

## **4.0 Description of the Management Alternatives**

### **4.1 Overview**

The Council developed a range of management measures and alternatives intended to represent the most feasible measures and alternatives that could reasonably be expected to resolve the stated problems and achieve the FMP goals and objectives. Some measures, determined to be impracticable or to not meet the goals and objectives of the FMP, were removed from further consideration and not analyzed in this document. The “no action” alternative is considered to include no management action (i.e., the equivalent of having no FMP for this fishery). The “status quo” alternative is considered to include the management measures implemented through the emergency regulations.

This section identifies and describes both the *management measures* and the *management alternatives* considered for this FMP. Each alternative includes a unique set of measures. The measures are the actual actions being considered to meet the goals and objectives of the plan. For example, a controlled access program is a specific type of management measure that may be used to address some of the problems in this fishery. Several of the management alternatives being considered include a controlled access program as one of the measures. The concept of management alternatives is distinct from that of measures because the alternatives represent specific combinations of measures which together would comprise the overall management program. For example, providing only a long list of potential measures does not inform the public as to what the actual management program may be, especially if some measures cannot work in combination with others (e.g., minimum sizes and allowing processing-at-sea) while others require certain combinations of measures to be effective (e.g., hard TAC and reporting requirements).

### **4.2 Description of the Proposed Management Measures and Options**

The following describes the management measures included in the preferred alternative for the Red Crab FMP. Within the description of each proposed management measure is a range of options that the Council considered. The specific option selected by the Council is described first, followed by the non-preferred options.

The options described below for each potential management measure were intended to represent a broad range of possible options for each management measure considered under the Red Crab FMP. Following the public review and comment period for the draft FMP and draft EIS, the Council considered any additional information received on this species and its fishery. If the additional information received had suggested that an option not specified below, but within the range of options considered, was more appropriate for this fishery, the Council may have selected a new option. For example, following discussions with the fishing industry and analysis of additional data, we may have determined that a trap limit of 550 traps is more appropriate than the current suggested option of 600 traps. Since 550 is only a slight adjustment to the proposed 600 trap limit and is well within the overall range suggested (400 - 1000 traps), we could have made this change in the final document.

#### 4.2.1 Incidental Catch Limit (allowance for other fisheries)

The FMP will establish an incidental catch limit as an allowance for fishing vessels not participating in the directed fishery to harvest and retain some amount of red crab. The FMP included several options for setting incidental catch levels and allowances for all fisheries not targeting red crab. This would ensure that the offshore lobster fishery, as well as other fisheries, would be able to continue to land relatively small amounts of red crab as an incidental catch in their primary fisheries.

The following options were intended to represent a range of possible incidental catch allowance limits. Red crabs landed under the incidental catch allowance may be subject to any minimum size and/or sex restrictions implemented under the plan. Evaluation of the following options was done based both on the incidental catch vessels being subject to other regulations as well as not subject to other regulations.

The following table summarizes data retrieved from the 1998, 1999 and 2000 VTR and dealer weighout databases for trips reporting some amount of red crab landed as incidental catch. Nearly 40% of all trips reporting incidental catch levels of red crab reported 100 pounds or less. Half of all trips reported 200 pounds or less. Setting an incidental catch limit of 1,000 pounds would account for most trips (88.6%) reporting some landings of red crab.

<b>Incidental Catch Limit Options</b>	<b>Cumulative Percentage of Trips</b>
50 pounds per trip	26.6%
100 pounds per trip	38.4%
500 pounds per trip	72.6%
1,000 pounds per trip	88.6%

**Table 12. Cumulative percentage of number of fishing trips with incidental catch limit or less of red crab, 1998 - 2000 data.**

##### 4.2.1.1 Preferred Option: 500 pounds per trip

This is the Council's preferred alternative. This option allows all vessels who obtain an open access incidental catch permit, or vessels holding a controlled access permit but are not on a red crab day-at-sea, to retain and land up to a maximum of 500 pounds of red crab, potentially subject to any other regulations, per fishing trip. The incidental catch limit will be measured as the weight of whole red crabs, or the whole weight equivalent.

##### 4.2.1.2 Non-Preferred Option 1: 50 pounds per trip

This option would allow all vessels not fishing on a directed red crab trip to retain and land up to a maximum of 50 pounds of red crab, potentially subject to any other

regulations, per fishing trip. The incidental catch limit will be measured as the weight of whole red crabs, or the whole weight equivalent.

#### 4.2.1.3 Non-Preferred Option 2: 100 pounds per trip

This option would allow all vessels not fishing on a directed red crab trip to retain and land up to a maximum of 100 pounds of red crab, potentially subject to any other regulations, per fishing trip. The incidental catch limit will be measured as the weight of whole red crabs, or the whole weight equivalent.

#### 4.2.1.4 Non-Preferred Option 3: 1000 pounds per trip

This option would allow all vessels not fishing on a directed red crab trip to retain and land up to a maximum of 1000 pounds of red crab, potentially subject to any other regulations, per fishing trip. The incidental catch limit will be measured as the weight of whole red crabs, or the whole weight equivalent.

#### 4.2.1.5 Non-Preferred Option 4: Tiered incidental catch limits

This option would provide for an additional level of allowable incidental catch for certain vessels participating in a fishery with an informal tradition of higher red crab landings during winter months. Vessels holding a valid Area 3 Lobster Permit would be allowed to retain and land up to a maximum of 1,000 pounds of red crab per fishing trip during the months of December, January, and February only. The rest of the year, these vessels, as well as all other vessels not fishing on a directed red crab trip, would be allowed to retain and land up to a maximum of 100 pounds of red crab per fishing trip. Both levels of incidental catch limits under this option are potentially subject to other regulations. The incidental catch limit will be measured as the weight of whole red crabs, or the whole weight equivalent.

### **4.2.2 Minimum Size Limit**

The Council considered establishing a minimum size limit for the red crab fishery. There are several issues related to the implementation and enforcement of this type of measure. For example, the Council debated how a minimum size limit (usually based on carapace width) might be established if butchering or processing at sea is allowed.

The following options for minimum size all refer to carapace width, based on the maximum width including the spines. Gray (1970) indicated methods for measuring red crabs both by width and by length and suggested that the length measurements may be less variable than the width. If there is concern that width measurements may be too uncertain, the Council could adopt Gray's length-width relationships and set a minimum size based on the carapace length, although this measurement may not be a very efficient technique for use in the field. Depending on whether and the degree to which the Council allows or restricts processing and/or butchering at sea, weight-based minimum size restrictions may have to be developed. If the crabs are sectioned (with the carapace removed) the minimum "size" will have to be indicated by a minimum section weight. For a minimum size to be effectively monitored, the Council will have to specify an

section weight that is equivalent to the minimum size for each possible method of butchering crabs (e.g., with gills or without gills). Also, although all the following options are specified in carapace width, conversions to carapace length could be used if this measurement is determined to be more appropriate for this fishery.

A minimum size restriction may apply to all vessels in possession of red crabs, whether from the directed fishery or as part of a incidental catch allowance. A significant issue for the Council was the utility of a minimum size limit relative to the difficulty of enforcement and actual conservation necessity of this type of measure. The market largely controls the size of the crab that is efficient to process and sell, and so far this seems to be about a minimum of a one pound crab. If we accept that the market will control the size of the crabs landed, implementation of a regulated minimum size may be unnecessary, especially given the enforcement concerns. If market conditions changed, or small crabs were being landed in increasing numbers, the Council could adopt a minimum size limit in the future via a framework adjustment to the FMP.

#### 4.2.2.1 Preferred Option: Non-regulated minimum size

As discussed above, it does not appear to be practicable to implement a regulatory minimum size in this fishery if any type of butchering and/or processing of red crabs at sea is permitted. The nature of the butchering process (removal of the carapace and the cutting of the crab in half laterally) makes it all but impossible to administer and enforce a minimum size regulation. With full processing at sea (removal of the meat from the body of the crab), it would be completely impossible to enforce this type of regulation.

Also, as discussed above, it does not appear to be necessary to regulate a minimum size for red crabs at this time. The market for red crabs is currently fairly restrictive in demanding only male crabs larger than four inches in carapace width. As long as these market conditions remain, a complicated and difficult to enforce regulatory minimum size may be superfluous and unnecessary.

However, there remains the concern that market conditions or other factors could change that would result in smaller crabs being landed and/or processed. Any downward trend in the size of the crabs landed could have significant implications for the sustainability of the resource as male crabs could start being harvested before they have an adequate opportunity to reproduce.

An option available to the Council to deal with this situation was to establish an “operational minimum size” that represents the smallest size crab that should be harvested. Although it would not be a violation to land crabs smaller than this size, self-reporting, port sampling and observer coverage would be used to track the sizes of red crabs being landed. If the proportion of crabs smaller than the operational minimum size begins to increase, the Council will consider taking appropriate action at that time to regulate a minimum size and ensure the enforceability of such an action.

