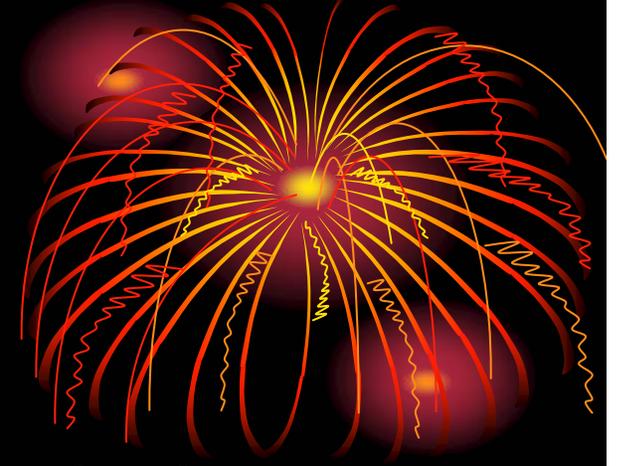




Factors that may be correlated to  
the bycatch rate

By  
Marjorie Rossmann  
&  
Debi Palka



**PURPOSE:** Find gear characteristics, fishing practices, or environmental factors that are correlated to the bycatch and so might be useful in a take reduction plan.

# Methods

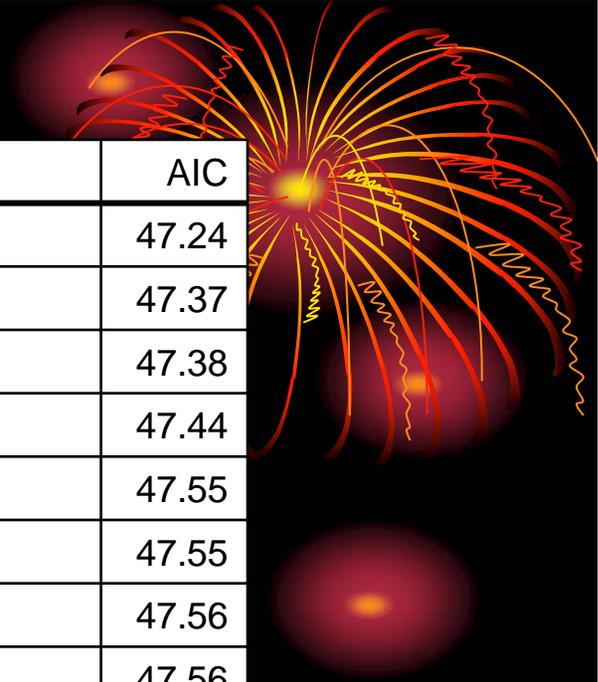


## 1) Univariate logistic regressions

- Same modeling techniques used to develop bycatch rate model
- Variables with lower AIC values are more highly correlated to the bycatch rate

# Mid-water Trawl

VARIABLE	AIC	VARIABLE	AIC
time Of day	40.28	Floats Used?	47.24
Codend Mesh Size,s(1)	41.86	Bottom Depth,s(1)	47.37
Codend Twine Type	42.50	Mesh Size Min, s(1)	47.38
Latitude degree,s(1)	42.81	Wind Speed,s(1)	47.44
Bottom slope - categorical	43.93	Excluder Used?	47.55
Target species - categorical	44.14	Fish Outlet Used?	47.55
Codend Material	44.30	Year	47.56
Season	44.43	Mesh Size Max, s(1)	47.56
NE or MidAtlantic	44.67	Codend Strengthener Used?	48.87
Wireout	44.76	Net Material	48.88
Gear type	45.21	Codend Chaffing Used?	48.90
Circle Mesh Size,s(1)	45.36	Net Condition Code	49.14
Distance betw pairs - Min,s(2)	45.39	Net Construction?	49.26
SST,s(2)	45.39	Codend Liner Used?	49.43
Head Rope Length,s(2)	45.58	Codend Hanging Config	49.45
Foot Rope Length,s(2)	46.00	Net Design	49.51
Kite Panels Used?	46.54	Transducer Brand	49.99
Tow Speed,s(2)	46.84	State landed	52.73
Blowout Panel Used in pair T?	47.16	Weather Conditions	52.78

