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Setting ABC for the 2012-13 MHI Deep 7 Bottomfish Fishery

110th Scientific and Statistical Committee
June 19-22, 2012
Council Office

Draft Dated May 22, 2012

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Background

- **Acceptable Biological Catch (ABC) is the annual amount of catch that accounts for the scientific uncertainty in OFL.**
- Set by the SSC based on a tiered system of control rules that considers the level of scientific information available on the stock, uncertainty in the estimate of OFL, and where possible, the acceptable probability of overfishing (P*) due to this uncertainty, as determined by the Council.
- The P* percentile cannot exceed 50%.

ABC Control Rules

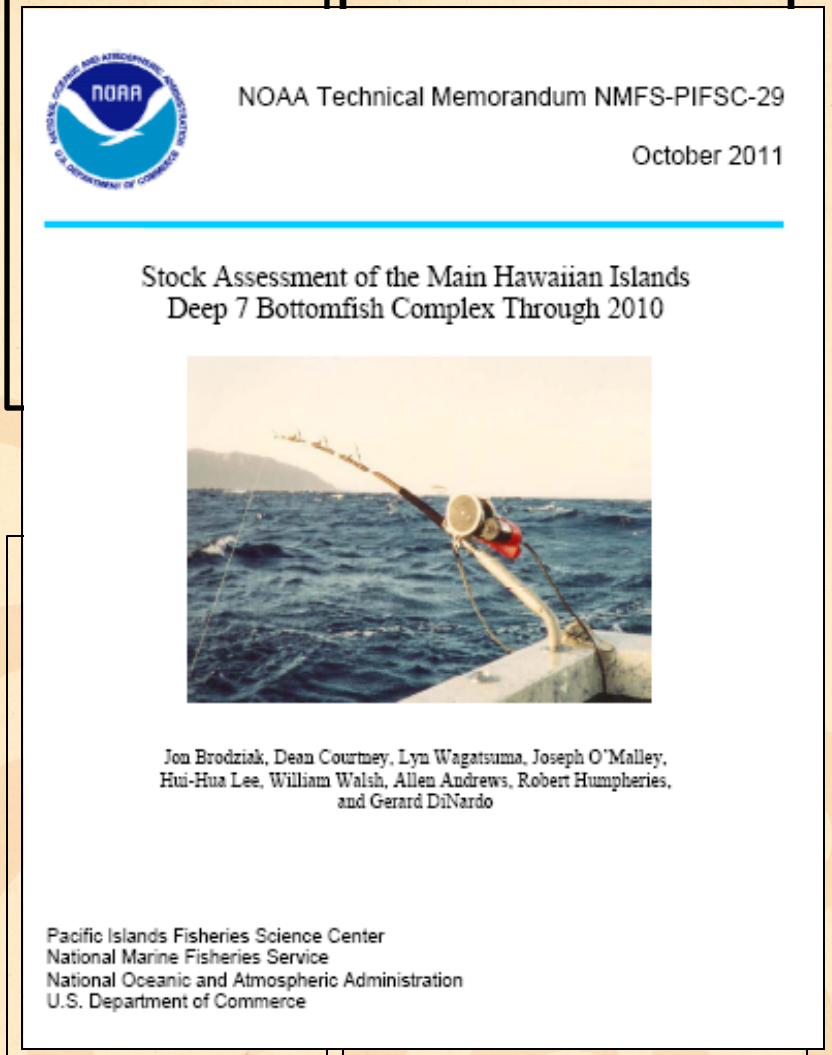
Tier 1 Stock
Reliable estimates of OFL and uncertainty in OFL from statistically based stock assessments

Tier 2 Stock
OFL and uncertainty in OFL estimated from statistically based stock assessments, but are not considered reliable

Tier 3 Stock
OFL and uncertainty in OFL estimated from DCAC-SRA and through re-sampling and are not considered reliable

ABC = P_{p*}(OFL)

- OFL is estimated as $$\mathrm{OFL} = B_y \left[\frac{F_{\mathrm{MSY}}}{F_{\mathrm{MSY}} + M}\right][1 - \exp(F_{\mathrm{MSY}} + M)]$$
- B_y is forecasted estimate of B in year y, the year for which the harvest limit is set;
- M is natural mortality coefficient;
- P_{P*} is the **P* percentile of the probability distribution of OFL;**
- OFL is not necessarily normally distributed; and
- the shape and particularly the width of the distribution reflect the uncertainty in the estimate of OFL.



