

# **Informational Briefing:**

## **An Overview of Scientific Uncertainty Buffers and Acceptable Biological Catch Specifications**

**Pacific Fishery Management Council  
November, 2011**

# New Terminology

Harvest Specification Framework Prior to 2011		Am. 23 Harvest Specification Framework	
ABC	Overfishing Limit	OFL	Overfishing Limit
OY	Buffer accommodates scientific uncertainty, management uncertainty, socioeconomic concerns, rebuilding/precautionary zone concerns, ecological concerns, etc.	ABC	Buffer accommodates scientific uncertainty
		ACL	Buffer accommodates management uncertainty, socioeconomic concerns, rebuilding/precautionary zone concerns, ecological considerations, etc.
HG	Buffer accommodates ad hoc sector allocations and other management objectives	ACT	Buffer accommodates inseason catch monitoring uncertainty

# Which of the Metrics are Science Determinations vs. Policy Determinations?

## SSC Scientific Determinations To Be Approved by the Council

- OFL
- Part of the ABC: Quantification of Assessment Variance (e.g.,  $\sigma = 0.36$  for cat. 1 stocks)
- Species or Stock Categorization Based On The Amount and Quality of Data Informing Harvest Specifications (Category 1, 2, or 3)

## Council Policy Determinations

- Part of the ABC: Size of Scientific Uncertainty Buffer For All Three Categories of Stocks Based on a Risk Assessment
- $P^*$  : Probability the est. OFL is Wrong, thus  $P^*$  is a Risk Assessment Metric

# What Exactly Is Sigma ( $\sigma$ )?

- **The Scientific Uncertainty Buffer has Two Parts:**
  - Scientific Variability between Stock Assessments
  - Probability the OFL Point Estimate is Wrong
- $\sigma$  is the Quantification of Stock Assessment Variability
- The SSC has Determined  $\sigma = 0.36$  for Category 1 Stocks,  $\sigma = 0.41$  for Widow,  $\sigma = 0.72$  for Category 2 Stocks, and  $\sigma = 1.44$  for Category 3 Stocks

# What is $P^*$ and How Does It Work?

- **The Scientific Uncertainty Buffer has Two Parts:**
  - Scientific Variability between Stock Assessments ( $\sigma$ )
  - Probability the OFL Estimate is Wrong ( $P^*$ )
- **( $P^*$ ) is an Overfishing Risk Assessment Metric**
  - Choosing a  $P^*$  Completes the Calculation of the Scientific Uncertainty Buffer, i.e., the Gap between OFL and ABC
  - Probability of Exceeding the OFL Given the Variability Between Stock Assessments ( $\sigma$ )