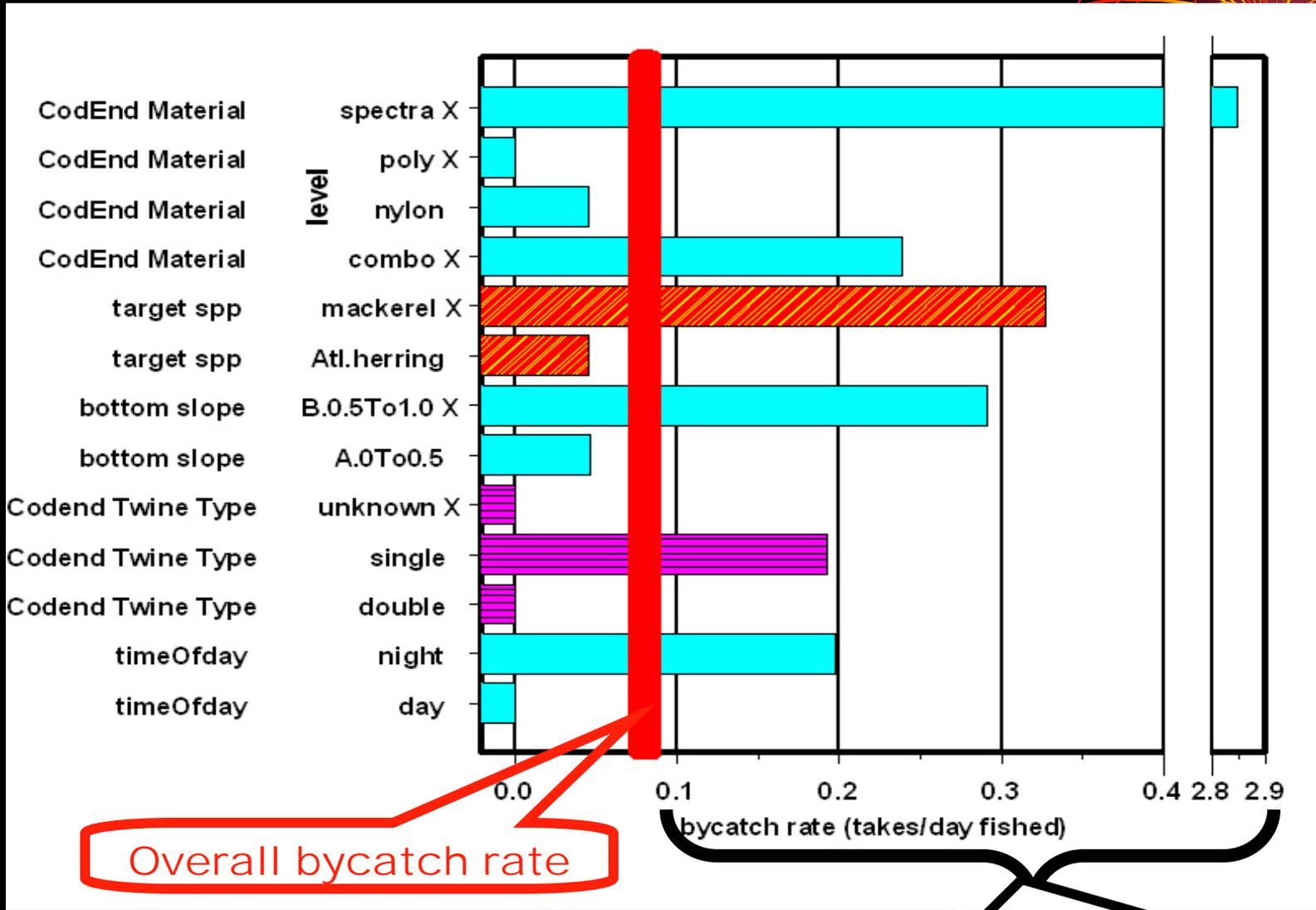
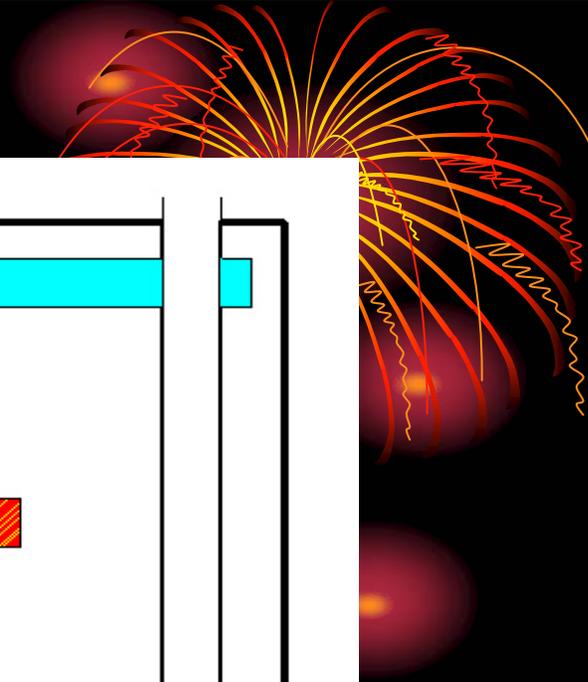


# Methods

## 2) Two types of plots for the bycatch rates of each level of a factor

- **Categorical factors:** Histograms of bycatch rates for each level of a factor
- **Continuous factors:** Line plots of bycatch rate for a factor

# Midwater trawls



Overall bycatch rate

Level has a higher than average bycatch rate

# Cautions:



- 1) Some factors are correlated with others, so there is not a cause-and-effect relationship
- 2) Sometimes a few "outlier" values drive the relationship