NOAA Technical Memorandum NMFS-PIFSC-29

October 2011

Stock Assessment of the Main Hawaiian Islands Deep 7 Bottomfish Complex Through 2010

Jon Brodziak, Dean Courtney, Lyn Wagatsuma, Joseph O'Malley, Hui-Hua Lee, William Walsh, Allen Andrews, Robert Humpheries, and Gerard DiNardo

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Process

- SSC must first evaluate the information available on the stock or stock complex then assign it to one of the five tiers.
- The SSC then applies the ABC control rule for that data tier to calculate ABC.

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Summary of Last Year's ABC for the MHI Deep 7 Bottomfish Fishery

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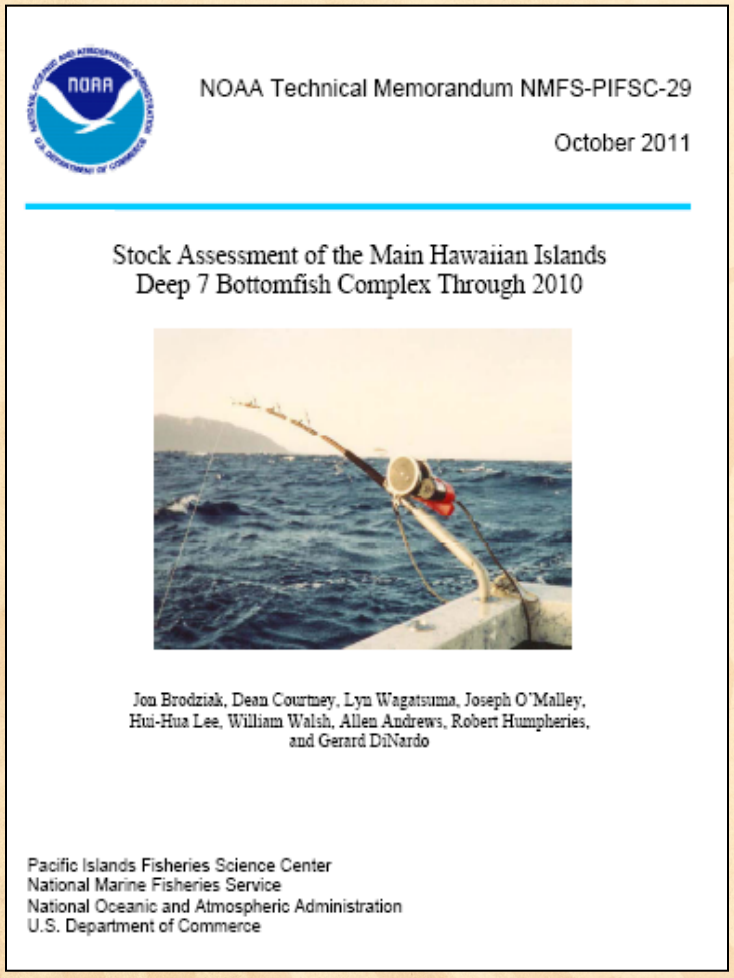
Acceptable Biological Catch



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- At its 104th meeting, the SSC determined that the MHI Deep 7 bottomfish stock assessment provided reliable estimates of MSY based reference points and documented uncertainty in model parameters.
- Qualifies as Tier 1-2 level stock
- ABC Control Rule applied:

$$ABC = P_{p^*} (OFL)$$

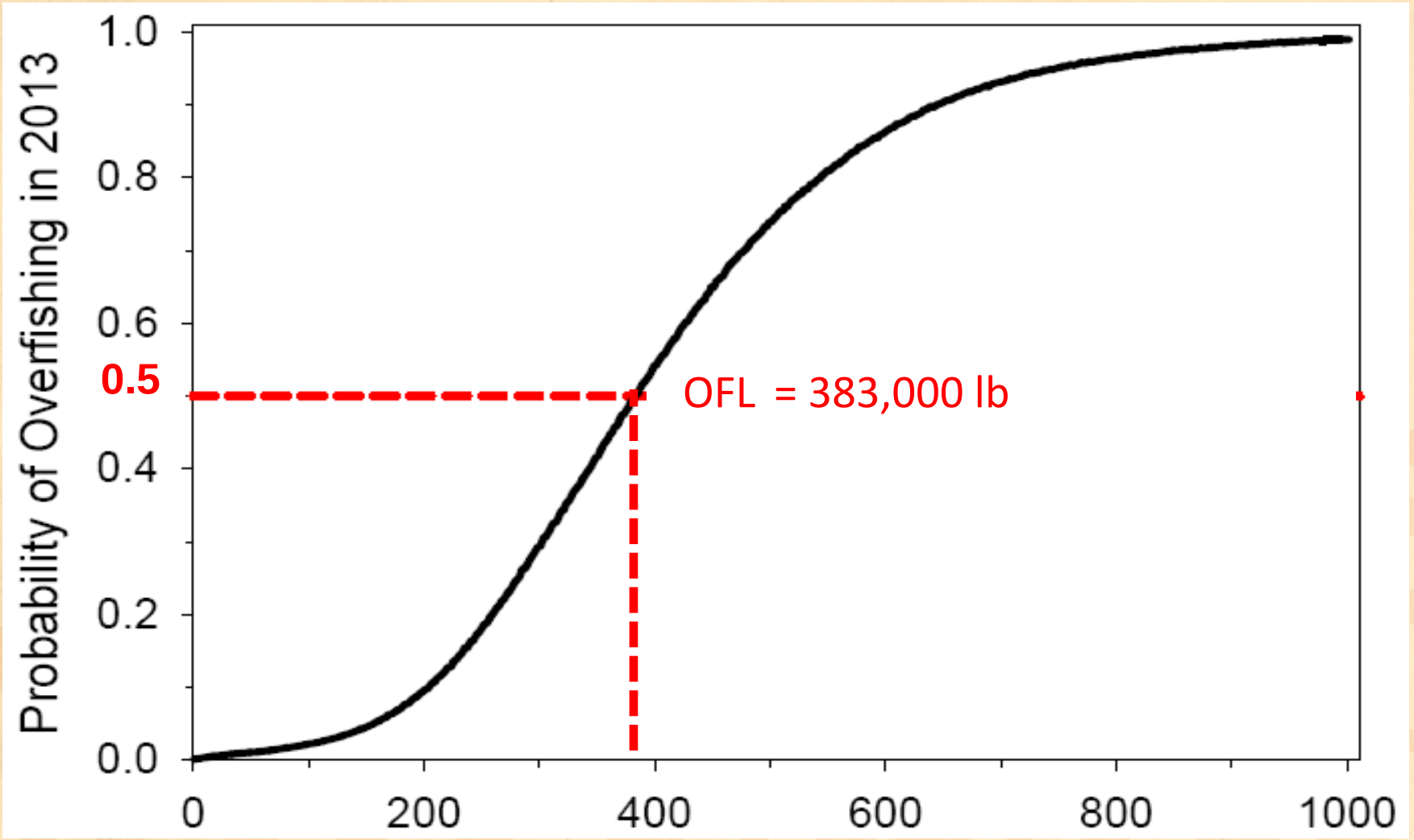
Stock assessment projection results showing the total commercial catches of Deep 7 bottomfish in fishing years 2012 and 2013 that would produce probabilities of overfishing of 0 – 99% under the Baseline Catch Scenario II and Baseline CPUE Scenario I

Catch (lb) of Deep 7 Bottomfish in 2012 & 2013	Probability of Overfishing Deep 7 Bottomfish in 2012	Probability of Overfishing Deep 7 Bottomfish in 2013
11	0	0
197,000	0.10	0.09
255,000	0.20	0.19
299,000	0.30	0.29
341,000	0.40	0.39
383,000	**0.50**	**0.50**
429,000	0.60	0.60
481,000	0.70	0.71
549,000	0.80	0.81
665,000	0.90	0.91
1,001,000	0.99	0.99

Source: Excerpted from Table 19.1 in Brodziak et al (2011)

MHI Deep 7 Stock Assessment Model Projection

Source: Brodziak et al (2011)



Determination of P* Percentile Used in ABC Control Rule for MHI Deep 7 Bottomfish

- Based on a qualitative assessment of information available for the stock considering the following four dimensions:

  (1) Assessment Information; (2) Assessment Uncertainty; (3) Stock Status; and (4) Productivity and Susceptibility.
- Each dimension worth -10 points (Total = - 40)
- The summed score of all dimensions is subtracted from P^*_{MAX} of 50%
- P* working group members include individuals from the SSC, PIFSC, PIRO and a Hawaii Council member

