

Working Paper #14

Indicators of Status

Acknowledgements:

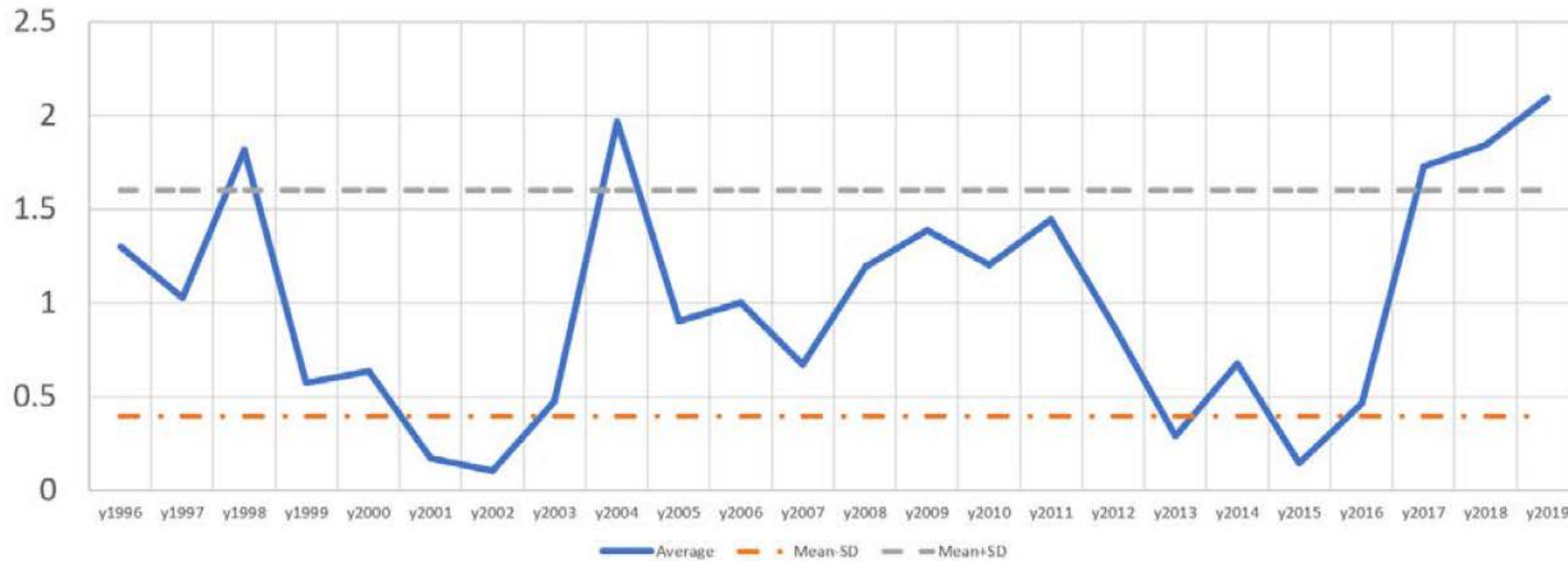
Lisa Hendrickson and Other Center Staff {VTR, VMS, Survey, Body Wt}

GARFO-MAFMC {Landings, Prices}

Industry for support of Summit (Manderson) and body weight samples

WP#14 Indicators of Status:

Ratio of annual with +/- 1 SD



Good
Ave
Poor

Good {1998, 2004, 2017, 2018, 2019}

Average {1997, 1999, 2000, 2005-2007, 2010-2012, 2014}

Poor {2001, 2002, 2003, 2013, 2015, 2016}

WP#14 Indicators of Status: Summary

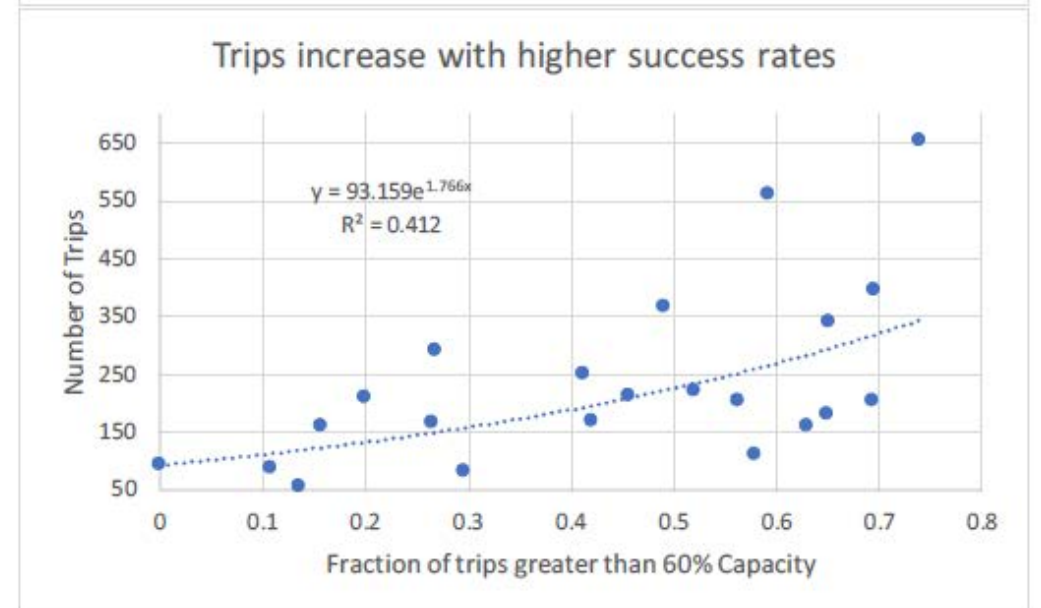
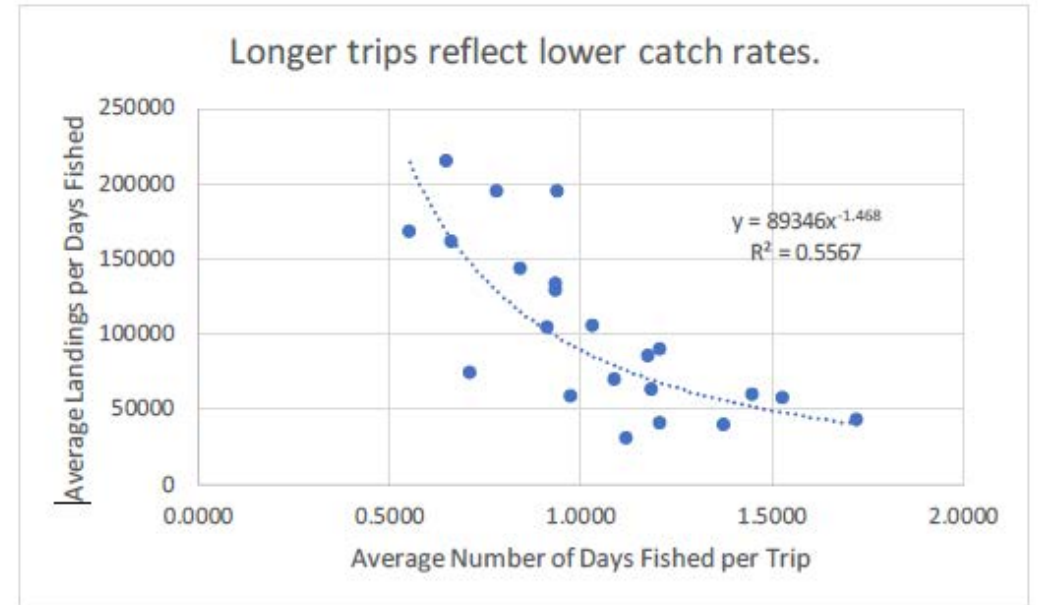
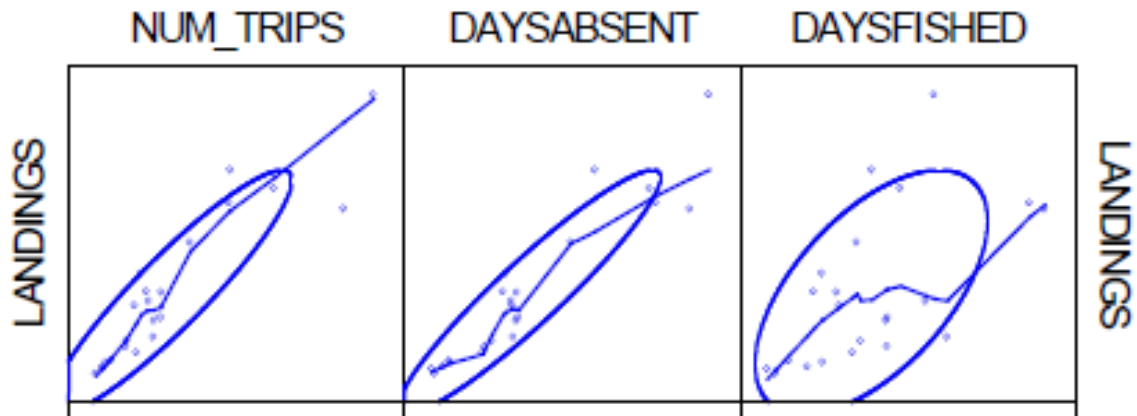
- Multivariate methods were used to explore post hoc classification of fishing year type using variables from Vessel Trip Reports, biological sampling of landings, and trawl surveys.
- Measures of fishing capacity on a per vessel (i.e., permit) basis may be a useful measure of fishery performance.
- Total fishing effort may be influenced by success earlier in the season. Complex in-season dynamics.