For the purposes of this measure, the operational minimum size is four inches in carapace width, measured as noted above, consistent with the minimum size at which red

crabs are considered to recruit to the fishery. There will be no regulations associated with this measure, but the fishing industry is put on notice that a minimum size could be implemented in the regulations in the future if the Council and/or NMFS determine that there is an increase in the number of percentage of undersized crabs being retained and landed.

Because this action would likely entail very strict controls on the handling of red crabs, including butchering and/or processing at sea, and strict controls on the allowable size composition of all red crab catches, it would be in the best interest of the fishing industry to ensure that landed red crabs remain sufficiently above the operational minimum size. This option essentially serves as a placeholder for possible future action by the Council to address any increases in the amount of undersized crabs harvested in the fishery.

#### 4.2.2.2 Non-Preferred Option 1: 4" minimum size (carapace width)

This option would establish the minimum allowable size for red crabs retained and landed of four inches, measured as the width of the crab's carapace at the spines. This size was identified during the scoping process as the minimum size acceptable to the market and the minimum size currently targeted by the industry.

#### 4.2.2.3 Non-Preferred Option 2: 4 ½" minimum size (carapace width)

This option would establish the minimum allowable size for red crabs retained and landed of four and a half inches, measured as the width of the crab's carapace at the spines. Reportedly, the market seeks red crabs at least one pound in weight. Both Serchuk (1977) and Meade (1973) suggest 4 ½" as being "of commercial size." Meade includes some size-weight data from harvested crabs that supports a minimum size of 4 ½" as equivalent to a one pound crab. A size-weight relationship developed by Farlow (1980) also indicates that a minimum size of 4 ½" would be consistent with a one pound male crab.

#### 4.2.2.4 Non-Preferred Option 3: 5" minimum size (carapace width)

This option would establish the minimum allowable size for red crabs retained and landed of five inches, measured as the width of the crab's carapace at spines. At the high end of the range of options, the Council could consider setting the maximum size at five inches. This would ensure that only large crabs at least one and a half pounds in weight are retained and landed.

#### 4.2.2.5 Non-Preferred Option 4: Allowances

Because of the potential for measurement and human error, if a regulated minimum size is selected, it may be necessary to add in an allowance for some percentage of crabs below the minimum size. The percentage should be low, no more than 1% by weight, and based on common fishing practices and constraints.

### 4.2.3 Males-Only

In addition to a minimum size restriction for the red crab fishery, the Council considered whether the fishery should be constrained to retain and land only male red crabs or whether females as well as males should be allowed to be landed. The Council also considered whether this restriction should apply to all vessels that land any amount of red crab (i.e., including the open access incidental catch vessels) or only to those vessels that qualify for a controlled access permit to fish in the directed fishery.

#### 4.2.3.1 Preferred Option: Male only restriction for the controlled access fishery

The preferred option restricts the harvest and landing of red crabs to male crabs only for those vessels holding a controlled access permit to participate in the directed red crab fishery. All female crabs captured in traps are required to be returned to the ocean. If the crabs are landed whole, the abdomen will remain intact and can be used to differentiate females from males. If the crabs are landed in sections, either the abdomen itself or the outline of the abdomen will be used to differentiate females from males. The male-only restriction will apply only to vessels that possess a controlled access permit for the directed fishery. These vessels will be granted a small allowance for the incidental retention of female crabs. The allowance for females will be an amount not to exceed one standard U.S. fish tote per vessel per trip.

Prohibiting the retention and landing of female crabs in the directed fishery puts into regulation what has been a common fishing practice and is, in fact, already a market requirement. Female red crabs are slow-growing and may only reproduce once every few years. Protecting females from all harvesting may serve to maintain and protect the reproductive potential of the species. This measure only affects the directed red crab fishery because they have the capability to quickly sort red crabs harvested in their traps and to return female crabs to the water almost immediately. The measure does not affect the incidental catch vessels because the Council does not want to provide any incentive to these fishermen to seek any more than the first 500 pounds of red crab that they harvest. The allowance for the incidental retention of female crabs by the controlled access vessels allows these fishermen to continue current fishing practices and represents a very small fraction of the total crabs retained and landed on each fishing trip (i.e., one standard U.S. fish tote is estimated to equate to roughly 100 pounds, which would be approximately 0.13% of the 75,000 pound trip limit).

#### 4.2.3.2 Non-Preferred Option 1: Male only restriction for all vessels

This option would restrict the harvest and landing of red crabs to male crabs only for all vessels that retain and land any amount of red crab, including those with controlled access permits to participate in the directed red crab fishery and those with open access incidental catch permits. All female crabs captured in traps or other fishing gear would be required to be returned to the ocean.

#### 4.2.3.3 Non-Preferred Option 2: No restriction on sex of crabs

This option would not restrict sex of the red crabs that may be retained and landed

in either the controlled access fishery or the incidental catch fishery. Male and female red crabs could be retained and landed by all vessels authorized to land red crabs.

#### **4.2.4 Butchering/Processing-at-Sea Restrictions**

The FMP will establish butchering and/or processing at sea restrictions for the directed red crab fishery. Butchering and/or processing red crabs at sea (versus landing crabs whole) expands the vessels' capacity to harvest red crab on a per trip basis. The FMP includes several options to set restrictions and/or prohibitions on the butchering and/or processing at sea of red crabs. These measures are balanced against the other measures considered in the FMP, such as minimum size limits and sex restrictions. Processing and butchering are defined as follows:

- *Processing, or to process*, with respect to the Atlantic deep-sea red crab fishery, means:
  - For full processing, the removal of meat from the body and/or legs of a red crab and any preparation of the meat that follows, including but not limited to cleaning, freezing, cooking, and/or glazing.
  - For partial processing, the splitting or cutting of crabs in half along the length of the carapace, removal of the carapace, and any preparation of the crab that follows, including but not limited to cleaning, freezing, cooking, and/or glazing.
- *Butchering*, with respect to the Atlantic deep-sea red crab fishery, means the splitting or cutting of crabs in half along the length of the carapace, removal of the carapace, and storing of the crab sections on ice.

The more butchering and processing activities that are allowed under the FMP, the more difficult it will be to control the number of small crabs being landed. The FMP will also establish tolerances for incidental separation of crab bodies, legs, and/or claws.

##### **4.2.4.1 Preferred Option: Partial processing and butchering allowed**

This is the Council's preferred option. This option allows all at-sea butchering and process activities short of full-processing, defined as above to include extraction of meat from the crab. Any activity short of removing the crab meat (including splitting, sectioning, freezing, cooking, and/or glazing of crab sections) would be considered butchering or partial processing and allowed under this option. Retaining and landing whole crabs would, of course, be allowed.

Appropriate recovery rates were developed to determine the whole weight equivalent from the weight of the butchered crabs. The recovery rate conversion formulas are as follows:

- 58% of whole to partially-processed red crab, or 1.72 to 1, for fully cleaned crab sections that have had the gills and other viscera removed;

and

- 64% of whole to butchered red crab, or 1.56 to 1, for crab sections with all or the majority of the gills retained.

The first recovery rate applies to red crab that is partially processed at sea, as defined in the FMP, and the second recovery rate applies to red crab that is butchered at sea, as defined in the FMP. The second recovery rate is higher because the individual crab sections that retain the gills, mandibles and other viscera weigh more (closer to the weight of a whole crab) than do crab sections without this material still attached. All persons are prohibited from transferring at sea, either directly or indirectly, or attempting to transfer at sea to any vessel, any red crab, or its equivalent as specified at § 648.13, taken in or from the red crab management unit.

Red crabs may only be landed whole or in half sections with the claws and legs attached. This prohibition will apply to all vessels that land red crab, either through the controlled access fishery or as incidental catch. Vessels with an incidental catch of red crabs must have no more than two claws and eight legs per crab on-board their vessel. The maximum allowance for red crab claws and legs separate from crab bodies for vessels participating in the controlled access fishery will be equal to the amount necessary to fill one standard U.S. fish tote per vessel per trip. This is expected to be roughly 100 pounds. This allowance only applies to the controlled access fishery and is only intended to account for incidental and unintended loss of claws and/or legs during normal fishing and handling operations.

These restrictions would allow the current practices of vessels involved in the red crab fishery to continue, while prohibiting any expansion of processing at sea activities. Vessels currently outfitted to butcher and/or partially process crabs at sea would not have to change their fishing practices. This measure should have no impact on the red crab industry, and will allow the male-only restriction to be administered and enforced. The sex of the crabs can be discerned either by the shape of the tail flap on whole crabs, or by the outline of the tail flap on crabs that have been butchered and/or partially processed. The requirement to land crabs either whole or in half sections with the legs and claws intact is intended to remove any incentive and prevent the harvesting of red crab for their claws and/or legs alone. The proposed allowance for the controlled access vessels recognizes that accidental claw and/or leg loss may occur during normal fishing operations and handling.