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Assessment Information

Description	Score
Perfect. Quantitative assessment provides estimates of exploitation and B; includes MSY-derived benchmarks	-0.0
Quantitative assessment provides estimates of exploitation and B; includes MSY-derived benchmarks; no spatially-specific information	-1.3 -2.0
Good. Measures of exploitation or B, proxy reference points, no MSY benchmarks, some sources of mortality accounted for	-4.0
Relative measures of exploitation or B, proxy reference points, absolute measures of stock unavailable	-6.0
No benchmark values, but reliable catch history	-8.0
Poor. No benchmark values, and carce or unreliable catch records	-10

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Uncertainty Characterization

Description	Score
Complete. Key determinant – uncertainty in both assessment inputs and environmental conditions included	-0.0
High. Key determinant – reflects more than just uncertainty in future recruitment	-2.5
Medium. Uncertainties are addressed via statistical techniques and sensitivities, but full uncertainty is not carried forward in projections	-4.0
Low. Distributions of F_{MSY} and MSY are lacking	-6.0
None. Only single point estimates; no sensitivities or uncertainty evaluations	-10

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Stock Status

Description	Biomass (B) and Fishing (F) Levels	Score
Neither overfished nor overfishing	B > MSST and BMSY, F < MFMT	-0.0
Neither overfished nor overfishing	B > MSST, F < MFMT	-2.0 -3.0
Neither Overfished nor overfishing	B ≥ MSST, F ≤ MFMT	-4.0
Stock is not overfished, overfishing is occurring	B > MSST, F > MFMT	-6.0
Stock is overfished, overfishing is not occurring	B < MSST, F ≤ MFMT	-8.0
Stock is overfished, overfishing is occurring	B < MSST, F >MFMT	-10.0

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Productivity & Susceptibility

Description	Score
Low risk. High productivity, susceptibility low.	-0.0
Low/medium risk. Moderate productivity, low susceptibility	~~-2.5~~ -4.9
Medium risk. Moderate productivity, and susceptibility	~~-5.0~~
Medium/High risk. Moderate productivity, high susceptibility	-7.5
High risk. Low productivity, high susceptibility	-10

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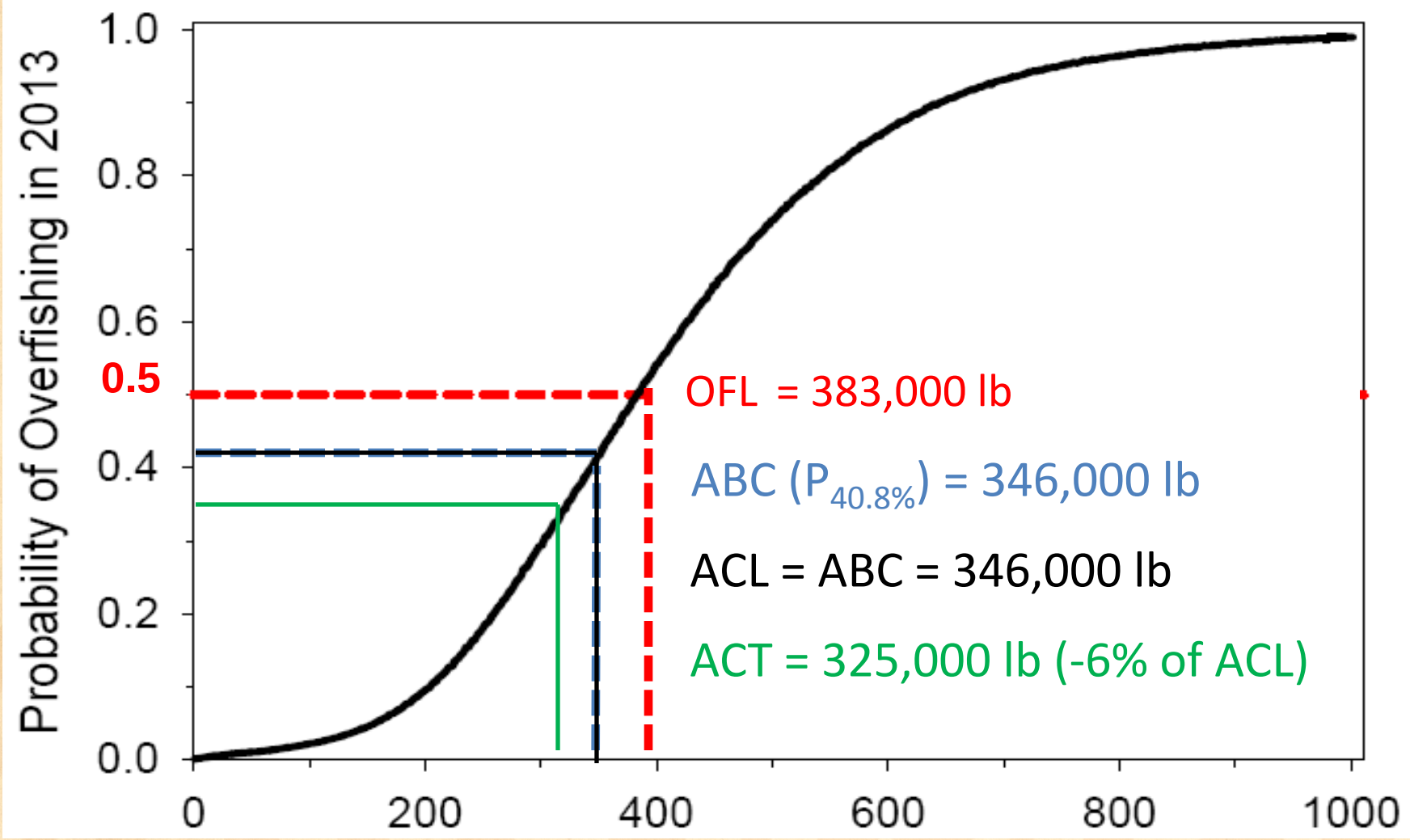
P* Percentile Outcome