# Why are we concerned about scientific uncertainty in estimating the OFL?

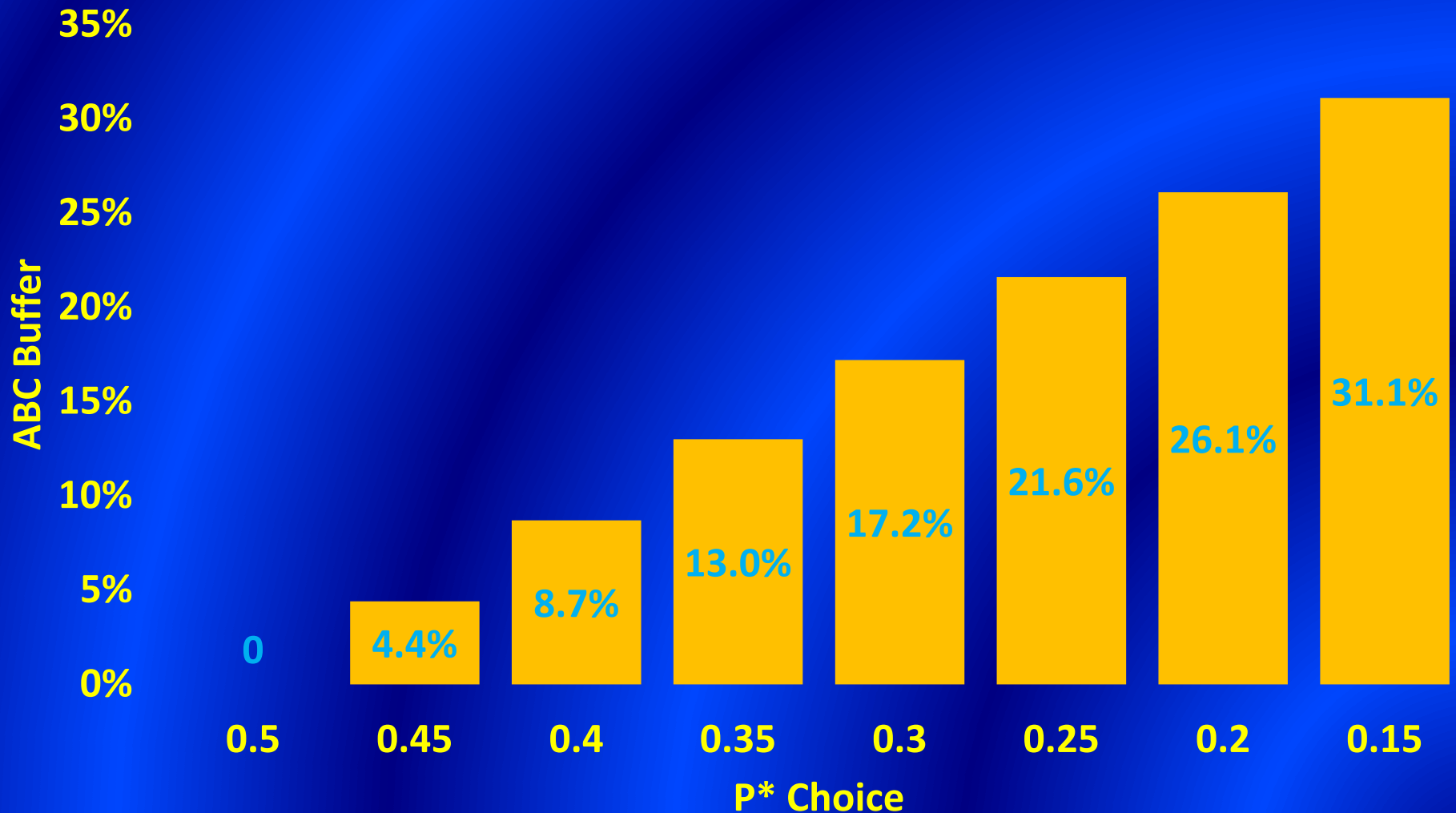
- The OFL is a median estimate, which means there is a 50% probability the estimate is too high (i.e., true OFL is lower) and a 50% probability the estimate is too low (i.e., actual OFL is higher)
- Any overfishing concern due to the true OFL being lower than the estimate can be mitigated by changing the probability from 50:50

# How does $P^*$ mitigate this concern?

- A  $P^*$  choice less than .5 adds a buffer to the OFL (i.e.,  $ABC < OFL$ ) and reduces the probability the OFL estimate is higher than the true value
  - There is no buffer when  $P^* = 0.5$
  - Council policy is the largest  $P^*$  considered is  $P^* = 0.45$
- Specifying a  $P^*$  of 0.45 means there is a 45% probability the OFL estimate is too high and a 55% probability the true OFL is as high or higher than estimated