#### 4.2.4.2 Non-Preferred Option 1: No processing or butchering at sea

This option would prohibit the landing of red crabs in any form except whole. This would prohibit all forms of processing and butchering at sea. This would be the most restrictive option considered under this measure. No recovery rates would need to be established, as all crabs landed will be in whole weight. Existing vessels that butcher and/or process at sea (within reasonable limits) may be given an exemption to this option -- grandfathered -- in order to allow them to continue to fish for red crab in the method for which their vessel is best suited. Existing vessels that do not butcher and/or process at sea would not be allowed to convert, and any new vessels entering the fishery would

not be allowed to butcher/process at sea but would have to enter the fishery prepared to land their crabs whole.

#### 4.2.4.3 Non-Preferred Option 2: No processing at sea (butchering allowed)

This option would allow the butchering of crabs at sea, but prohibit all forms of processing. Crabs could be landed either whole or sectioned, but not frozen, cooked, cleaned, and/or glazed.

Appropriate recovery rates would be established to determine the whole weight equivalent from the weight of the butchered crabs. In the 2001 emergency regulations, NMFS identified two recovery rates to be used by vessels that butcher crabs at sea. The first recovery rate applies to vessels that remove the gills and/or fully clean the crab sections. This recovery rate is 58% of whole to butchered crabs, or 1.72 to 1, and is called the “cleaned” recovery rate (66 FR 23182). The second recovery rate applies to vessels that do not remove the gills and mandibles and only partially clean the associated viscera off the crab sections. This recovery rate is 64%, or 1.56 to 1, and is called the “gills-on” recovery rate (66 FR 38165). This recovery rate is higher because the individual crab sections that retain the gills, mandibles and other viscera weight more (closer to the weight of a whole crab) than do crab sections without this material still attached.

#### 4.2.4.4 Non-Preferred Option 3: All processing and butchering allowed

This option would use the original definitions of processing and butchering at sea, and allow all of these activities to occur. Under this option, vessels could separate crab meat from the body and clean, cook, glaze, and/or freeze, etc. at sea with no restrictions. This would be the least restrictive option considered under this measure. Appropriate recovery rates would need to be established for all contingencies under this option to accurately determine the whole weight equivalent from the weight of the butchered crabs. The recovery rates used would be dependent upon the specific process used (e.g., crab meat picked, cooked, and frozen would be considered separately from crab sections with the carapace removed). If centrifuge or other meat separation technology is used on board a red crab fishing vessel, it would become impossible to control the size of crabs harvested, processed and landed.

Appropriate recovery rates would be established to determine the whole weight equivalent from the weight of the butchered or processed crabs. The recovery rates used would be dependent upon the specific process used (e.g., crab meat picked, cooked, and frozen would be considered separately from crab sections with the carapace removed). In the 2001 emergency regulations, NMFS identified two recovery rates to be used by vessels that butcher crabs at sea and one for use by vessels that process crabs at sea. The first recovery rate applies to vessels that remove the gills and/or fully clean the crab sections. This recovery rate is 58% of whole to butchered crabs, or 1.72 to 1, and is called the “cleaned” recovery rate (66 FR 23182). The second recovery rate applies to vessels that do not remove the gills and mandibles and only partially clean the associated viscera off the crab sections. This recovery rate is 64%, or 1.56 to 1, and is called the

“gills-on” recovery rate (66 FR 38165). This recovery rate is higher because the individual crab sections that retain the gills, mandibles and other viscera weight more (closer to the weight of a whole crab) than do crab sections without this material still attached. The third recovery rate applied to vessels that fully process crabs at sea and land meat-only. This recovery rate is 25%, or 4 to 1, and is called the “meat-only” recovery rate (66 FR 23182).

#### **4.2.5 Trap/Pot Limits**

The FMP will establish trap/pot limits for the directed red crab fishery. The setting of trap limits (number of traps allowed) was identified as a potential measure for the FMP during the initial scoping process. These limits and restrictions only pertain to vessels with controlled access permits to participate in the directed red crab fishery. Vessels fishing primarily for lobsters may employ significantly more traps than the trap limits specified below, but these vessels would only be subject to the red crab incidental catch limit, not the trap limit. Consideration of these options depend also upon the gear requirements implemented in the FMP. For instance, limiting the number of traps would have much less utility if trap size was not also controlled. The Council determined the enforceability of trap restrictions and developed a procedure for administering the trap limit to ease the enforcement burden associated with this measure. The administration and enforcement of this measure may be complicated by the proximity of the offshore lobster fishery and red crab vessels that are permitted to also fish for lobsters.

As a partial solution to improve the enforceability of this measure, rather than manage the trap limit by counting individual traps, the Council intends to require each vessel to declare, in a formal statement attached to their permit, the maximum number of traps per string that they employ. They would then be allowed a maximum number of strings based on the proposed trap limit (e.g., 600) divided by their declared traps per string. All fractions will be rounded down to the lowest whole number (i.e., if they are allowed 600 traps and they declare 125 traps per string -- which divides to 4.8 strings -- they would be allowed a maximum of 4 strings).

##### **4.2.5.1 Preferred Option: 600 traps per vessel**

This is the Council’s preferred option. This option allows all vessels holding a controlled access permit and fishing on a directed red crab trip to employ a maximum of 600 red crab traps in the harvesting of red crabs. This amount has been reported to the Council as the “industry standard” used by most vessels, although individual vessels may vary slightly from this number. This limit is not expected to represent a significant reduction for any vessel currently directing on red crab, although it may be a slight to moderate reduction for some. Most importantly, this option would prevent any vessel from *increasing* the number of traps they employ, either in an attempt at increasing their effort or in an attempt at “holding bottom.”

This measure will be managed and enforced via a requirement for each vessel to declare, on their annual permit application, the maximum number of traps they use per string and the maximum number of strings they employ in their fishing operations, such

that the product of the maximum number of traps per string and the maximum number of strings declared by the vessel is no more than 600 traps. If on a red crab trip (on a red crab DAS and more than the incidental catch limit of red crab on board) no vessel may haul any fishing gear other than red crab gear, marked as required according to the gear marking requirements.

A limit of 600 traps per vessel reflects current fishing practices and is consistent with the NMFS emergency regulations, so this measure should have no impacts to red crab fishing vessels involved in the directed fishery. This measure is intended to prevent an increase in the number of traps used in the red crab fishery. Because the fishery will be managed via effort controls (principally through DAS limits), any method by which a vessel can increase their efficiency per day of fishing has the potential to subvert the effort controls intended to ensure a sustainable fishery. Increasing the number of traps used is one technique that could be used to increase a vessel's efficiency; this measure, in conjunction with the maximum trap size described below, maintains the relative fishing power of all vessels to be roughly equivalent to existing levels. It is not the intent of the Council to limit the ability of red crab vessels to participate in other fisheries; thus, the trap limit is only intended to constrain the gear used in the red crab fishery.

#### 4.2.5.2 Non-Preferred Option 1: 400 traps per vessel

This option would allow all vessels fishing on a directed red crab trip to employ a maximum of 400 traps in the harvesting of red crabs. In most, if not all, cases this would be a reduction in the number of traps currently employed by vessels. The Council may want to consider a wholesale reduction in the number of traps used by each vessel in the fishery as a conservation measure to control effort.

#### 4.2.5.3 Non-Preferred Option 2: 1,000 traps per vessel

This option would allow all vessels fishing on a directed red crab trip to employ a maximum of 1,000 traps in the harvesting of red crabs. This amount is most likely more than is being used by any vessel currently directing on red crab, but the option is intended to represent the upper bound on the reasonable range of options considered in the development of the FMP.

#### 4.2.5.4 Non-Preferred Option 3: Overage Allowance

Because all vessels may suffer some gear damage or loss, a small allowance should be made for vessels to have spare traps available for use as replacements. This allowance should probably be indicated by a percentage of the trap limit and should be based on typical per trip gear loss. For instance, if a vessel fishing 500 traps typically has to replace around 25 per trip, the allowance should be 5%. The advisors report replacing an average of approximately 10 traps per trip, and as many as 50 traps on a trip, so these numbers could be used to establish an appropriate overage allowance. If the option is implemented to set a maximum number of traps allowed per string and a maximum number of strings per vessel, an overage allowance would not be necessary.