WP#14 Indicators of Status: Data & Methods

Variables suggested by fishermen shown in red

- Landings
- Effort {Trips, Days Absent, Days Fishing}
- LPUE {Landings/Trip, Landings/DA, L/DF}
- Standardized LPUE = $\{L/T, L/DA, L/DF\} / \{\text{respective means}\}$
- **Capacity Ratio by Vessel = Landings/max{observed LPUE by vessel}**
 - Can look at fishing success as fraction of vessels exceeding some fraction of its capacity
- **Average Body Weight (g)**
- **Average Price**
- NEFSC Bottom Trawl Survey
- Fishery Status {Poor, Average, Good}

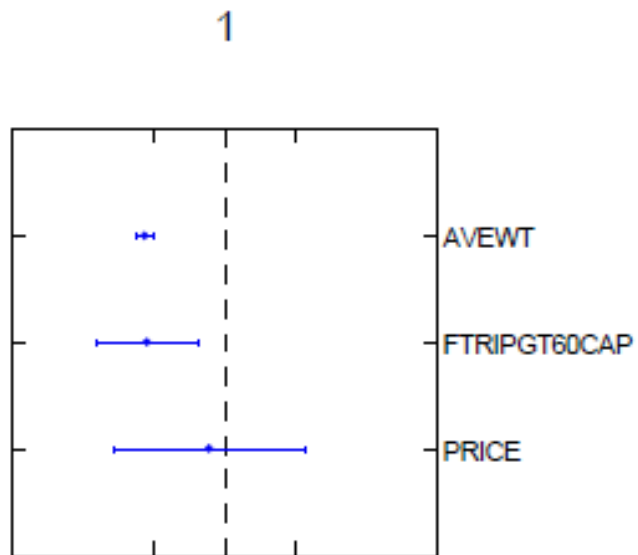
WP#14: Results— Inter-relationships



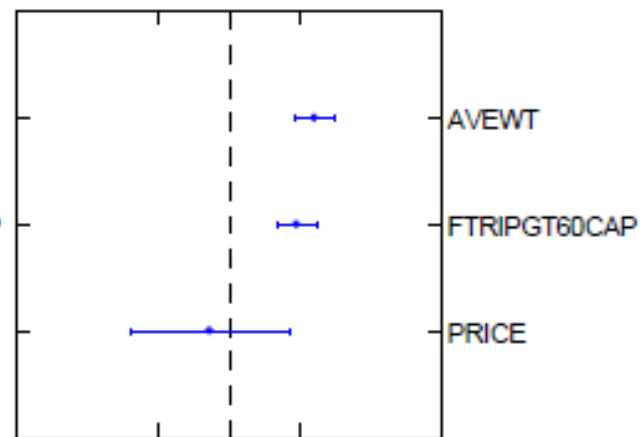
Cluster Profile Plots

WP#14 Indicators of
Status: Results

Group 1:
2000, 2001,
2013, 2014,
2015, 2016



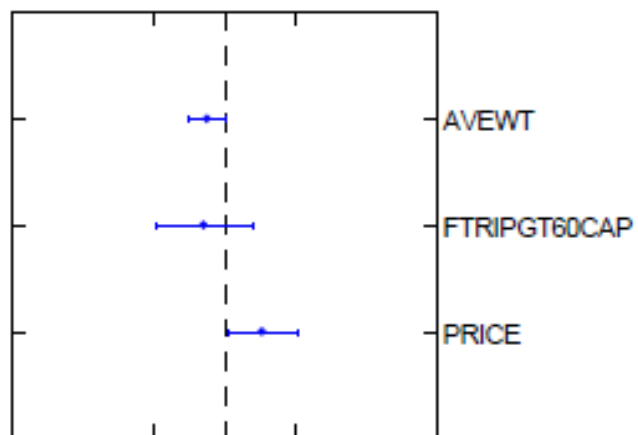
