Pre-Take Reduction Team Meeting

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Stock Assessment Process – Understanding the Marine Mammal Protection Act

Presented by

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MMPA Amendments of 1994
Taylor et al. 2000, Conservation Biology 14: 1243-1252

- MMPA of 1972 required extensive data that could not be obtained for most stocks.

- 1988: Congress recognized that system not working

- 1994 amendments work with the type of data we <u>can actually get</u>.

- Designed to account for uncertainty in assessment data

- Potential Biological Removal (PBR) approach identifies stocks that may have unsustainable human-caused impacts (='strategic' stocks)

- Allows management to identify potential problems and focus on species & fisheries with greatest likelihood of adverse impacts.

- Marine Mammal Stock Assessment Reports published annually

MMPA, Sec. 117– Stock Assessment Reports

Sec. 117. (a) Each draft stock assessment, based on the best scientific information available, shall—

(1) describe the geographic range...

(2) provide the minimum population estimate, net productivity rates, and current population trend...

(3) estimate the annual human-caused mortality and serious injury of the stock by source and, for a strategic stock, other factors ...including effects on marine mammal habitat and prey;

(4) describe commercial fisheries that interact with the stock,...

(5) categorize the status of the stock ... [Strategic/not strategic]

(6) estimate the potential biological removal level for the stock...

MMPA, Definitions

The term "potential biological removal level" means the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

The potential biological removal level is the product of the following factors:

(A) The minimum population estimate of the stock.

(B) One-half the maximum theoretical or estimated net productivity rate of the stock at a small population size.

(C) A recovery factor of between 0. 1 and 1. 0.

$$PBR = N_{min} * \tfrac{1}{2} R_{max} * F_r$$

Working out the details...

- June 1994: PBR Workshop (*Barlow et al. 1995, NOAA Tech Memo NMFS-OPR-95-6; Wade 1998, Marine Mammal Science; Taylor et al. 2000, Conservation Biology*)

- April 1996: Guidelines for Assessing Marine Mammal Stocks (GAMMS) Workshop (*Wade and Angliss 1997, NOAA Tech Memo NMFS-OPR-12*)

- September 2003: Guidelines for Assessing Marine Mammal Stocks II (GAMMS II) Workshop (*NMFS 2005, 70 FR 35397 June 20, 2005*)

Revisions to Guidelines for Assessing Marine Mammal Stocks (GAMMS II)

NMFS 20005

Available at:
http://www.nmfs.noaa.gov/pr/pdfs/sars/gamms2005.pdf

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$$PBR = N_{min} * \tfrac{1}{2} R_{max} * F_r$$

The MMPA…

… defines the minimum abundance estimate as "…an estimate of the number of animals in a stock that—

(A) is based on the best available scientific information on abundance, incorporating the precision and variability associated with such information; and

(B) provides reasonable assurance that the stock size is equal to or greater than the estimate."

The Stock Assessment Guidelines…

…define the minimum abundance estimate (N_{min}) as either

- a direct count (e.g. seals on land), or

- the lower 20th percentile of a statistical abundance estimate

$$PBR = N_{min} * \tfrac{1}{2} R_{max} * F_r$$

The MMPA…

… defines the population growth rate, or net productivity rate as "…the annual per capita rate of increase in a stock resulting from additions due to reproduction, less losses due to mortality."

The Stock Assessment Guidelines:

In the absence of stock-specific measured values, use defaults for the net productivity rate (R_{max}) :

4% for whales, dolphins, porpoises, and manatees

12% for seals, sea lions, and sea otters

The MMPA…

… defines the recovery factor as "between 0.1 to 1.0"

The intent of Congress was to ensure the recovery of populations to their optimum levels, and to ensure that the time necessary for populations listed as endangered, threatened, and depleted to recover was not significantly increased.

The Stock Assessment Guidelines:

Set the default recovery factors as follows:

0.1-0.3 for endangered species or stocks known to be declining

0.4-0.5 for threatened or depleted species, and for stocks of unknown status

up to 1.0 for stocks known to be at optimum levels, or of unknown status but known to be increasing

Stock Assessment

The MMPA…

… requires comparison of estimated human-caused mortality <u>and serious injury</u> (M&SI) to the PBR.

To reduce variation in annual estimates, guidelines suggest comparing 5-yr average annual M&SI.

PBR = Potential Biological Removal

$$N_{min} * \tfrac{1}{2} R_{max} * F_r$$

If M&SI > PBR →   Strategic stock

If M&SI <= PBR →   Not a strategic stock

Example: PBR = 5000 * 0.02 * 0.5 = 50 animals per year

Estimated M&SI: 12 animals per year

→ <u>Not strategic</u>

Established Stock Assessment Process

- Designed to achieve MMPA goals using the type and quality of data we can actually get, not what we <u>wish</u> we could get.

- Provides default values when actual data are difficult or impossible to obtain (R_{max})

- Acknowledges uncertainties in data (e.g. inaccurate or imprecise estimates of abundance, mortality)

- Provides incentive to obtain better data: with better data, it is less likely that a stock will be declared strategic when it really should not be

- Provides mechanism for focusing on stocks with unsustainable takes, and convening Take Reduction Team to collaboratively find solutions

Questions?