# ABC Buffers for Category 1 Stocks Under Varying P\* Levels

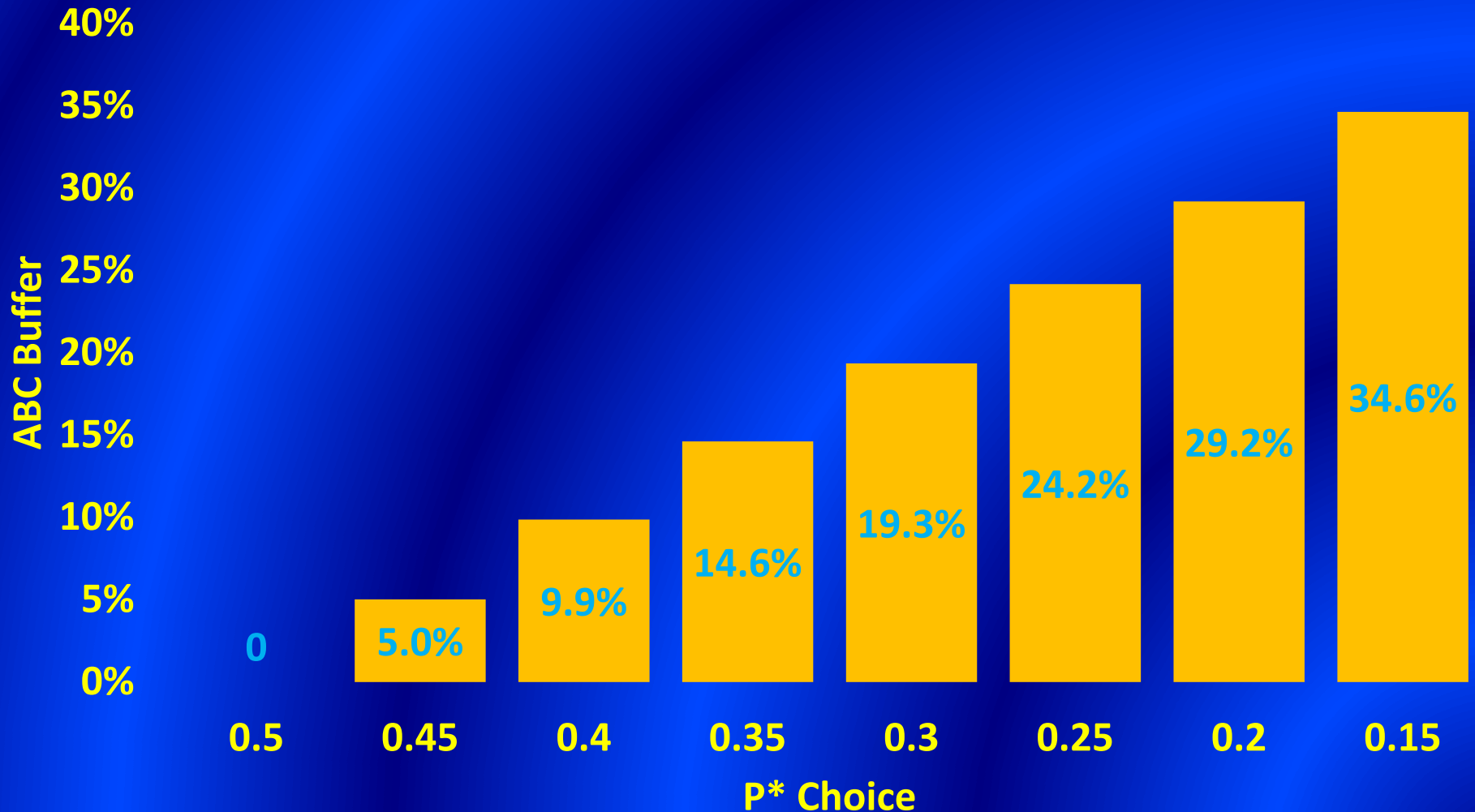
$\sigma = 0.36$