#### 4.2.6 Gear Requirements and Restrictions

The FMP will establish gear requirements and restrictions for the directed red crab fishery. The Council considered the utility of requiring escape vents (of a size to be determined to allow for the escapement of small crabs and possibly females) on all traps used in the directed red crab fishery. Other gear requirements considered as options in the FMP include size and materiel restrictions for traps used in the directed fishery. Gear marking or trap tag requirements were also considered. Gear modifications may be necessary to comply with marine mammal and protected species requirements. The Council considered prohibiting all fishing gear types except pots and traps in the directed red crab fishery.

Vessels fishing for red crab under either a controlled access permit or an open access incidental catch permit will be required to comply with all relevant gear requirements and restrictions as indicated in the Atlantic Large Whale Take Reduction Plan, pursuant to 50 CFR § 229.32.

##### 4.2.6.1 Preferred Option 1: Maximum trap size

The FMP will establish limits on the size of traps that may be used by a vessel with a controlled access permit in the directed red crab fishery. The Council considered several ways to set a maximum allowable size for red crab traps, including based on specific maximum allowable dimensions (e.g., 48" by 30" by 18"), maximum allowable trap foot print area (e.g., 10 feet<sup>2</sup>), maximum trap girth measured in two directions (e.g., 250 inches), or by maximum allowable trap volume (e.g., 18 feet<sup>3</sup>). The latter three options allow for different trap designs (e.g., square, circular, or conical) that are still constrained by the overall size restrictions, but allow some degree of flexibility.

The maximum allowable size of all traps used in the controlled access red crab fishery will be 18 cubic feet. All traps used in the controlled access fishery must be either rectangular/trapezoidal or conical, but new trap designs may be approved by the Regional Administrator provided the volume of the new trap design does not exceed the maximum limit established by the Council.

Restricting traps used in the red crab fishery to a maximum size prevents any future increase in trap size, constraining trap efficiency to current levels. Eighteen cubic feet was selected as the maximum allowable volume to allow for some margin of error in the traps currently being used and was based on rounding the larger of the two calculated trap volumes to the nearest cubic foot. This measure, in conjunction with the trap limit described above, serves to prevent a potential increase in the per day efficiency of fishing vessels fishing under a DAS limit program.

##### 4.2.6.2 Preferred Option 2: Gear markings

The Council considered requiring that all traps used in the directed red crab fishery be marked in such a way as to identify them as red crab traps, the vessel from which they are deployed, and any other information the Council or the Regional Administrator deems necessary. In order to clearly identify red crab fishing gear as such, the vessel to

which it belongs, and other information necessary to enforce the provisions of the FMP, the following will be required on all buoys used at the end of each red crab trap trawl:

- “RC” should be painted on the top of each buoy to clearly indicate red crab fishing gear;
- the vessel’s permit number should be painted on the side of each buoy to clearly indicate the vessel and to allow for verification that it is authorized to participate in the controlled access fishery;
- the number of the trap trawl relative to the total number used by the vessel (i.e., “3 of 6”) should be painted on the side of each buoy as well;
- all letters and numbers painted on buoys should be at least three inches in height to be clearly visible by U.S. Coast Guard and other vessels; and
- high flyers and radar reflectors will be required on each trap trawl.

Gear markings are necessary to identify fishing gear being used in the red crab fishery. The proposed gear markings would allow the administration and enforcement of the trap limit. These proposed gear marking requirements are consistent with current marking practices in the red crab fishery.

#### 4.2.6.3 Preferred Option 3: Prohibition on the use of parlor traps

The use of parlor traps in the red crab fishery is prohibited. A parlor trap is a trap with two or more compartments within the trap that are intended to make it more difficult for animals to escape from the trap. A red crab trap must therefore have only one compartment within the trap and that compartment must not be divided into sections with barriers that impede the free movement of crabs within the trap. A red crab pot is not to have any form of chamber or partition in the pot which is capable of containing red crabs other than that formed by the external frame of the pot.

Parlor traps improve the ability of traps to retain crabs over a longer time. Thus the use of parlor traps could increase fishing effort, particularly if accompanied by a change in fishing strategy, such as longer soak times. Parlor traps would likely increase the productivity of traps when they are left on the fishing grounds between trips. Because the current traps do not prevent the escape of crabs from the trap, many of the crabs that might enter the traps during the period between trips are gone before the vessel returns to haul the traps on the next trip. Parlor traps would create a concern about "ghost" fishing if traps are lost. Lost traps do not present a ghost fishing problem at present because the crabs can escape from the traps. Parlor traps would be more likely to cause handling damage to crabs. This would lower product quality for the marketable crabs that were kept and increase mortality for the crabs that are released alive.

#### 4.2.6.4 Preferred Option 4: Prohibition on the use of other gear types

The FMP will require that only traps meeting the above specifications, restrictions,

and requirements be used in the directed red crab fishery. Other gear types, such as otter trawls, dredges, nets, etc., would be prohibited from use by vessels holding a controlled access permit for the red crab fishery and operating on a red crab DAS. This prohibition would not apply to those vessels retaining incidental catch-level amounts of red crab harvested while participating in other fisheries, even if they hold a controlled access permit for the red crab fishery.

Prohibiting non-trap fishing gear (principally otter trawl and dredge gear) in the controlled access directed red crab fishery will protect the resource and its habitat from more damaging fishing gear, minimizing the potential for any adverse impacts to red crab EFH. This measure will reduce the potential for increased discard mortality associated with other gear types. This prohibition will also reduce potential gear conflicts between red crab fishermen.

#### 4.2.6.5 Non-Preferred Option 1: Escape vents

This option suggests that escape vents be required on all traps used in the directed red crab fishery. The escape vents would be used to facilitate the escapement of small crabs and possibly females if the fishery is regulated as male-only. The most appropriate size for the escape vent will be determined based on an analysis of size-weight relationships for male and female red crabs, as well as on information from the fishing industry on common fishing practices. The most appropriate size for the escape vent also depends upon the minimum size adopted by the Council, if such a measure is adopted. If the Council adopts a minimum size of five inches, the escape vent would need to be larger than if the Council adopts a minimum size of four inches. We should consult with the industry on this issue to determine whether current trap design incorporates enough spacing to be considered a sufficient escape vent. Depending on the operation of this fishery and the trap designs used, escape vents may not be necessary, although the Council could reserve the right to require escape vents if trap design or fishing operations change.

#### 4.2.6.6 Non-Preferred Option 2: Trap materials

This option would establish controls on the materials allowed to be used in the directed red crab fishery. As stated above, comments received during the scoping process indicated that the industry standard trap is constructed of wood and wire mesh. The Council could control trap design materials, although this may prevent the industry from developing new designs and materials which may be better suited to this fishery. This option is probably not necessary, but the Council may want to restrict the use of toxic materials (including wood treatments) in the construction of red crab traps.

#### 4.2.6.7 Non-Preferred Option 3: Trap configuration and deployment

Whether or not the Council chooses to adopt any other gear controls or restrictions, it may consider establishing certain minimum and/or maximum standards for the configuration and deployment of trap trawls. Items to consider include a minimum and/or maximum number of traps per trawl allowed (e.g., no less than 20 and no more

than 100) and a minimum and/or maximum lengths for trap trawls (e.g., no less than 100 yards and no more than 1 mile in length). This option is probably unnecessary as the fishermen will have determined the most efficient trap and string configuration for their fishery.

#### 4.2.6.8 Non-Preferred Option 4: Ghost panel

The Council may consider requiring some form of “ghost panel” or other mechanism designed to allow for escapement after a period of time if the trap has been abandoned or lost. The Council concluded that this measure is not necessary at this time. Current trap designs employ a circular opening on the top of the trap, approximately eight inches in diameter, that allows for both the ingress and egress of animals to and from the trap. Sufficient information exists to suggest that animals only remain in the trap as long as there is bait available; once the bait is exhausted, the animals leave the trap (Ganz and Herrmann 1975). This option may become necessary if trap designs change to prevent the free egress of animals from the traps. The necessity of this option may also depend, in part, on whether the Council adopts or changes other gear controls, such as trap design requirements and prohibitions.

#### 4.2.7 **Total Allowable Catch**

The FMP will establish a target total allowable catch (TAC) for the red crab fishery. The establishment of a hard TAC was identified as a potential measure for the FMP and considered by the Council. A hard TAC would operate by establishing an upper limit for annual landings in the fishery, and once this limit was reached, the fishery would be shut down for the remainder of the year. The Council expressed concern over the likelihood of creating conditions leading to a “derby”-type fishery. The Council agreed with the need to take precautions against creating a derby fishery and created a suite of management measures intended to maintain fishing effort and mortality low enough to obviate the need for a shutdown early in the year.