# Cautions:

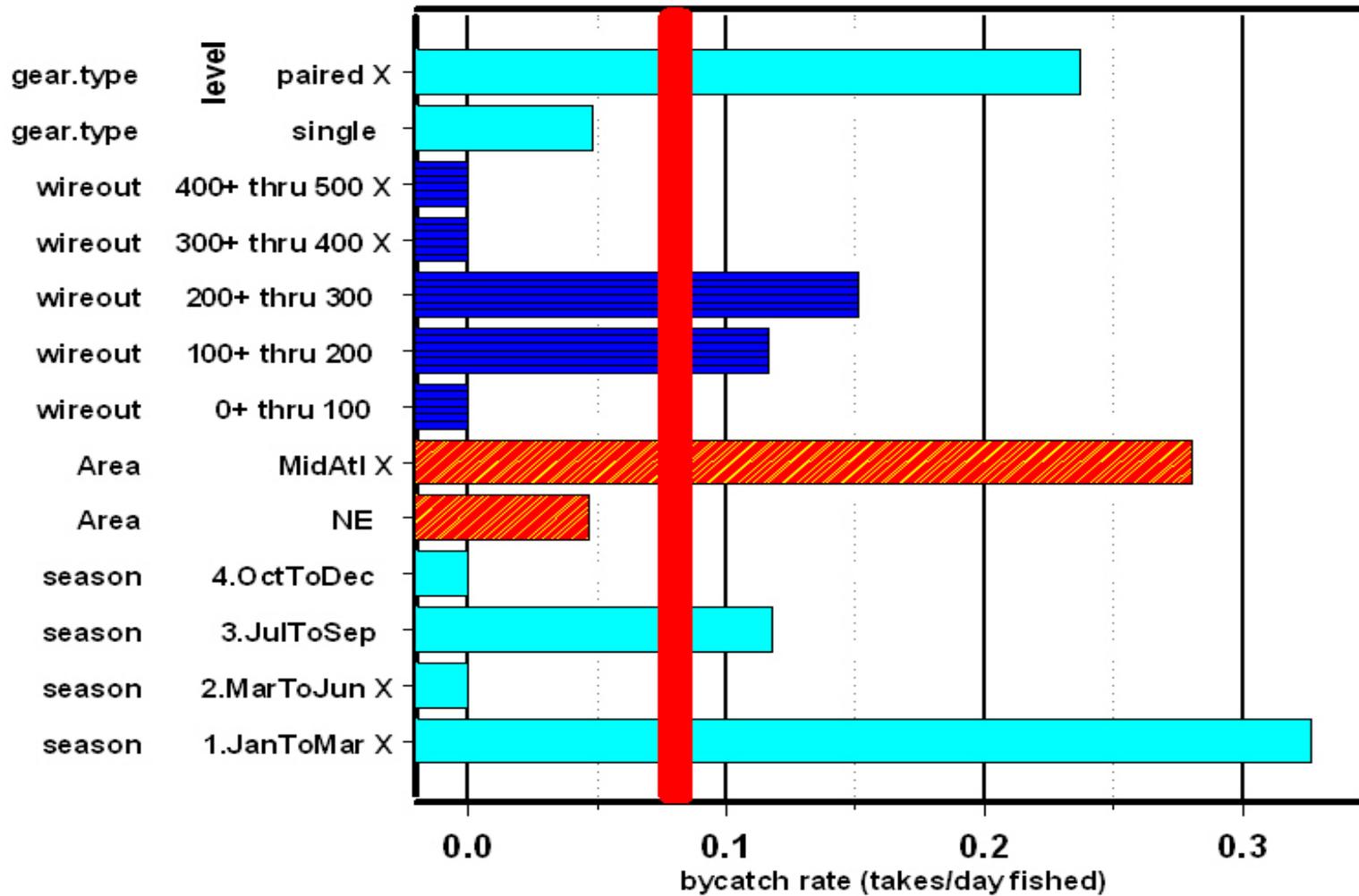
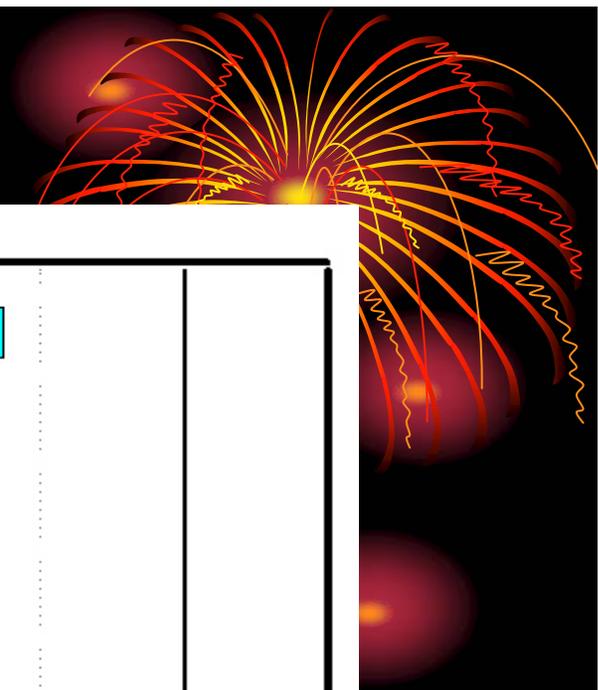