2



Group 2:
1997, 1998,
2004, 2006,
2007, 2008,
2017, 2018

3

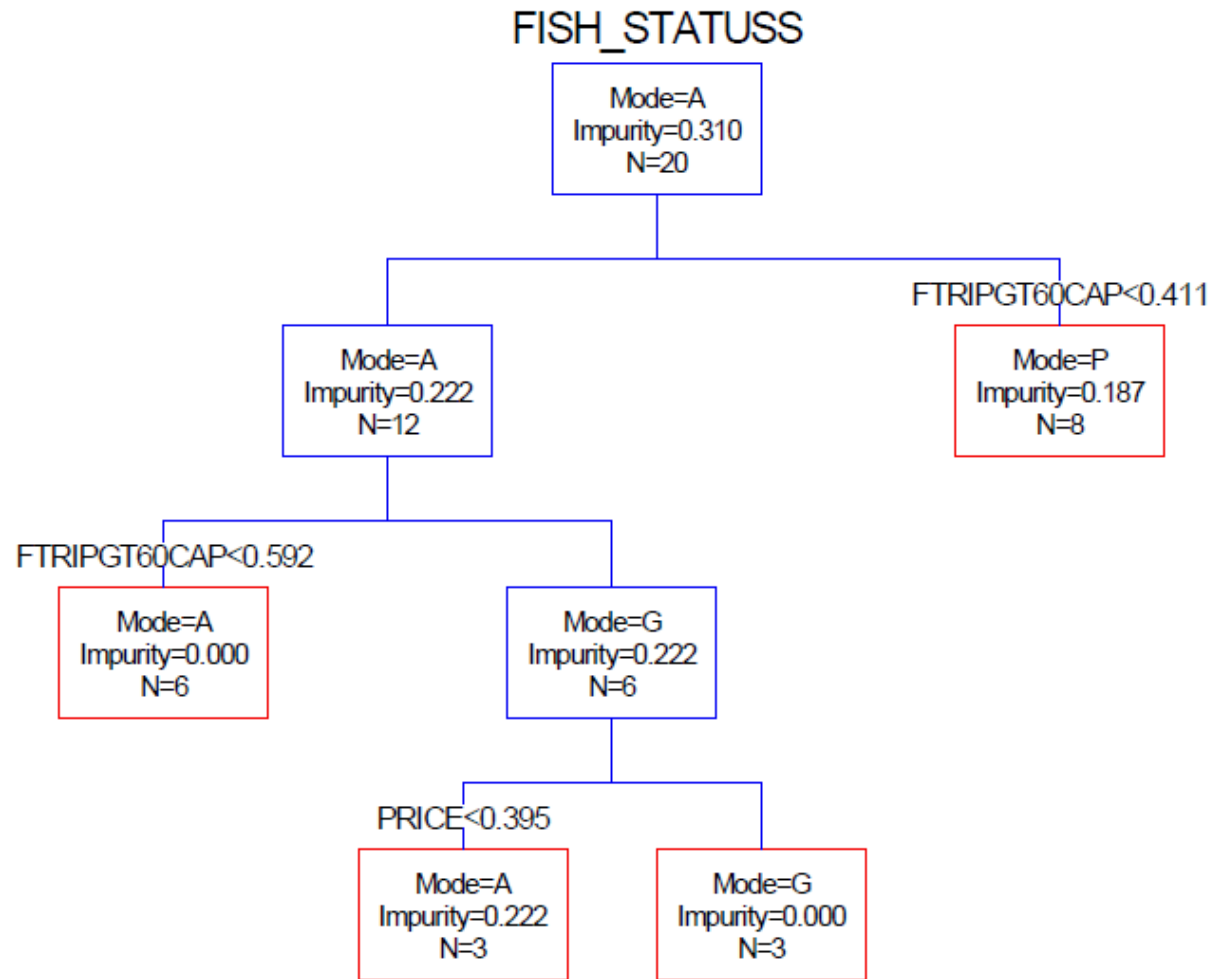
Group 3:
1999, 2002,
2003, 2005,
2010, 2011,
2012



WP#14

Indicators of Status: Results

- **Regression Tree using 3 key variables.**
- “Poor” → Fraction of trips >60% capacity is less than 0.41
- “Good” → Fraction of trips >60% Capacity is >0.592, AND price > \$0.395
- “Average” = everything else
- Proportion of variability explained by this model = 0.582
- Proportion of variance explained by “best model” = 0.781



Discriminant Analysis:

{Price, Ave Wt, Fraction of trips > 60% capacity}

Model Prediction	"True" State of Nature			Predicted Total	Percent Correct
	Average	Good	Poor		
Average	7	1	2	10	70%
Good	0	4	0	4	100%
Poor	0	0	6	6	100%
Total	7	5	8	20	85%