# ABC Buffers for Widow Rockfish

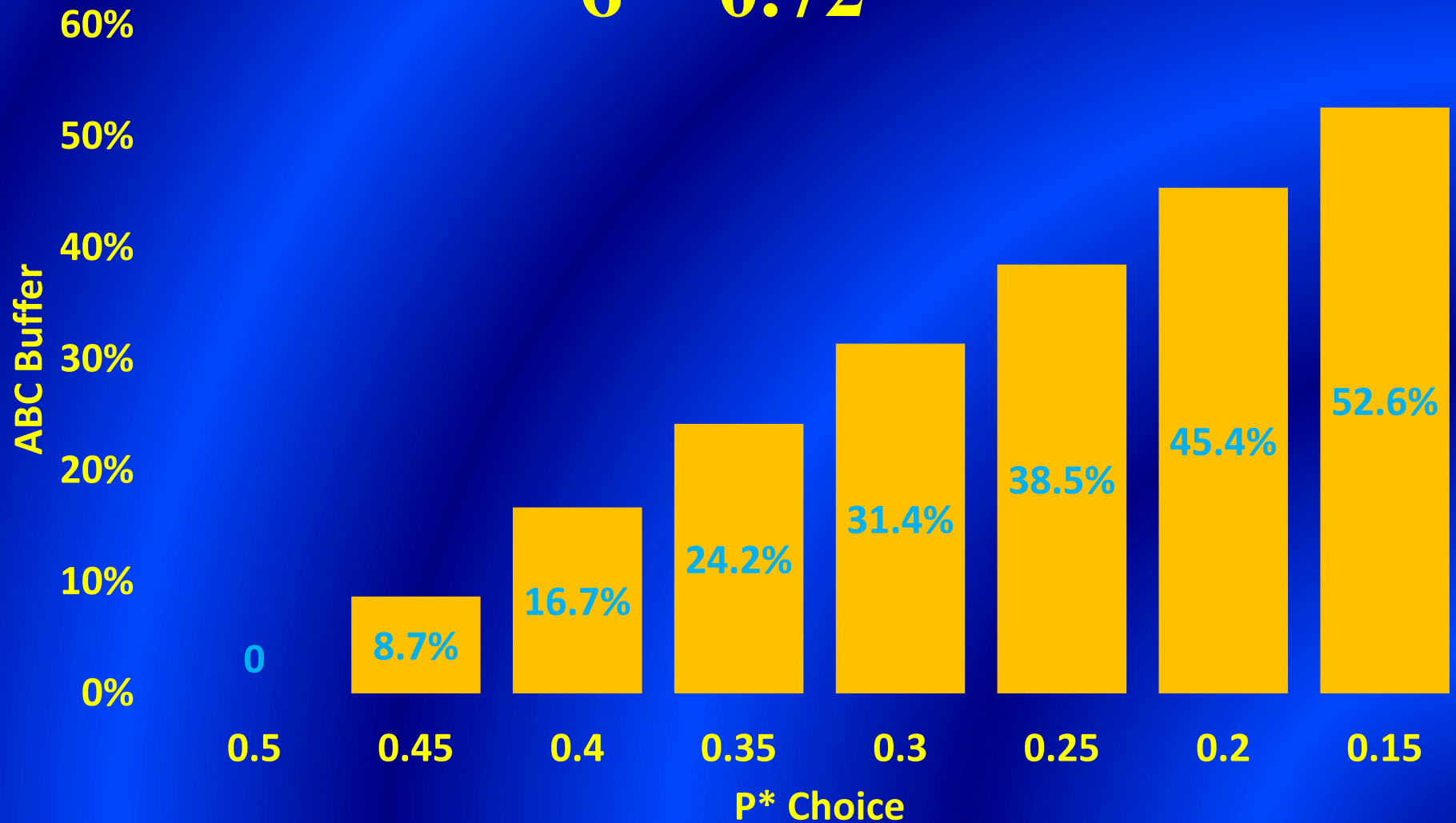
## Under Varying P\* Levels

$\sigma = 0.41$