- 3) Some levels do not have enough observed hauls to, on average, have enough statistical power to have a chance to observe a take

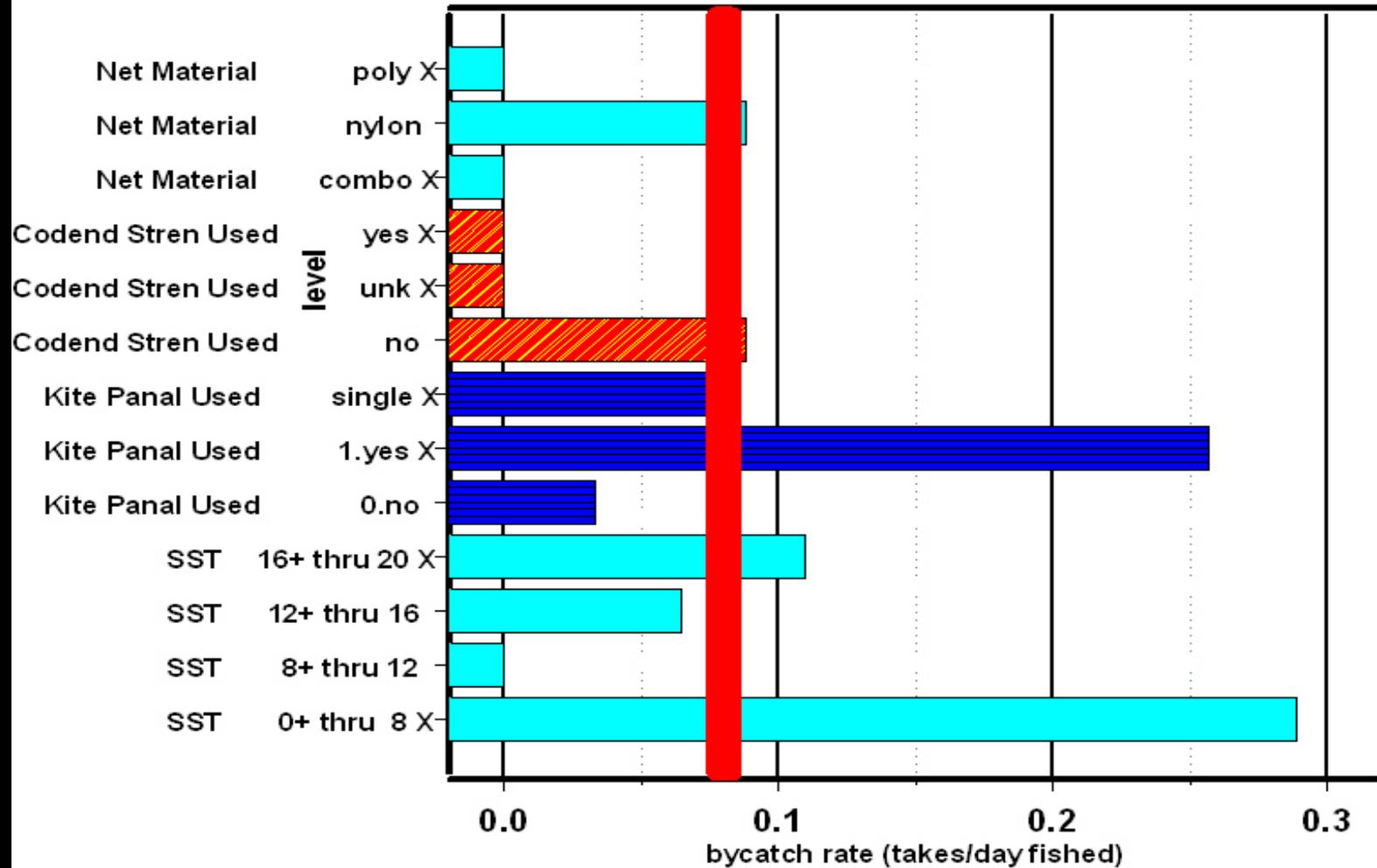
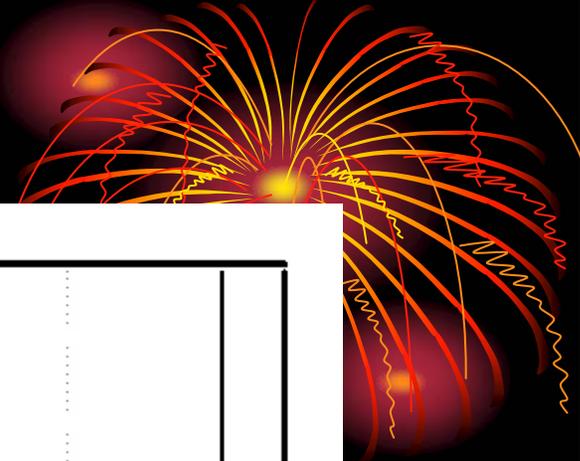
(levels with X)