Each of the following options for specifying an annual TAC could be implemented using either a hard TAC or a target TAC. Under the hard TAC option, the Council would need to specify a data collection system for determining when the TAC has been reached and notification procedures for shutting down the fishery. Some allowances for data variability and timing issues would need to be established and addressed. Under the preferred target TAC option, the Council will specify a data collection system and protocols for establishing the following year’s TAC based on current year harvest levels. Besides the options listed below, there may be other options for specifying a TAC that require more information than is currently available. The Council will retain the flexibility (through the framework adjustment process) to change the approach as new information is collected.

At the end of this section, Table 13 summarizes the five options and indicates possible amounts for an annual TAC under each option. The actual amount of a TAC in any given year under several of these option depends upon the MSY set for the resource. If the calculated MSY of 6.24 million pounds is changed, either through better

information on which to base the calculations or changes in the assumptions selected by the Council, the amount of TAC under non-preferred options 1 and 3 would also change. The preferred option depends upon the selection of a target yield (OY). Non-preferred option 4 depends upon both the amount of target yield and the number of vessels allowed access to the directed fishery.

#### 4.2.7.1 Preferred Option: Target Yield

This is the Council's preferred option. Each fishing year, the landings in the red crab fishery will be counted against a target total allowable catch (TAC). The target TAC will be set annually through the annual specification process, equal to the most current estimate of optimum yield (OY) for the fishery, and may be readjusted based on any projected overage or underage expected for the current fishing year. For example, when the Council is setting the annual specifications for the following fishing year, if OY is 5.928 million pounds and the Council projects that 6.75 million pounds will be harvested in the current fishing year (a 822,000 pound overage), then the target TAC for the following year could be set at 5.106 million pounds. If, on the other hand, the Council projects that only 5.25 million pounds will be harvested in the current fishing year (a 678,000 pound overage), then the target TAC could be set at 6.606 million pounds.

These calculations will have to take past years' landings into account as well as projections for the current year, and this may affect whether and the degree to which the Council adjusts the TAC for the following year based on current year projections. The methods used to project current year landings will be developed by the Council's Red Crab PDT and will be adjusted as data collection improves.

Setting the annual target TAC based on OY reflects the intent of the OY provisions of the Magnuson-Stevens Act and provides a conservative approach to setting the annual TAC. Since the principal control on the fishery will be an effort-based control on days-at-sea, use of a hard TAC (where the fishery shuts down when the TAC is reached) is not an appropriate mechanism. Any type of hard TAC, in conjunction with a DAS program, would encourage vessels to use as many of their DAS as possible as soon as possible in the fishing year before the hard TAC is reached. This would be inconsistent with the goals and objectives of the FMP, which include maintaining, to the greatest extent possible, a twelve-month fishery and minimizing the potential for a derby fishery. The target yield could vary with the condition of the stock.

#### 4.2.7.2 Non-Preferred Option 1: Maximum sustainable yield (MSY)

The hard or target TAC would be set equal to the best available estimate of MSY for the red crab resource, as adjusted for the management unit. In each year, the TAC would be set at the adjusted MSY. Please see Section 3.4.3 for a full discussion on methods of estimating MSY and current best estimates. When new information becomes available that allows a revision of the estimate of MSY, the TAC would also be adjusted.

#### 4.2.7.3 Non-Preferred Option 2: Average landings

The TAC could be based not on an estimate of MSY, but on the average landings

reported in the red crab fishery over the last ten years or so. Since we believe the fishery to be sustainable at the levels of fishing activity involved in the last ten years, the average landings could be used as a proxy for a reasonable annual TAC. This method would be considered precautionary in the face of imperfect data on the true MSY and could be considered an approach that would allow the fishery to continue as it has been for the past several years. This approach may underestimate the available resource, especially if MSY is revised upward following collection of additional data. This approach could be used either as a hard TAC or as a target TAC, but given its conservative nature would probably be better used as a hard TAC.

4.2.7.4 Non-Preferred Option 3: Economic considerations

The TAC could be based on economic considerations. Biological limits would establish the upper constraint for the annual TAC, but this amount would be reduced downward to better incorporate economic considerations (e.g., optimizing per unit costs, maximizing economic rents, etc.). This approach could be used either as a hard TAC or as a target TAC. In this case, the most direct approach to setting a TAC that best incorporates economic considerations would be to set the TAC equal to the maximum economic yield (MEY). The concept of MEY is explained in Section 3.6.3.3.

4.2.7.5 Non-Preferred Option 4: Vessel-based cap on landings

Rather than establish an overall TAC for the entire fishery, the target yield could be divided and assigned to individual vessels or categories of vessels (e.g., large catcher-processors and small catcher vessels). Each vessel or category of vessels would be allocated a certain amount of landings for the year and when they reached this amount of landings, would have to stop fishing for the remainder of the year. Because this option, if used to allocate a portion of the overall TAC to each vessel in the fishery, is essentially an individual vessel quota (IVQ) allocation, this is not a viable alternative at this time.

	Measure of TAC	Amount of TAC
<b>Preferred Option</b>	target (OY)	5.928 M pounds*
<b>Option 1</b>	MSY	6.24 M pounds*
<b>Option 2</b>	Average Landings	3.21 M pounds
<b>Option 3</b>	MEY	5.925 M pounds*
<b>Option 4</b>	Vessel-Based	5.928 M pounds*

**Table 13: Summary of alternatives for setting a TAC for the red crab fishery.**

\*The actual amount of a TAC under several of these option depends upon the MSY set for the resource. If the calculated MSY of 6.24 million pounds is adjusted, so too will the amount of TAC under options 1 and 3. The preferred option depends upon the selection of a target yield (OY). Option 4 depends upon both the amount of target yield and the number of vessels allowed access to the directed fishery.

#### 4.2.8 Trip Limits

The FMP will establish trip limits for these vessels holding a controlled access permit for the directed red crab fishery. In order to minimize the potential for a derby fishery that may be associated with the setting of a TAC, the Council considered trip limits as a potential measure for the FMP. The balancing of enforcement concerns versus conservation rationale for trip limits was considered. For each option considered under this measure, the trip limit would be considered to be in whole weight equivalent (i.e., a vessel that partially processes or butchers crabs at sea, if the practice is allowed under the FMP, would use a specified recovery rate conversion formula and determine the whole weight equivalent of the weight of their crab product). For example, if a vessel butchers at sea and uses a 50% recovery rate, under the 10,000 pound limit they would be limited to landing 5,000 pounds of butchered red crab per trip. The specification of reasonable and straight-forward conversion rates will be critical to the success of this potential measure.

##### 4.2.8.1 Preferred Option: Differential Trip Limit

This is the Council's preferred option. Instead of implementing a one-size-fits-all trip limit, the Council considered several methods to apply differential trip limits to the red crab fishery in an attempt to recognize differences in vessel size, fishing efficiency, and history in the fishery. The first method considered allows vessels to declare into a trip limit category and allocates vessels a specific number of fishing trips. The second method considered would establish some number of vessel trip limit categories and use vessel landings history to determine the category in which to place each vessel. The third method considered would establish a separate trip limit for each vessel, based on the vessel's highest trip on record, by landings of red crab.

All vessels holding a controlled access red crab permit fishing in the directed fishery will be subject to a possession/trip limit of red crab. The baseline possession limit for all controlled access vessels will be 75,000 pounds of whole red crab or their equivalent. If a vessel can show documented proof of a higher trip during the controlled access qualification period, then that vessel will qualify for a trip limit equal to the larger trip, rounded to the nearest 5,000 pounds. Vessels that butcher and/or partially process the red crabs they harvest (subject to the butchering and processing at sea restrictions identified above) must apply the more appropriate of the two recovery rate formulas to their catch in order to determine whether they are within the possession limit.

This approach to the differential trip limit maintains the approximate capacity of fishing vessels as it was prior to the control date, increases the potential for fishing vessels to operate efficiently, and recognizes some of the inherent differences among the fishing operations and capacities of the vessels operating in the fishery prior to the control date. The baseline trip limit of 75,000 pounds serves to establish for any new vessels that qualify to enter the fishery a trip limit equal to the approximate average capacity of vessels engaged in the fishery prior to the control date. The overall intent of the trip limit measure is to maintain the overall capacity of the red crab fleet to be approximately equal what it was prior to the control date, prevent an overall increase or a

creep in the capacity of the red crab fleet, and to prevent one or more vessels from subverting the constraints of the DAS program by extending their fishing trips and making fewer but much larger fishing trips. The recovery ratios are necessary to administer the trip limits in the face of different types of fishing operations.

