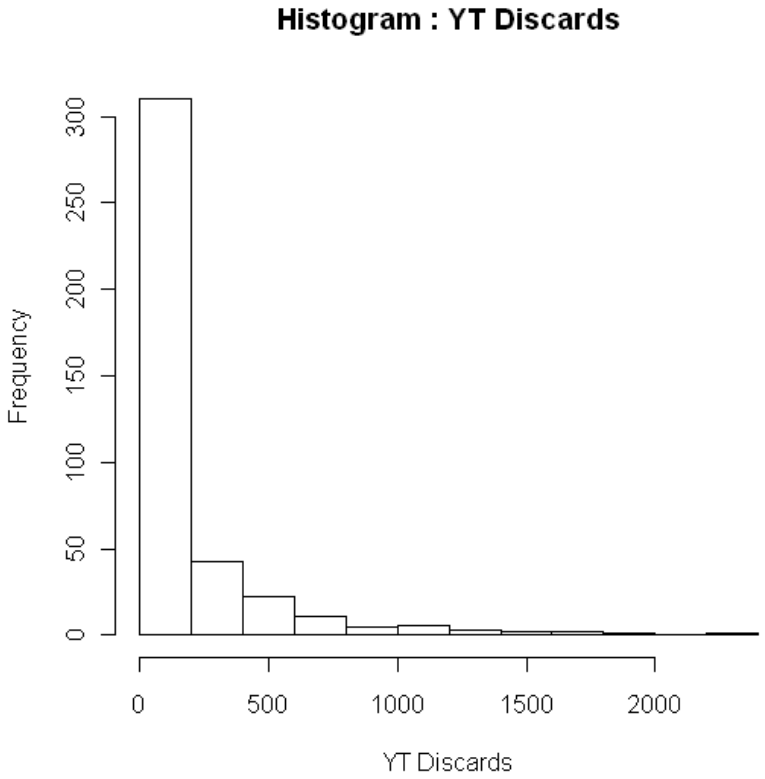
Exponential Weight α

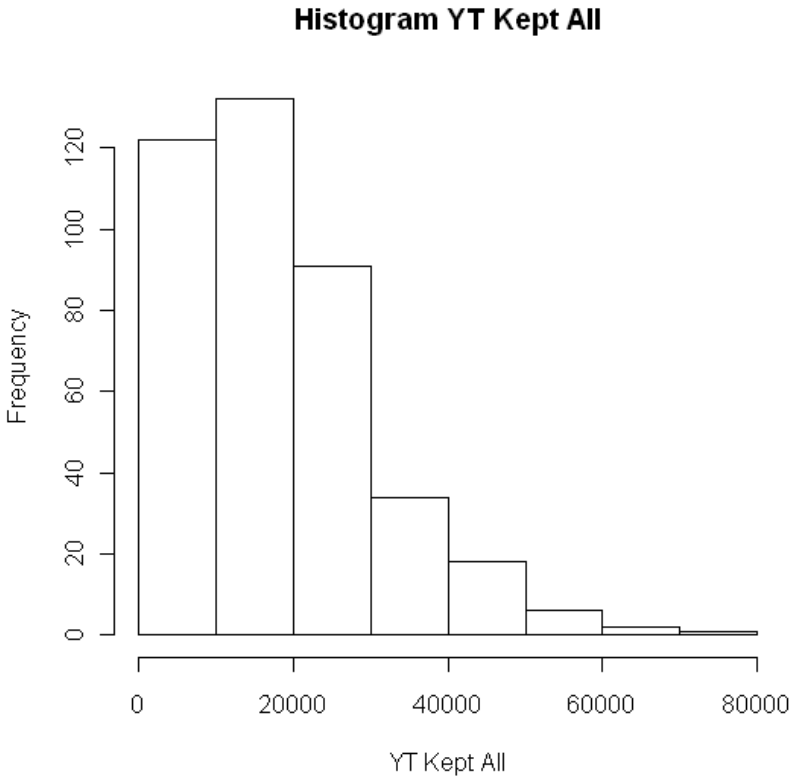
- α will range from 0 to 1
- Small α : Quickly shift from SR to Cum.
- High α : Slowly shift from SR to Cum.
- As I increases α expression decreases