- Interpretation 1: not enough observed hauls to show a reliable relationship
- Interpretation 2: relationship so strong do not need a large number of hauls to have a significant relationship

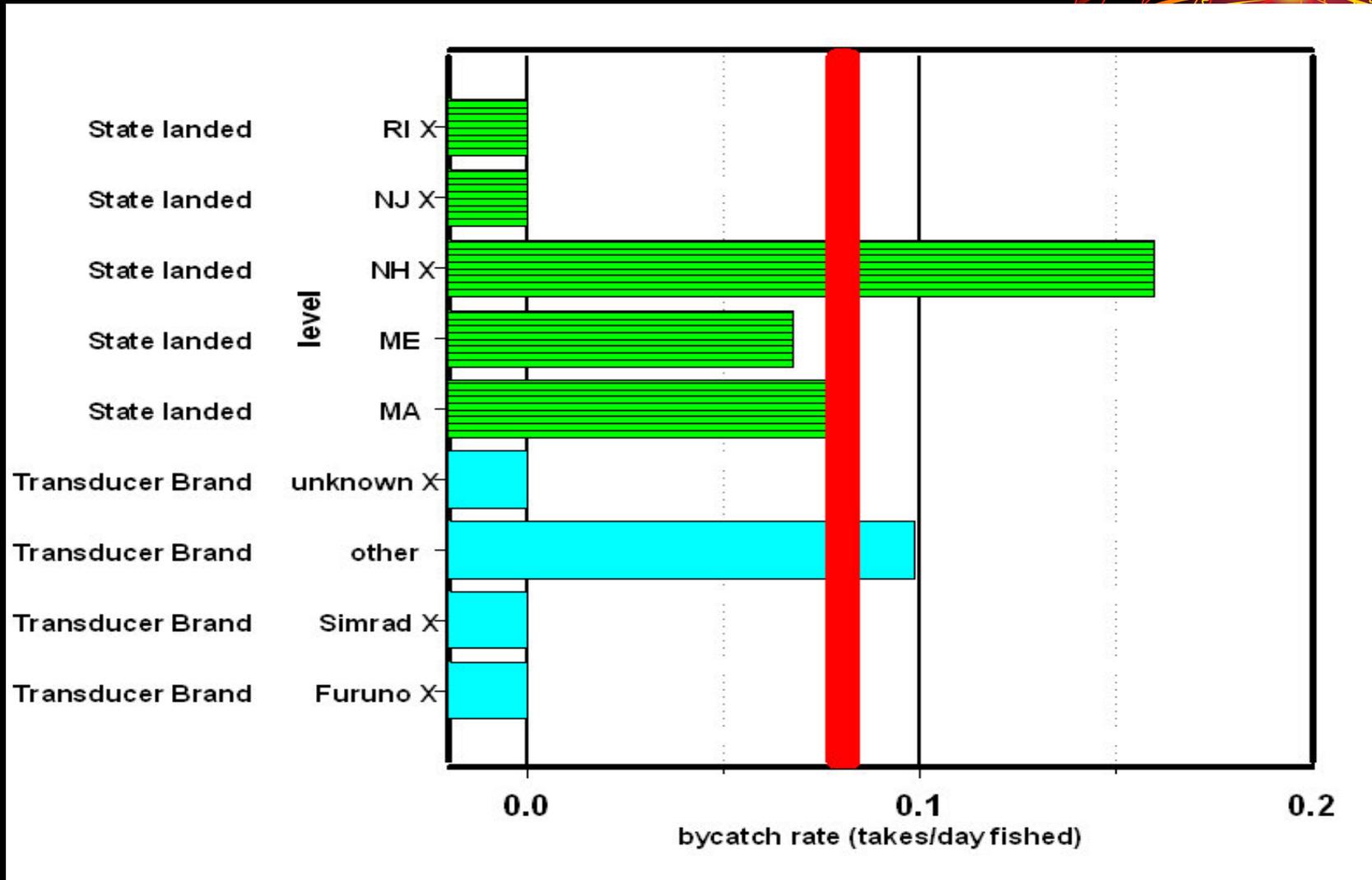
# Midwater trawls



# Midwater trawls



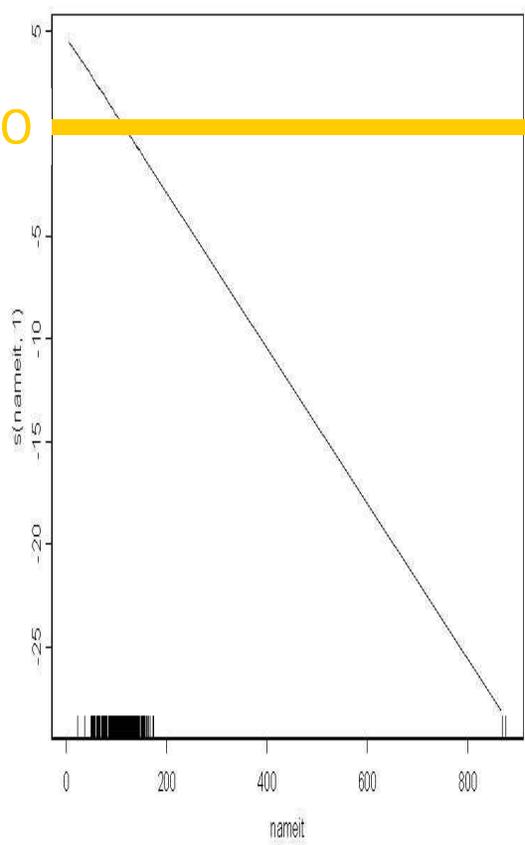