Using the first method considered, the Council would be able to offer differential trip limits for different vessels, based on the vessel's choice, and allocate a maximum number of trips per year to each vessel depending on the category of trip limit they choose. This program would be modeled on the scallop fishery closed area exemption program, wherein each scallop vessel was allocated a certain number of fishing trips and a maximum trip limit. The chief difference is that this program would include the entire red crab directed fishery and this concept provides a tiered approach to vessel trip limits, such that a vessel might declare into a 60,000 pound trip limit category, a 120,000 pound trip limit category, or a 180,000 pound trip limit category, depending on which amount of landings is most economical for their vessel. Each vessel would then be allocated a certain number of trips such that the ratio of landings to trip limit category would be the same. For example, under the above categories of trip limits, vessels declaring into the 60,000 pound category would be allocated twice as many trips as vessels in the 120,000 pound category and three times as many trips as the vessels in the 180,000 pound category. Vessels declaring into the 120,000 pound category would be allocated three trips for every two allocated to the vessels in the 180,000 pound category.

Once a vessel declared into a category, they would be committed to that category for at least the remainder of the fishing year. The Council and NMFS would have to establish an appeals process for broken trips, but in general once the maximum number of trips is reached, a vessel would not be able to continue fishing, even if they harvested less than their trip limit on one or more trips. As with the sea scallop closed area exemption program, the Regional Administer could retain the right to increase the number of trips allocated to all vessels if it becomes clear during the fishing year that the overall TAC will not be reached.

The second method considered for a differential trip limit establishes some number of trip limit categories (e.g., two categories equal to 60,000 pounds and 100,000 pounds). Under this example scenario, all vessels participating in the directed fishery would be subject to the 60,000 pound trip limit unless they can show evidence of a past trip with landings of 100,000 pounds or greater prior to the control date. If they have evidence of such a previous trip, they would be allowed to fish at the higher trip limit. This would allow vessels with a history of higher than average per trip landings (which may be necessary to remain economically viable in the fishery) to continue fishing at that level. Other vessels without the history of higher than average per trip landings would not be allowed to increase their effort but would be constrained to a lower level of per trip landings more in line with the rest of the fleet. This type of differential trip limit, based in part on vessel history, would not necessarily be combined with an allocated number of trips, but could be implemented on its own as a variation of any of the above trip limit options. The number of categories and the trip limits would be based on the most appropriate natural breaks in vessel landings.

The third differential trip limit method considered would establish a different trip limit for each vessel, based solely on their highest trip on record. This could be considered an extension of the second method, with the number of trip limit categories being equal to the number of vessels in the directed fishery and the trip limits themselves based on the largest reported trip of each vessel.

#### 4.2.8.2 Non-Preferred Option 1: 10,000 pounds

This option represents the low end of the range and would indicate that any vessel on a directed red crab trip could land no more than 10,000 pounds (whole weight equivalent) of red crabs, subject to any other restrictions (such as minimum sizes, male only, etc.).

#### 4.2.8.3 Non-Preferred Option 2: 50,000 pounds

This option represents a mid-range trip limit, as a more likely limit than the options at either end of the range. Under this option, all vessels fishing on a directed red crab trip would be limited to landing 50,000 pounds (whole weight equivalent) of red crabs, subject to all other restrictions.

#### 4.2.8.4 Non-Preferred Option 3: 65,000 pounds

This option represents another mid-range trip limit, and is based on the average hold capacity of the traditional red crab vessels. Under this option, all vessels fishing on a directed red crab trip would be limited to landing 65,000 pounds (whole weight equivalent) of red crabs, subject to all other restrictions. This option may be implemented for all vessels participating in the directed red crab fishery until such time as the differential trip limits can be implemented.

#### 4.2.8.5 Non-Preferred Option 4: 200,000 pounds

This option represents the most likely upper bound on trip limits the Council would reasonably consider under this FMP. Under this option, all vessels fishing on a directed red crab trip would be limited to landing 200,000 pounds (whole weight equivalent) of red crabs, subject to all other restrictions. Although the Council may consider this as an option for purposes of establishing an upper extreme, it should not be construed as a likely outcome of the FMP development process.

### **4.2.9 Controlled Access Program**

The Council identified the development of a controlled access program as a specific objective for the FMP. The Council intends the controlled access system to establish qualification criteria based on history in the red crab fishery, including criteria to clearly differentiate history in the Atlantic red crab fishery (within the management unit) from history in other areas such as the Gulf of Mexico and South Atlantic. The intent of this system is to ensure that participation in the red crab fishery is maintained at sustainable levels. Although “limited entry” was discussed during the scoping process and supported by several industry members, the various options considered under proposed controlled

access system include components of a limited entry program. Thus, a limited entry program did not appear as a stand-alone measure.

As an alternative to a straight in-or-out access program (where vessels either get total access or no access to the directed fishery), the Council considered a program of differentiated access for vessels to qualify for different levels of participation based on their history in the fishery. Under this system the Council would develop categories (e.g., occasional, part-time, and full-time as in the scallop fishery, or seasonal access to the directed fishery as well as full-time access) and allow vessels different levels of participation according to the category qualification criteria. Only landings from the New England Council's management area for the red crab fishery may be used to qualify for the controlled access program.

#### 4.2.9.1 Preferred Option: Control date cut-off

This is the Council's preferred option. Implementation of the Red Crab FMP will include a controlled access program for vessels that wish to participate in the directed red crab fishery and retain more than the incidental catch limit described above. This option limits the vessels qualified to participate in the directed red crab fishery to only those vessels with a history of verifiable landings prior to the March 1, 2000 control date. In order to qualify for the controlled access program and receive a controlled access red crab fishing permit, vessels must demonstrate that their average annual landings of red crabs during the three years prior to the control date (March 1, 1997 - February 29, 2000) were greater than 250,000 pounds. Only red crabs harvested from and landed in the Red Crab FMP management unit will qualify for the controlled access program.

Prior to selecting the specific criteria, the Council considered a range of options for qualification criteria under the control date cut-off. The following options were intended to represent a range of qualification criteria, some of which were considered too restrictive and others which were considered not restrictive enough.

- a. At least 10,000 pounds of verifiable annual landings in one or more years of up to the three years prior to the control date. The intention of this option would be to differentiate vessels targeting red crabs from those landing small amounts of red crab as incidental catch in their primary fisheries.
- b. At least 300,000 pounds of verifiable annual landings in one or more years of up to the three years prior to the control date. The intention of this option would be to differentiate full-time directed red crab vessels from those vessels occasionally targeting red crabs.

The proposed qualification criteria for the controlled access program utilize the March 1, 2000 red crab control date, as was intended by the Council, and are consistent with the goals and objectives of the Red Crab FMP. The proposed criteria allow vessels with an established history in this fishery to continue, while preventing an increase in capacity above recent historic levels. This measure is intended to prevent overcapacity in the fishery. The proposed vessel transfer and upgrading restrictions maintain consistency

of fleet capacity with current conditions and maintain a consistent basis for the calculation of DAS projections and allocations. This measure also protects the capacity of the fleet for the future, should other controls such as trap limits and trip limits change.

#### 4.2.9.2 Non-Preferred Option 1: Control date priority

This option would give those vessels with a history of verifiable red crab landings priority access in the directed red crab fishery under the FMP. This would not prohibit additional vessels from qualifying to participate in the directed fishery, but would not guarantee them access either. Access qualification would be based on the capacity of the resource and the total capacity of the vessels. First, the total capacities of the vessels with a history prior to the control date (based on a set of minimum qualification criteria -- see Option 1) would be summed and compared against the capacity of the resource. If there is additional resource capacity remaining, additional vessels would be added until the capacity of the fishery matched that of the resource.

It may be difficult to determine vessel capacity and this option may require more information than we have currently. The vessel capacity will be linked strongly to the other management measures implemented under the FMP. This could also be considered in the future as a way to tweak the control date cut-off option -- initially, we could establish access based on qualification relative to the control date, but as additional information becomes available we could conduct an interim review and allow additional vessels access to the fishery. This could be done every three years, or some other reasonable interval, especially after a new stock assessment is conducted and available. New vessels may be given access in one of several ways: (1) attrition of existing vessels; (2) revised resource capacity; or (3) reduction in fishing effort of existing vessels.

#### 4.2.9.3 Non-Preferred Option 2: Vessels with landings after control date

This option would limit the vessels qualified to participate in the directed red crab fishery to only those vessels with a verifiable history of some minimum amount of landings in the one year subsequent to the control date (March 1, 2000 - February 28, 2001). The qualification criteria for this option could be the same range as the control date cut-off option.

- a. At least 10,000 pounds of verifiable landings.
- b. At least 300,000 pounds of verifiable landings.