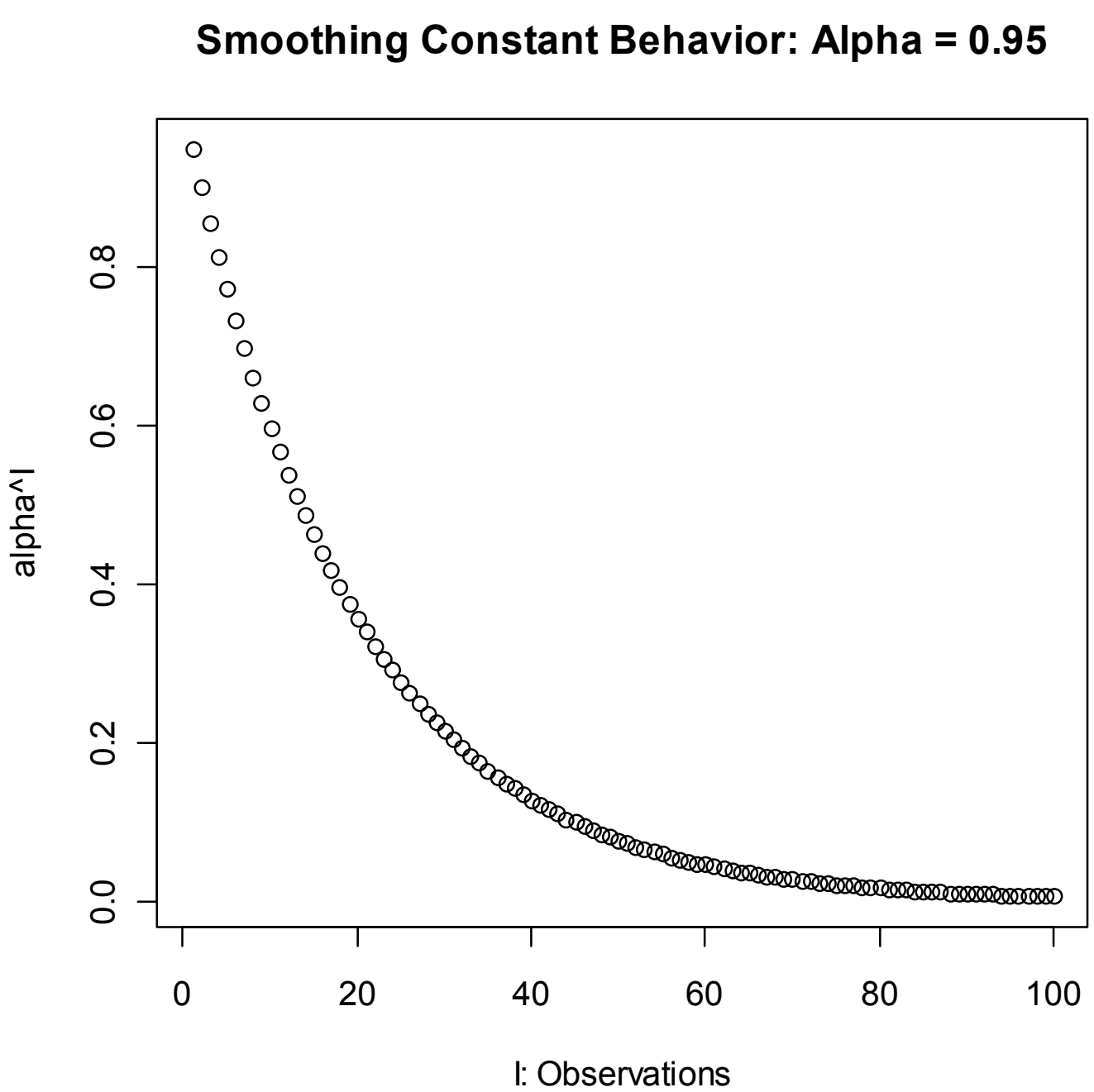
$$\frac{\sum_{i=0}^{I} d_i}{\sum_{i=0}^{I} kall_i} = \frac{\frac{\sum_{i=0}^{I} d_i}{I}}{\frac{\sum_{i=0}^{I} kall_i}{I}}$$

