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14.0 List of Public Meetings

Date	Meeting	Location
January 18, 2000	Red Crab Committee	Danvers, MA
January 18-20, 2000	Council Meeting	Danvers, MA
February 11, 2000	Scoping Meeting	Portsmouth, NH
February 14, 2000	Scoping Meeting	New Bedford, MA
March 22-23, 2000	Council Meeting	Gloucester, MA
January 23, 2001	Red Crab Committee and Advisors	Danvers, MA
January 23-25, 2001	Council Meeting	Danvers, MA
February 26, 2001	Red Crab PDT Meeting	Woods Hole, MA
March 13, 2001	Red Crab Committee	New London, CT
March 14-15, 2001	Council Meeting	New London, CT
April 12, 2001	Red Crab PDT Meeting	Woods Hole, MA
May 1, 2001	Red Crab Committee	Peabody, MA
May 2-3, 2001	Council Meeting	Peabody, MA
May 15, 2001	Red Crab Advisors	Newburyport, MA
June 4, 2001	Red Crab PDT Meeting	Plymouth, MA
June 29, 2001	Red Crab Committee	Danvers, MA
July 24-26, 2001	Council Meeting	Portland, ME
August 8, 2001	Red Crab PDT Meeting	Woods Hole, MA
August 30, 2001	Red Crab PDT Meeting	Woods Hole, MA
October 11, 2001	Red Crab PDT Meeting	Woods Hole, MA
October 29, 2001	Red Crab Committee and Advisors	Danvers, MA
November 6-8, 2001	Council Meeting	Gloucester, MA
December 14, 2001	Public Hearing	Gloucester, MA
December 17, 2001	Public Hearing	New Bedford, MA
January 8, 2002	Red Crab Advisors	Newburyport, MA
January 9, 2002	Red Crab Committee	Mansfield, MA
January 15-17, 2002	Council Meeting	Portsmouth, NH
February 26-27, 2002	Council Meeting	Danvers, MA

15.0 List of Acronyms

ACCSP Atlantic Coastal Cooperative Statistics Program

ALWTRP Atlantic Large Whale Take Reduction Plan

B Biomass

B₀ Virgin Stock Biomass

B_{msy} Biomass at MSY-levels

CEQ Council on Environmental Quality

CPUE Catch-Per-Unit-Effort

CW Carapace Width

DAS Days at Sea

DEIS Draft Environmental Impact Statement

EA Environmental Assessment

EEZ Exclusive Economic Zone

EFH Essential Fish Habitat

EIS Environmental Impact Statement

ESA Endangered Species Act

F Fishing Mortality Rate

FMP Fishery Management Plan

F_{msy} Fishing mortality rate at MSY-levels

FR Federal Register

HAB Harmful Algal Bloom

IFQ Individual Fishing Quota

IVQ Individual Vessel Quota

IVR Interactive Voice Response

IWC International Whaling Commission

LOA Letter Of Authorization

M Natural Mortality Rate

MEY Maximum Economic Yield

MFMT Maximum Fishing Mortality Threshold

MMPA Marine Mammal Protection Act

MSST Minimum Stock Size Threshold

MSY Maximum Sustainable Yield

NEFMC New England Fishery Management Council

NEFSC Northeast Fisheries Science Center

NEPA National Environmental Policy Act

NMFS National Marine Fisheries Service

NOAA National Oceanic and Atmospheric Administration

NSGs National Standard Guidelines

OY Optimum Yield

PBR Potential Biological Removal

PDT Plan Development Team

PREE Preliminary Regulatory Economic Evaluation

RFA Regulatory Flexibility Act

RIR Regulatory Impact Review

RSW Refrigerated Sea Water

SAFE Stock Assessment and Fishery Evaluation

SAFMC South Atlantic Fishery Management Council

SFA Sustainable Fisheries Act

SIA Social Impact Assessment

TAC Total Allowable Catch

VTR Vessel Trip Report

WO Weigh Out

16.0 Glossary

B. Biomass, measured in terms of total weight, spawning capacity, or other appropriate units of production.

B₀. Virgin stock biomass, i.e., the long-term average biomass value expected for the stock in the absence of fishing. In the FMP, B₀ is used as the biomass of red crabs prior to the onset of commercial fishing for this resource.

Biomass weighted F. A measure of fishing mortality that is defined as an average of fishing mortality at age weighted by biomass at age for a ranges of ages within the stock (e.g., ages 1⁺ biomass weighted F is a weighted average of the mortality for ages 1 and older, age 3⁺ biomass weighted is a weighted average for ages 3 and older). Biomass weighted F can also be calculated using catch in weight over mean biomass. See also fully-recruited F.