# Midwater trawls



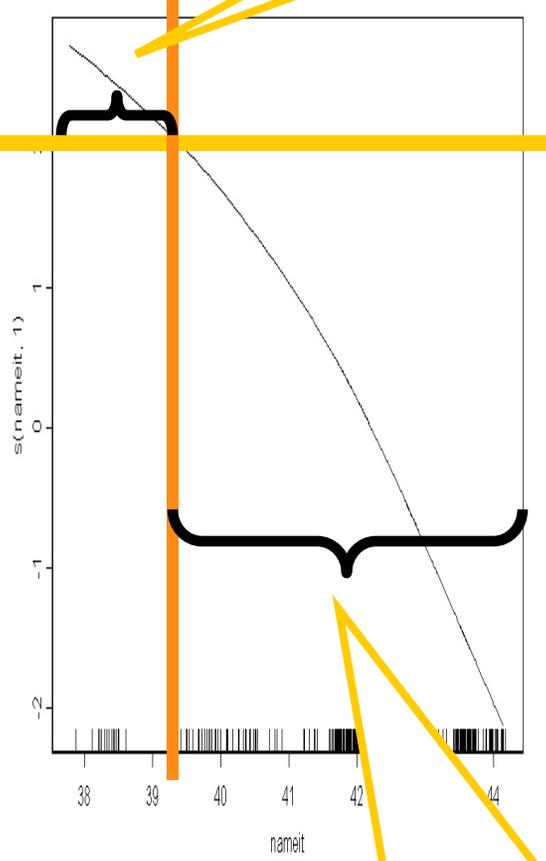
# Mid-water Trawl

X values has a higher than average relationship

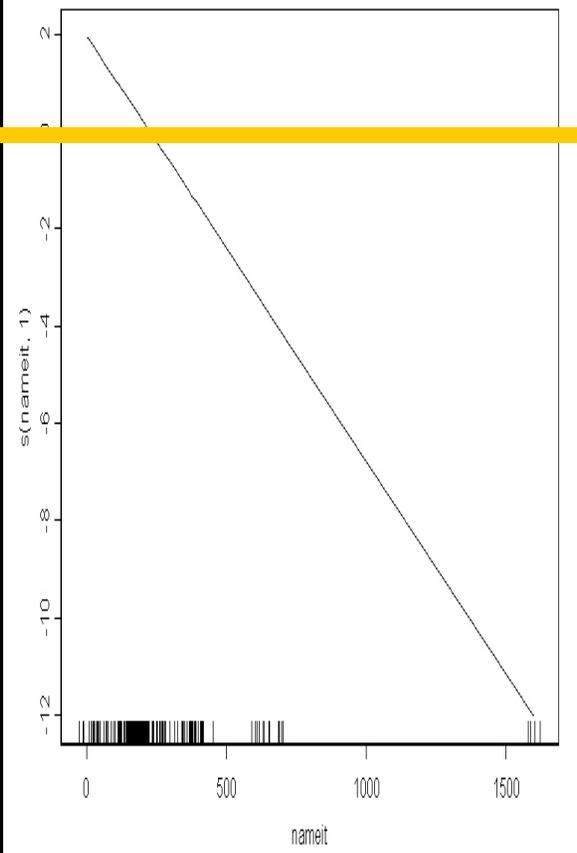
Cod Mesh Size,  $s(1)$



Latitude Degree,  $s(1)$

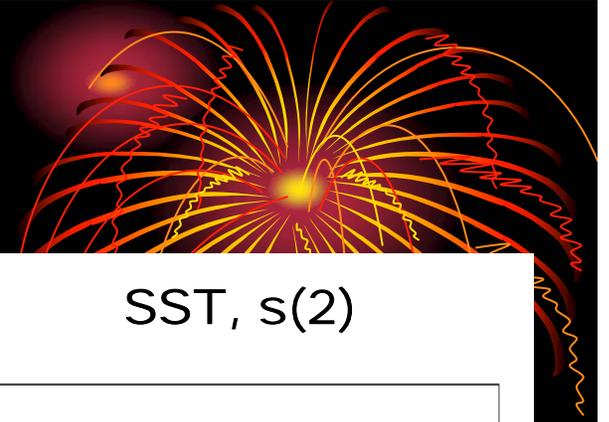