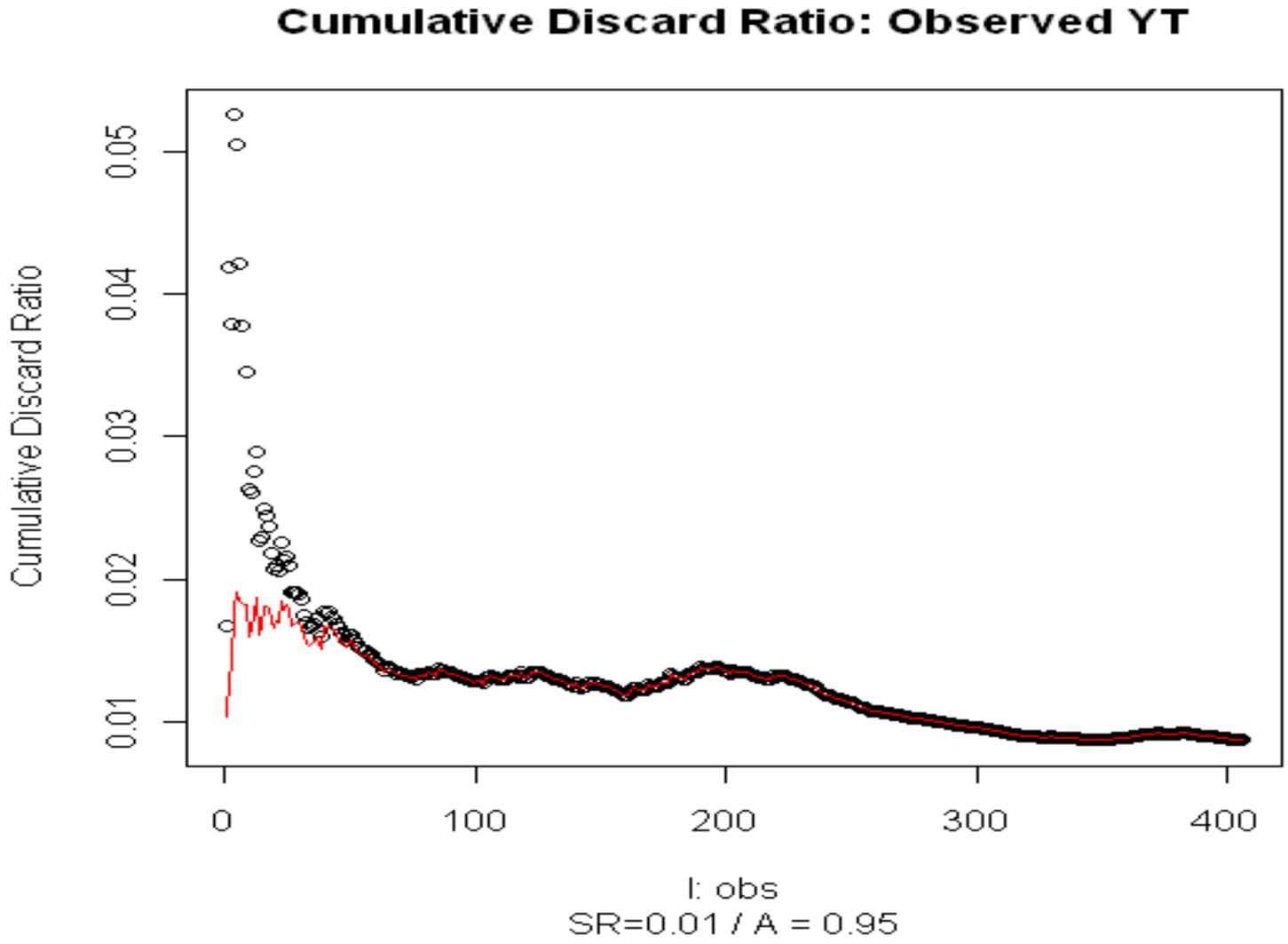
Benchmark Sample Size

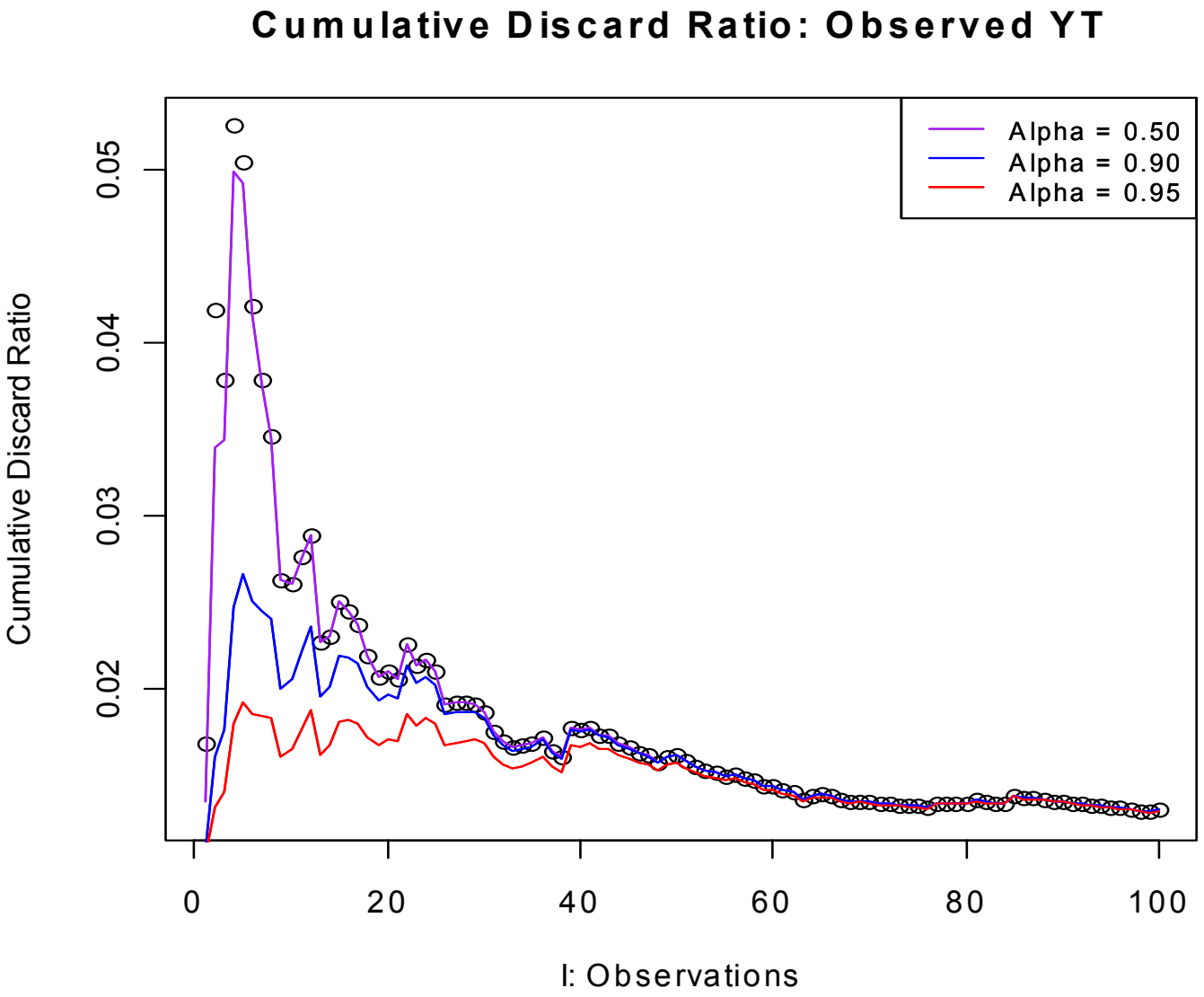
- Discard rate is a ratio of means
- Means follow rules of central limit theorem (CLT):
  - As I increases means tend toward normality at approx. 60 trips and the ratio becomes stable
- Data: FY08 GBYT, large mesh, non-reg. discards, Kall on obs. trips, live weight