B_{msy}. Long term average exploitable biomass of male red crabs that would be achieved if fishing at a constant fishing mortality rate equal to F_{msy}. For most stocks, B_{MSY} is about ½ of the carrying capacity. The proposed overfishing definition control rules call for action when biomass is below ¼ or ½ B_{MSY}, depending on the species.

B_{target}. A desirable biomass to maintain fishery stocks. This is usually synonymous with B_{MSY} or its proxy.

B_{threshold}. 1) A limit reference point for biomass that defines an unacceptably low biomass i.e., puts a stock at high risk (recruitment failure, depensation, collapse, reduced long term yields, etc). 2) A biomass threshold that the SFA requires for defining when a stock is overfished. A stock is overfished if its biomass is below B_{threshold}. A determination of overfished triggers the SFA requirement for a rebuilding plan to achieve B_{target} as soon as possible, usually not to exceed 10 years except certain requirements are met. B_{threshold} is also known as B_{minimum}.

Carapace. The shield-like exoskeletal plate that covers at least part of the anterior dorsal surface of many arthropods.

Catch. The sum total of crabs killed in a fishery in a given period. Catch is given in either weight or number of crabs and may include landings, unreported landings, discards, and incidental deaths.

Control rule. A pre-determined method for determining fishing mortality rates based on the relationship of current stock biomass to a biomass target. The biomass threshold (B_{threshold} or B_{min}) defines a minimum biomass below which a stock is considered overfished.

CPUE. Catch-per-unit-effort, or in this FMP, the average number of marketable red crabs caught per trap, where a single trap haul is considered the standard unit of fishing effort.

Days-at-sea (DAS). The total days, including steaming time that a boat spends at sea to fish.

Exploitable biomass. The biomass of crabs in the portion of the population that is vulnerable to fishing.

Exploitation pattern. Describes the fishing mortality at age as a proportion of fully recruited F (full vulnerability to the fishery). Ages that are fully vulnerable experience 100% of the fully recruited F and are termed fully recruited. Ages that are only partially vulnerable experience a fraction of the fully recruited F and are termed partially recruited. Ages that are not vulnerable to the fishery (including discards) experience no mortality and are considered pre-recruits. Also known as the partial recruitment pattern, partial recruitment vector or fishery selectivity.

Exploitation rate (f). The fraction of crabs in the exploitable population killed during the year by fishing. This is an annual rate compared to F , which is an instantaneous rate. For example, if a population has 1,000,000 crabs large enough to be caught and 550,000 are caught (landed and discarded) then the exploitation rate is 55%.

F . Instantaneous fishing mortality rate. Measures the effective fishing intensity for a given partial recruitment pattern.

$F_{0.1}$. A conservative fishing mortality rate calculated as the F associated with 10 percent of the slope at origin of the yield-per-recruit curve.

Fishing effort. The amount of time and fishing power used to harvest fish. Fishing power is a function of gear size, boat size and horsepower.

F_{MAX} . A fishing mortality rate that maximizes yield per recruit. F_{MAX} is less conservative than $F_{0.1}$.

F_{MSY} . A fishing mortality rate that would produce MSY when the stock biomass is sufficient for producing MSY on a continuing basis.

Framework adjustments. Adjustments within a range of measures previously specified in a fishery management plan (FMP). A change usually can be made more quickly and easily by a framework adjustment than through an amendment. For plans developed by the New England Council, the procedure requires at least two Council meetings including at least one public hearing and an evaluation of environmental impacts not already analyzed as part of the FMP.

$F_{threshold}$. 1) The maximum fishing mortality rate allowed on a stock and used to define overfishing for status determination. 2) The maximum fishing mortality rate allowed for a given biomass as defined by a control rule.

Growth overfishing. Fishing at an exploitation rate or at an age at entry that reduces potential yields from a cohort but does not reduce reproductive output (see recruitment

overfishing).

Landings. The portion of the catch that is harvested for personal use or sold.

Limited-access permits. Permits issued to vessels that met certain qualification criteria by a specified date (the "control date").

Maturity ogive. A mathematical model used to describe the proportion mature at age for the entire population. A_{50} is the age where 50% of the crabs are mature.

Mean biomass. The average number of crabs within an age group alive during a year multiplied by average weight at age of that age group. The average number of crabs during the year is a function of starting stock size and mortality rate occurring during the year. Mean biomass can be aggregated over several ages to describe mean biomass for the stock. For example the mean biomass summed for ages 1 and over is the 1⁺ mean biomass; mean biomass summed across ages 3 and over is 3⁺ mean biomass.

Metric ton. A unit of weight equal to a thousand kilograms (1 kg = 2.2 lbs.). A metric ton is equivalent to 2,205 lbs. A thousand metric tons is equivalent to 2.2 million lbs.