Dimension	Score
1. Assessment Information: Quantitative assessment provides estimates of exploitation and B; includes MSY-derived benchmarks, but species specific data, fishery independent data, tagging data, spatial analysis and all sources of mortality not captured in the assessments	-1.3
2. Uncertainty characterization: Complete. Key determinant – uncertainty in both assessment inputs and environmental conditions included	-0
3. Stock status: Neither overfished nor overfishing, but status based on stock complex as opposed to individual stocks.	-3
4. PSA: Medium risk: Moderate productivity, and susceptibility	-4.9
Final Score	-9.2
P* percentile = 50 minus Final Score (-9.2)	**P* = 40.8**

MHI Deep 7 Stock Assessment Model Projection



Annual Catch (in 1,000 lb) in 2012-13

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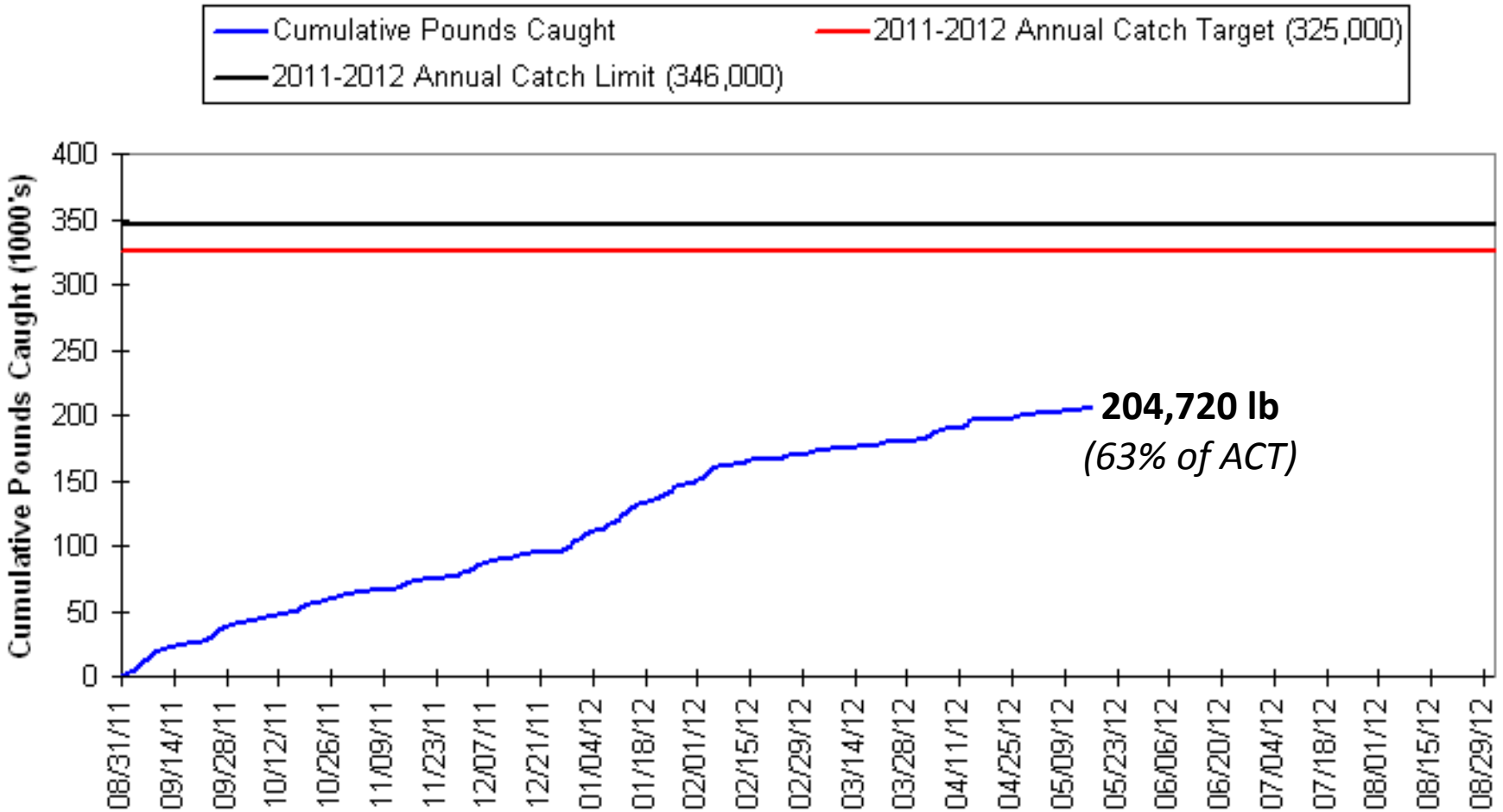
Main Hawaiian Islands Monthly Catch of Deep 7 Bottomfish
(Includes ONLY data Recieved and Processed as of 05/17/2012)