Circle Mesh Size,  $s(1)$

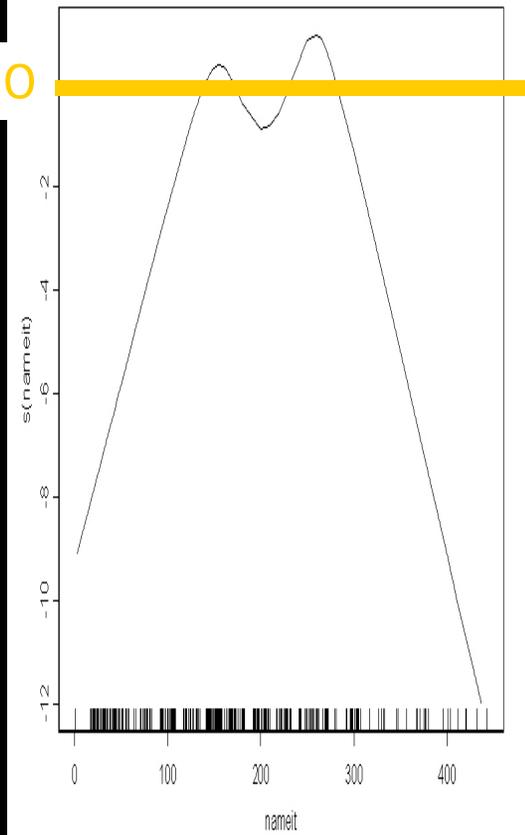


X values has a lower than average relationship

# Mid-water Trawl

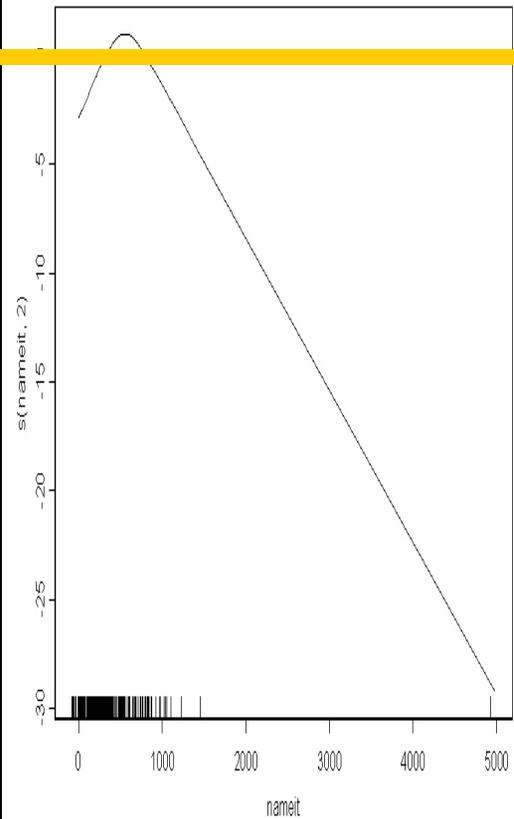


Wireout



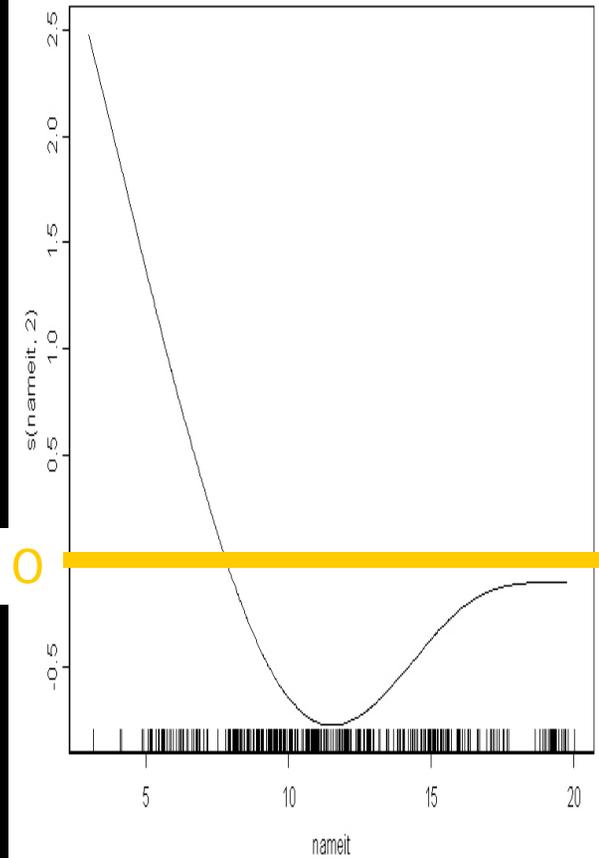
ATGTRT Sept 2006

Min dist betw pairs



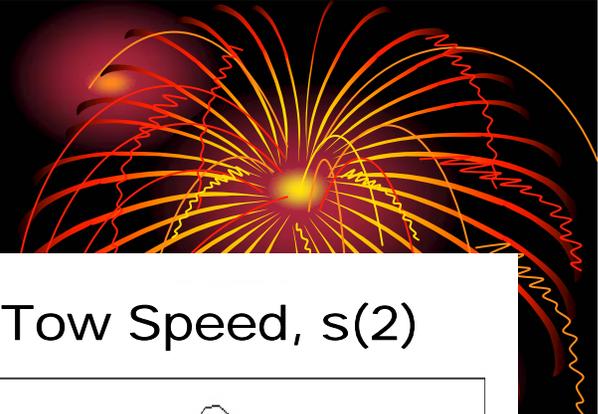