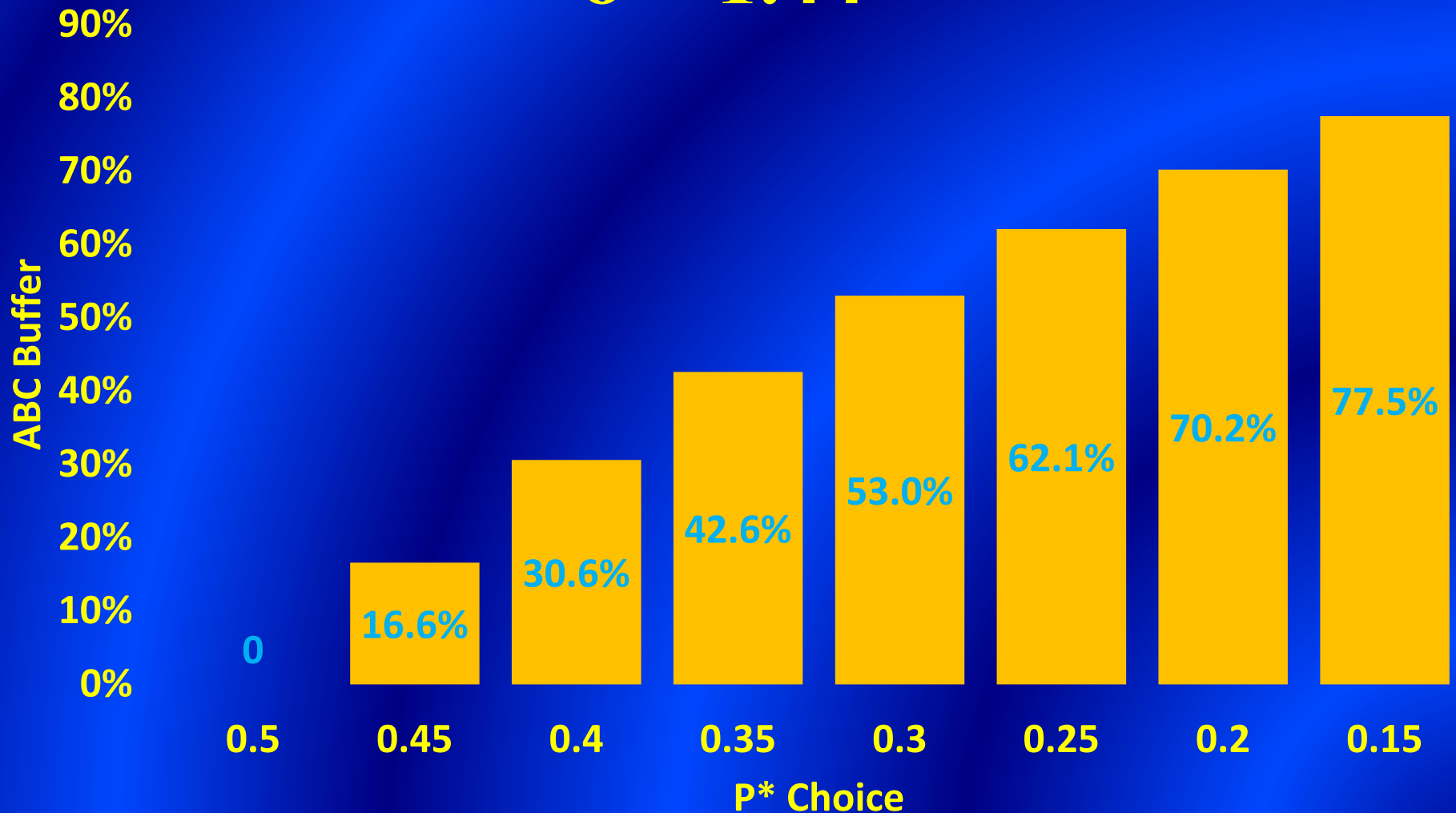
# ABC Buffers for Category 2 Stocks Under Varying P\* Levels