#### 4.2.9.4 Non-Preferred Option 3: All currently active vessels

This option would give those vessels currently and actively fishing for red crab access to the directed red crab fishery under the FMP. New vessels not currently in the fishery would not necessarily be given access to the fishery unless there was capacity remaining. New vessels may be given access in one of several ways: (1) attrition of existing vessels; (2) revised resource capacity; or (3) reduction in fishing effort of existing vessels. The difficulty with this option will be to define "currently." One method for determining the number of vessels in the fishery is to use the number of

vessels that requested letters of authorization (LOA) from the Regional Administrator during implementation of the red crab emergency regulations (17 vessels requested LOAs during the May 18 - November 14, 2001 emergency period). Although 17 vessels had LOAs, fewer actually fished for red crab using the LOA, so there will be an additional level of difficulty determining (1) the number of current vessels and (2) the number of active vessels. We may be able to use the implementation date of the FMP as a cut-off, but that could result in a rush of vessels entering the fishery while the FMP is in development or NMFS' review. Another option is for the Council to consider an additional control date that would be established during the development of the FMP. Any analysis of this option would have to allow for the entry of additional vessels above those currently engaged in the red crab fishery.

#### 4.2.9.5 Non-Preferred Option 4: Vessel size restrictions

This option would establish an upper limit on the size of vessels that may participate in the directed red crab fishery. The size restriction could be based solely on registered length (e.g., a maximum of 120 feet), on hold capacity (e.g., a maximum of 100,000 pounds) or on some combination of vessel specifications. This option would be less relevant if controlled access is implemented as part of this FMP.

#### **4.2.10 Vessel Transfer / Vessel Upgrading Restrictions**

The FMP will implement vessel transfer and upgrading restrictions on vessels authorized to hold a controlled access permit for the directed red crab fishery. The Council's intention was to develop this measure to be as consistent as possible to the Council's other FMPs (Northeast Multispecies, Sea Scallop, etc.). This measure would restrict the ability of vessel owners to transfer their controlled access eligibility to another vessel and to upgrade or replace their own vessels to within certain limits. This measure would be irrelevant if no controlled access was implemented as part of the FMP.

##### 4.2.10.1 Preferred Option: Implement vessel transfer/upgrade restrictions

Vessels will be restricted from transferring their red crab eligibility to another vessel if that vessel was more than 10% larger in length, gross registered tonnage, and/or net tonnage than the original vessel's baseline specifications. The intention of this option is to prevent transferring eligibility in the directed red crab fishery from a relatively small vessel to a much larger vessel. Vessels also would be restricted from replacing and/or upgrading their red crab eligible vessel if the upgrade or replacement would increase the length, gross registered tonnage, and/or net tonnage by more than 10% of the original vessel's baseline specifications. This measure only applies directly to vessels with a controlled access permit for the directed red crab fishery, but all fishing vessels are subject to the more restrictive of the regulations that pertain to any permits which they hold. For example, if a vessel holds both a limited entry northeast multispecies permit and a controlled access red crab permit, that vessel is subject to the more restrictive of the vessel transfer/upgrading restrictions.

#### 4.2.10.2 Non-Preferred Option: Do not implement vessel transfer/upgrade restrictions

There would be no restrictions or limits placed on vessels participating in the red crab fishery regarding vessel transfers and/or upgrading.

#### 4.2.11 **Days-at-Sea Limits**

The FMP will establish days-at-sea (DAS) limits for the directed red crab fishery. Days-at-sea will be used in conjunction with a target TAC to mitigate the potential for creating a derby fishery as a result of implementing new management measures. The days-at-sea program could be adjusted annually depending on how the fishery is doing against the annual TAC. The initial total DAS available to the fishery depends upon several factors, including the initial TAC and other effort controls implemented through the FMP, such as trap limits and/or trip limits.

Vessels will be required to declare, on an annual basis as part of their permit renewal application, into or out of the directed red crab fishery for the following fishing year. The Council may utilize this information to adjust the number of DAS allocated to each vessel declaring into the fishery. For example, if based on the target TAC established for the coming fishing year, the fleet DAS are calculated to be 600 and there are six vessels normally authorized to participate in the directed fishery, each vessel would be allocated 100 DAS. If, however, two vessels opt out of the fishery for the coming fishing year, the remaining four vessels may each be allocated 150 DAS.

It is the intent of the FMP that DAS will be counted as a whole day (24 hours). Any portion of a day on which a vessel is out of port will count as a full DAS. For example, if a vessel embarks on a fishing trip at 11:00 PM on June 1, then that counts as one DAS. If they return from the trip at 1:00 AM on June 10, that also counts as one DAS, and they would have used 10 DAS on the fishing trip (not the 8.0833 DAS that would be counted if an hourly clock is used).

##### *Part 1 -- DAS Allocations*

#### 4.2.11.1 Preferred Option: Equal allocation of DAS

This is the Council's preferred option. Under this option, DAS will be initially allocated to all vessels that qualify to fish in the controlled access directed red crab fishery on an equal basis, without regard to the vessel's history in the fishery or past landings. Vessel qualification criteria should be considered distinct from this measure and subject to the options considered under the controlled access program measure. Adjustments to DAS would be made evenly to all vessels in the program and increases/decreases will be specified in whole numbers. Allocation of DAS may be to all vessels equally, or equally to all vessels within certain categories. For example, vessels that butcher crabs at sea could all receive the same number of DAS, this category may be allocated more or less than a category of vessels that land crabs whole. This allocation would be based on the relative efficiency and productivity of the vessels within each category, once sufficient data are available with which to make a determination of their relative efficiency.

The equal allocation of available DAS treats all vessels authorized to participate in the controlled access red crab fishery equally, regardless of their prior level of effort in the fishery. The requirement for vessels to declare their intent prior to each fishing year allows the Council, working with NMFS, to adjust the annual allocation of DAS based on the expected number of vessels that will actually participate in the fishery. This is an important consideration due to the small number of vessels that will be involved in this fishery. Because only five vessels will likely qualify for controlled access permits, each vessel will be allocated 20% of the total available fleet DAS. If one vessel declares out of the fishery for a year, that increases the DAS allocated to each remaining vessel by 25% (e.g., if each of 5 vessels gets would allocated 200 DAS of a total 1000 fleet DAS, and 1 vessel declares out, each of the remaining 4 vessels would get an additional 50 DAS, or 25% of their initial 200 DAS allocation). Although this type of declaration requirement is not standard with other DAS programs, it is important in this fishery in order to achieve OY on a continuing basis.

Upon implementation of the FMP, the Council will be required to make annual recommendations to NMFS regarding the target TAC and allocations of DAS for subsequent fishing years. Changes to either the target TAC or the DAS allocations will be implemented through the annual specifications process described in Section 3.9. There are three variables necessary to specify the DAS allocated to each vessel participating in the controlled access red crab fishery: (1) the target TAC for the fishing year; (2) the number of vessels that will be allocated DAS; and (3) a measure of central tendency representing the per day efficiency of the vessels in the red crab fleet.

The target TAC will be determined based upon the specification of OY, adjusted according to the projected landings for the current fishing year (see Section 4.2.7.1). The number of vessels will be equal to the number of vessels authorized to participate in the directed red crab fishery under the controlled access program, adjusted if one or more of these vessels declares out of the fishery for the coming fishing year (see Section 3.8.1.1). The measure of central tendency for the per day efficiency is a more complicated matter that will vary according to the available data.

As described in Section 5.3.10, there are several measures of central tendency that may be appropriate in this situation: (1) median landings per day of trip; (2) arithmetic mean landings per day of trip; (3) trimmed mean landings per day of trip; (4) mean of vessels per day of trip; and (5) upper or lower bounds on a confidence interval. There are other measurements possible, including but not limited to: (1) geometric mean; (2) harmonic mean; and (3) mode. Selection of the most appropriate statistical measure often depends upon the available data, in particular, the proper scale of measurement and the distribution of the data.

Each year, the Council's Red Crab PDT will examine the available data on vessel landings and trip length (available from the VTRs and/or from the IVR call-in program combined with the DAS accounting program). The PDT will select the most appropriate statistical measure and estimate a per day vessel efficiency that can be applied to the controlled access fleet. This per day efficiency will represent the "average" amount of landings a vessel could be expected to harvest on each day that they are on a fishing trip.

Because as more time goes by during which the fishery is operating under the FMP and therefore subject to the reporting requirements of the FMP, the availability of data should improve and the distribution of available may change, the choice of the most appropriate statistical measure should be expected to change from year to year.

Dividing the target TAC by the best estimate of per day efficiency provides the overall fleet allocation of DAS. The fleet DAS allocation would then be divided by the number of vessels to be participating in the controlled access directed red crab fishery to determine the DAS allocated to each vessel. For example, if the target TAC is set at 5.928 million pounds and the median landings per day of a fishing trip are estimated to be 6,671 pounds (see Table 19), then the fleet DAS would be 888. If five vessel are authorized and declare their intent to participate in the controlled access fishery, each vessel would be allocated 178 DAS (see Table 20). For the first year of FMP implementation, the upper 95% confidence interval was used, six vessels were assumed to be in the directed fishery, and a baseline of 130 DAS were allocated to each vessel as a conservative allocation to accommodate the many uncertainties associated with the initial allocation of DAS. As the uncertainties associated with this program decrease, less conservative approaches can be used to allocate DAS.