Factors Correlated to Bycatch Rate

SST, s(2)

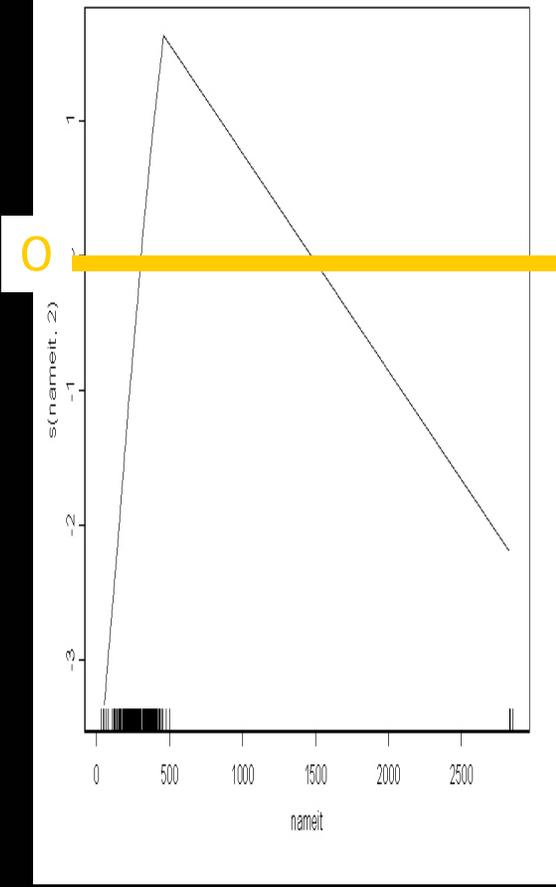


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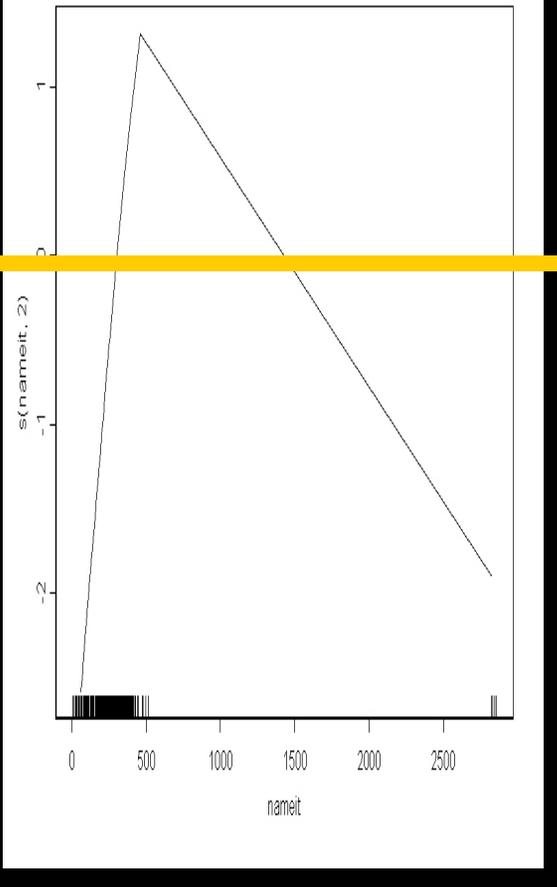
# Mid-water Trawl



Head Rope Len,  $s(2)$



Foot Rope Len,  $s(2)$



Tow Speed,  $s(2)$