MFMT. Maximum fishing mortality threshold. This is the reference point for determining if overfishing is occurring.

Mortality. See Annual total mortality (A), Exploitation rate (f), Fishing mortality (F), Natural mortality (M), and instantaneous total mortality (Z).

MSST. Minimum stock size threshold. This is the reference point for determining if the stock is in an overfished condition.

MSY. Maximum sustainable yield. The largest long-term average yield (catch) that can be taken from a stock under prevailing ecological and environmental conditions.

Natural mortality. A measurement of the rate of death from all causes other than fishing such as predation, disease, starvation, and pollution. Commonly expressed as an instantaneous rate (M). The rate of natural mortality varies from species to species, but is assumed to be $M=0.15$ for deep-sea red crab. The natural mortality rate can also be expressed as a conditional rate (termed n and not additive with competing sources of mortality such as fishing) or as annual expectation of natural death (termed v and additive with other annual expectations of death).

Open access. Describes a fishery or permit for which there is no qualification criteria to participate. Open-access permits may be issued with restrictions on fishing (for example, the type of gear that may be used or the amount of crabs that may be caught).

Overfished. An overfished stock is one "whose size is sufficiently small that a change in management practices is required in order to achieve an appropriate level and rate of rebuilding."

Overfishing. Overfishing “occurs whenever a stock or stock complex is subjected to a rate or level of fishing mortality that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis.”

Pre-recruits. Crabs in size or age groups that are not vulnerable to the fishery (including discards).

Recruitment. The amount of crabs added to the fishery each year due to growth and/or migration into the fishing area. For example, the number of crabs that grow to become vulnerable to fishing gear in one year would be the recruitment to the fishery. “Recruitment” also refers to new year classes entering the population (prior to recruiting to the fishery).

Recruitment overfishing. Fishing at an exploitation rate that reduces the population biomass to a point where recruitment is substantially reduced.

Relative exploitation. An index of exploitation derived by dividing landings by trawl survey biomass. This measure does not provide an absolute magnitude of exploitation but allows for general statements about trends in exploitation.

Retrospective pattern. A pattern of systematic over-estimation or underestimation of terminal year estimates of stock size, biomass or fishing mortality compared to that estimate for that same year when it occurs in pre-terminal years.

Spawning stock biomass (SSB). The total weight of crabs in a stock that are sexually mature, i.e., are old enough to reproduce.

Status Determination. A determination of stock status relative to $B_{\text{threshold}}$ (defines overfished) and $F_{\text{threshold}}$ (defines overfishing). A determination of either overfished or overfishing triggers a SFA requirement for rebuilding plan (overfished), ending overfishing (overfishing) or both.

Stock. A grouping of crabs usually based on genetic relationship, geographic distribution and movement patterns. A region may have more than one stock of a species (for example, Gulf of Maine cod and Georges Bank cod).

Surplus production models. A family of analytical models used to describe stock dynamics based on catch in weight and CPUE time series (fishery dependent or survey) to construct stock biomass history. These models do not require catch at age information. Model outputs may include stock biomass history, biomass weighted fishing mortality rates, MSY, F_{MSY} , B_{MSY} , K, (maximum population biomass where stock growth and natural deaths are balanced) and r (intrinsic rate of increase).

Surplus production. Production of new stock biomass defined by recruitment plus somatic growth minus biomass loss due to natural deaths. The rate of surplus production is directly proportional to stock biomass and its relative distance from the maximum stock size at carrying capacity (K). B_{MSY} is often defined as the biomass that maximizes

surplus production rate.

Survival rate (S). Rate of survival expressed as the fraction of a cohort surviving the a period compared to number alive at the beginning of the period ($\frac{\text{\# survivors at the end of the year}}{\text{numbers alive at the beginning of the year}}$).

Survival ratio (R/SSB). An index of the survivability from egg to age-of-recruitment. Declining ratios suggest that the survival rate from egg to age-of-recruitment is declining.

TAC. Total allowable catch. This value is calculated by applying a target fishing mortality rate to exploitable biomass.

Total mortality. The rate of mortality from all sources (fishing, natural, pollution) Total mortality can be expressed as an instantaneous rate (called Z and equal to $F + M$) or Annual rate (called A and calculated as the ratio of total deaths in a year divided by number alive at the beginning of the year)

Yield-per-recruit (YPR). The expected yield (weight) of individual crabs calculated for a given fishing mortality rate and exploitation pattern and incorporating the growth characteristics and natural mortality.

Z. Instantaneous rate of total mortality. The components of Z are additive (i.e., $Z = F+M$.)

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