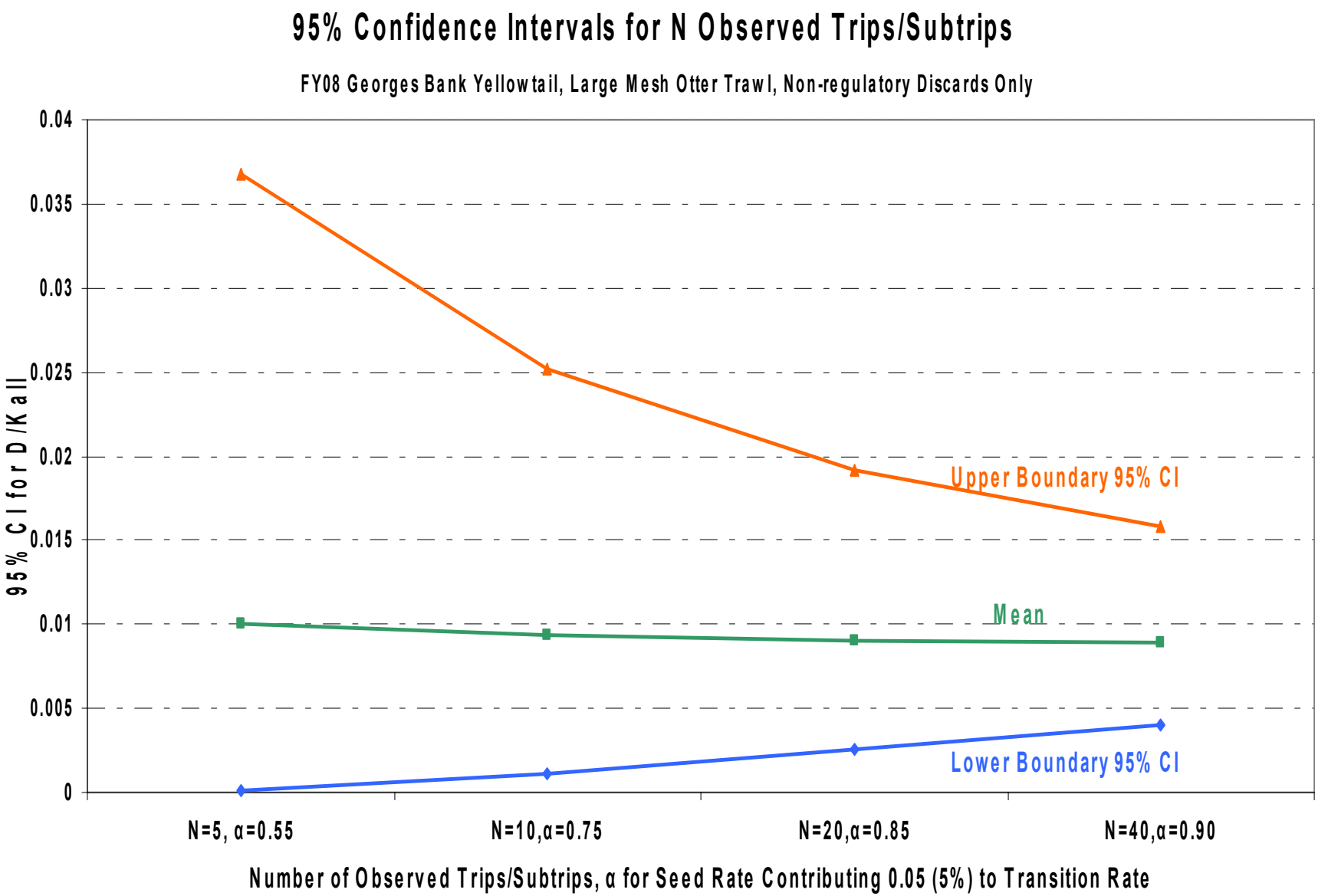

Histogram : YT Discards
Frequency
0
50
100
150
200
250
300
0
500
1000
1500
2000
YT Discards


Histogram YT Kept All
Frequency
0
20
40
60
80
100
120
0
20000
40000
60000
80000
YT Kept All


Smoothing Constant Behavior: Alpha = 0.95
alpha^l
0.0
0.2
0.4
0.6
0.8
0
20
40
60
80
100
l: Observations


Cumulative Discard Ratio: Observed YT
Cumulative Discard Ratio
0.01
0.02
0.03
0.04
0.05
0
100
200
300
400
I: obs
SR=0.01 / A = 0.95


Cumulative Discard Ratio: Observed YT
Alpha = 0.50
Alpha = 0.90
Alpha = 0.95
Cumulative Discard Ratio
0.02
0.03
0.04
0.05
0
20
40
60
80
100
I: Observations


95% Confidence Intervals for N Observed Trips/Subtrips
FY08 Georges Bank Yellowtail, Large Mesh Otter Trawl, Non-regulatory Discards Only
95% CI for D/Kall
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
Upper Boundary 95% CI
Mean
Lower Boundary 95% CI
N=5, α=0.55
N=10,α=0.75
N=20,α=0.85
N=40,α=0.90
Number of Observed Trips/Subtrips, α for Seed Rate Contributing 0.05 (5%) to Transition Rate

Pros/Cons

- High alpha – trust SR, keep influence for many observed trips
- Low alpha – don't trust SR, reduce influence quickly and shift to Cum. rate.
- $\alpha = 0.95$ (high alpha), SR influences for approx. N = 60 observed trips;
  - $\alpha = 0.85$,N = 20; $\alpha = 0.75$,N = 10; $\alpha = 0.55$, N = 5
- Tradeoff between N and variance of rate
- Many strata may not have enough observed trips. Look at grouping small strata. (e.g. grouping sector strata together into one gear group)