$\sigma = 0.72$

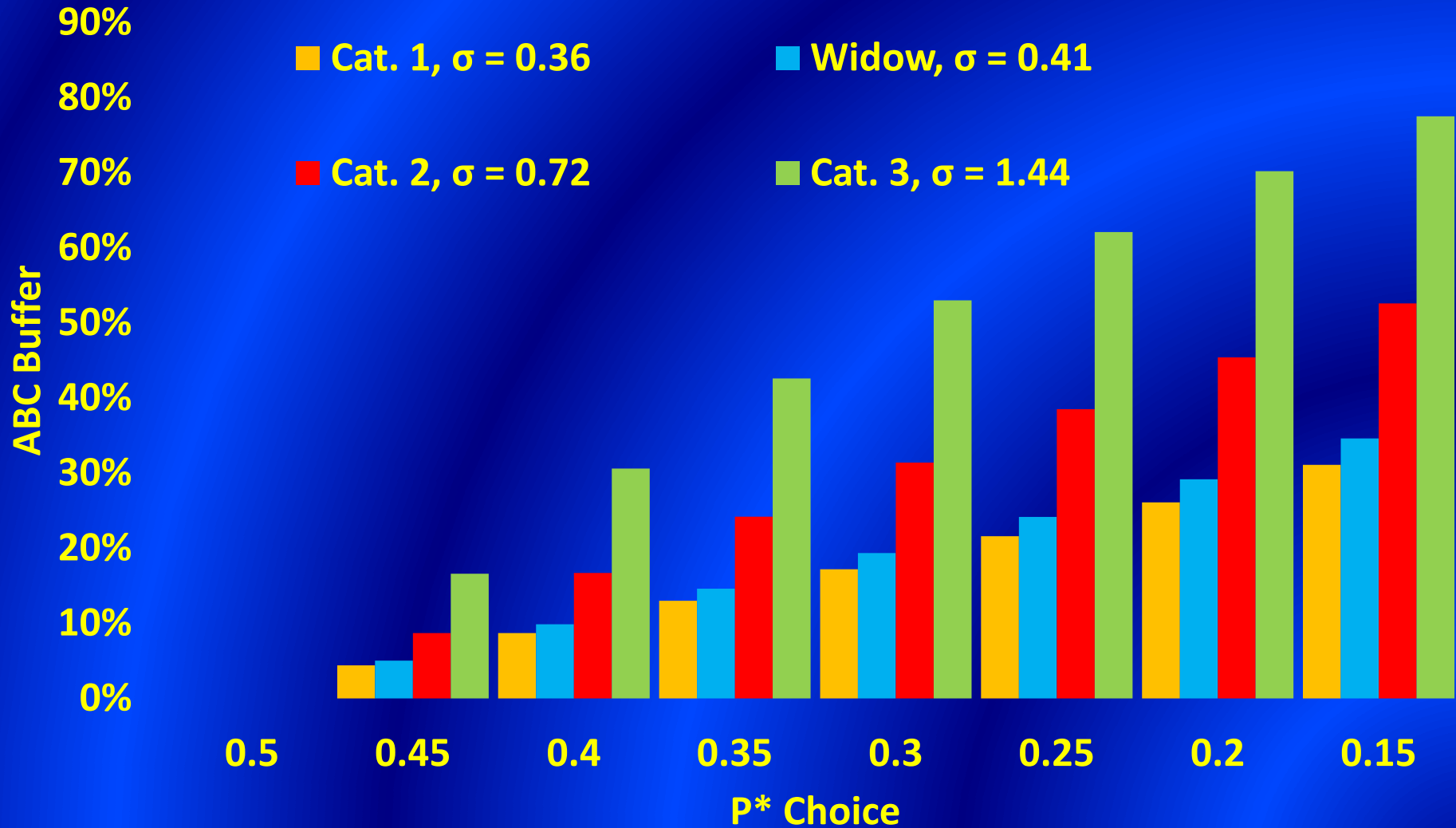


# ABC Buffers for Category 3 Stocks Under Varying P\* Levels

$\sigma = 1.44$



# ABC Buffers for All Stock Categories Under Varying P\* Levels



# Dover Sole

## 2011 Harvest Specifications

Specifications	Comment
<ul style="list-style-type: none"><li>• Exploitable biomass = 657,004 mt</li></ul>	<ul style="list-style-type: none"><li>• Estimate from 2011 assessment</li></ul>
<ul style="list-style-type: none"><li>• OFL = 44,400 mt</li></ul>	<ul style="list-style-type: none"><li>• Projected from 2005 assessment</li></ul>
<ul style="list-style-type: none"><li>• ABC = 42,436 mt</li></ul>	<ul style="list-style-type: none"><li>• <math>\sigma = 0.36</math> (cat. 1 stock), <math>P^* = 0.45</math></li></ul>
<ul style="list-style-type: none"><li>• ACL = 25,000 mt</li></ul>	<ul style="list-style-type: none"><li>• Higher ACL not selected due to management uncertainty and socio-economic considerations</li></ul>