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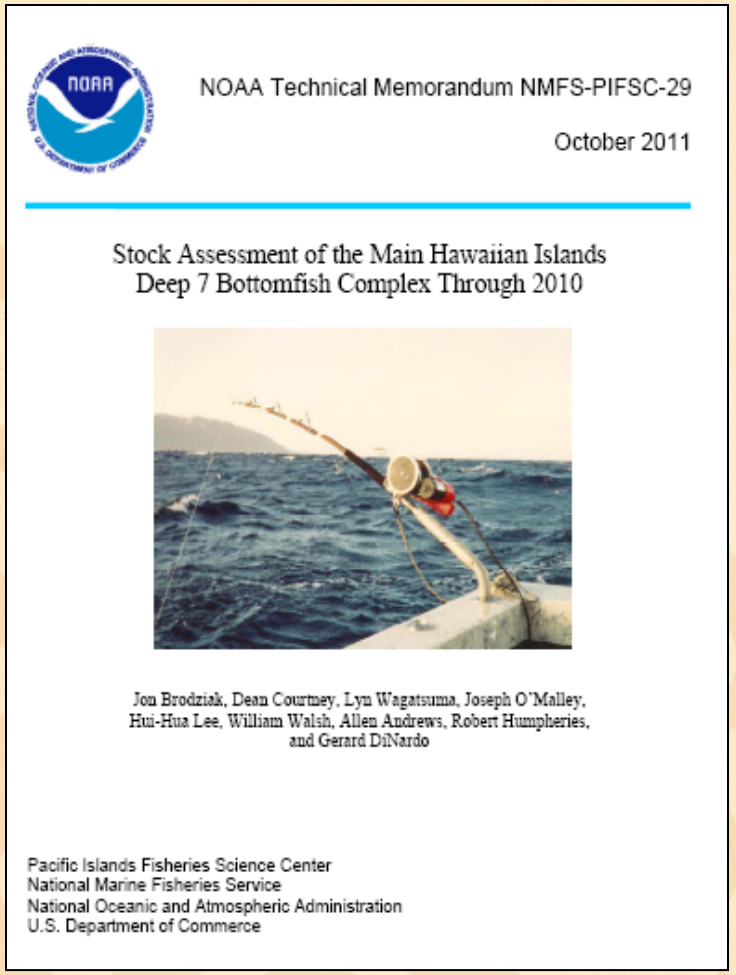
SSC Action

- Brodziak et al. 2011 remains the most recent stock assessment for MHI Deep 7 bottomfish and estimates OFL to be 383,000 lb.
- Is there new information that would lead the SSC to modify its previously recommended ABC of 346,00 lb?



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