#### 4.2.11.2 Non-Preferred Option 1: Allocation based on history

This option would initially allocate DAS to all vessels qualified to fish in the directed red crab fishery on a sliding scale based on the history of the vessel in the fishery. Vessels with a long history in the red crab fishery would be allocated more DAS than recent entrants to the fishery. Vessel qualification criteria should be considered distinct from this measure and subject to options considered under the controlled access option. Adjustments to DAS would be made proportional for all vessels in the program and increases/decreases could be specified in a percentage of existing DAS (for instance, if the DAS adjustment is for a 10% increase, then a vessel initially allocated 100 DAS would have 110 while a vessel initially allocated 50 DAS would have 55).

#### 4.2.11.3 Non-Preferred Option 2: Allocation based on landings

This option would initially allocate DAS to all vessel qualified to fish in the directed red crab fishery on a sliding scale based on landings of red crab reported over a specified time period (e.g., the one year prior to implementation of the FMP; the one year prior to the control date; the highest amount of landings in one of the previous three years; the average amount of landings from the previous three years, etc.). Vessels with higher landings would be allocated proportionally more DAS than vessels with lower landings. Vessel qualification criteria should be considered distinct from this measure and subject to options considered under the controlled access option. Adjustments to DAS would be made proportional for all vessels in the program and increases/decreases could be specified as a percentage of existing DAS (for instance, if the DAS adjustment is for a 10% increase, then a vessel initially allocated 100 DAS would have 110 while a vessel initially allocated 50 DAS would have 55).

## *Part 2 -- End of Year DAS Carry-Over*

### 4.2.11.4 Preferred Option: Partial end-of-year carry over

This is a preferred option of the Council. Any red crab DAS allocated to a vessel with a controlled access permit to participate in the directed red crab fishery in one fishing year may be carried over to the next fishing year, up to a maximum of 10 DAS or 10% of the total allocated DAS, whichever is less. The partial end of the year DAS carry-over is intended to ensure that at least some unused fishing effort is not wasted, while providing no incentive to hoard DAS. This measure also limits the potential annual fishing capacity to roughly 10% above the baseline. DAS sanctioned vessels will be credited with unused DAS based on their DAS allocation minus total DAS sanctioned. The maximum partial carry-over could be based on a whole number (e.g., 10 DAS) or could be based on a percentage of their total DAS (e.g., 10% of DAS), whichever is less. Any carry-over of unused DAS from one year to the next will expire at the end of that year; the carry-over of unused DAS is not cumulative. For example, if a vessel is allocated 100 DAS in year 1, but used only 90, then that vessel would be able to carry-over 10 DAS into year 2. If that vessel is also allocated 100 DAS for year 2, it would have a total of 110 DAS available. However, if that vessel only fished 105 DAS in year 2, it would not be able to carry over 5 DAS into year 3. It would only be able to carry DAS into year 3 if it fished less than 100 DAS in year 2, and then only carry-over 100 minus the number of DAS it fished (up to a maximum of 10 DAS).

### 4.2.11.5 Non-Preferred Option 1: No end-of-year carry-over

Controlled access vessels qualified to participate in the directed red crab fishery that have unused DAS on the last day of the fishing year in any year may not carry over any unused DAS into the following year.

### 4.2.11.6 Non-Preferred Option 2: Complete end-of-year carry-over

Controlled access vessels qualified to participate in the directed red crab fishery that have unused DAS on the last day of the fishing year in any year may carry over all of their unused DAS into the following year. DAS sanctioned vessels will be credited with unused DAS based on their DAS allocation minus total DAS sanctioned.

## **4.3 Description of the Proposed Management Alternatives**

The management alternatives identified below list specific measures that would be included in each alternative, but in most cases, the specific option within that measure is not necessarily related to the alternative selected. For example, all but the “no action” alternative include incidental catch limits as one measure. There exists a range of options for how to implement incidental catch limits (50 pounds per trip, 100 pounds, 500 pounds, etc.) and these are not dependent upon the alternative that may be selected. Descriptions of each type of measure and the relevant options are provided in the previous section.

#### **4.3.1 Preferred Alternative (#5): Target TAC, Days-at-Sea and Trip Limits**

This is the Council's preferred alternative. This alternative is the same as alternative #4, with the addition of trip limits. Trip limits would be used to ensure that each trip taken by a red crab vessel is roughly equivalent. The objective of the alternative is to determine the appropriate number of DAS appropriate to harvest, but not exceed, the target TAC. DAS can be adjusted on an annual basis in response to changing stock conditions and to better estimate the amount of fish likely to be harvested. A trap limit will be used to control the potential fishing power of individual vessels. A differential trip limit will be used to maintain differences among fishing vessels, but still maintain the overall fishing fleet at levels approximating those during the time prior to the control date.

- a. Incidental catch limits
- b. Males only
- c. Butchering/processing-at-sea restrictions
- d. Trap limits
- e. Gear requirements/restrictions
- f. Total allowable catch
- g. Trip limits
- h. Controlled access system
- i. Days-at-sea limits

#### **4.3.2 Non-Preferred Alternative 1: "Emergency Rule"**

This alternative would implement a set of measures most similar to those implemented under the emergency regulations. The emergency regulations implemented a hard TAC (based on an estimate of MSY), a trip limit, a trap limit, incidental catch limits for vessels not operating in the directed red crab fishery, and reporting requirements for all participants in the fishery. In addition to these measures, this alternative also includes gear requirements and restrictions to maintain the directed fishery as trap only and to assure compliance with marine mammal requirements. Although an express objective of the FMP, this alternative does not include a controlled access system so as to be as consistent as possible with the emergency regulations.

- a. Incidental catch limits
- b. Trap limits
- c. Gear requirements/restrictions

- d. Total allowable catch
- e. Trip limits

#### **4.3.3 Non-Preferred Alternative 2: Hard TAC with Trap Limits**

This alternative would control total fishing effort and landings primarily through the use of a hard TAC. The primary mechanism to make fishing effort equivalent among vessels and to prevent expansion of effort would be a trap limit. A controlled access system would be implemented to limit the number of vessels participating in the directed fishery to an appropriate number. Supplemental measures such as requiring landed crabs to be males only, some form of butchering or processing-at-sea restrictions, and gear requirements and restrictions would be used to control certain aspects of the fishery. Incidental catch limits and reporting requirements would also be implemented.

- a. Incidental catch limits
- b. Males only
- c. Butchering/processing-at-sea restrictions
- d. Trap limits
- e. Gear requirements/restrictions
- f. Total allowable catch
- g. Controlled access system

#### **4.3.4 Non-Preferred Alternative 3: Hard TAC, Trap Limits and Trip Limits**

In an effort to spread out the landings of red crab and reduce the potential for creating a derby-type fishery, this alternative includes all the measures from the previous alternative with the addition of trip limits. This alternative is also very similar to the “Emergency Rule” alternative with the addition of the male only restriction and some form of butchering and/or processing-at-sea restriction.

- a. Incidental catch limits
- b. Males only
- c. Butchering/processing-at-sea restrictions
- d. Trap limits
- e. Gear requirements/restrictions
- f. Total allowable catch

- g. Trip limits
- h. Controlled access system

#### **4.3.5 Non-Preferred Alternative 4: Target TAC with Days-at-Sea**

This alternative would implement many of the same measures as previous alternatives (incidental catch limits, males only, butchering/processing-at-sea restrictions, gear requirements/restrictions, and a controlled access system), but the principle mechanism to control effort in the fishery would be the use of vessel days-at-sea (DAS). Rather than a hard TAC at which point the fishery would be shut down, a target TAC would be established for the year and DAS would be allocated among the vessels participating in the directed fishery. The objective of the alternative would be to determine the appropriate number of DAS to harvest, but not exceed, the target TAC. DAS can be adjusted on an annual basis in response to changing stock conditions and to better estimate the amount of red crab likely to be harvested. Some form of trap limit would be used to control the potential fishing power of individual vessels.

- a. Incidental catch limits
- b. Males only
- c. Butchering/processing-at-sea restrictions
- d. Trap limits
- e. Gear requirements/restrictions
- f. Total allowable catch
- g. Controlled access system
- h. Days-at-sea limits

#### **4.3.6 Non-Preferred Alternative 6: Trip Limits and Set Number of Trips**

This alternative would also implement many of the same measures as previous alternatives (incidental catch limits, males only, butchering/processing-at-sea restrictions, trap limits, gear requirements/restrictions, and a controlled access system), but the principle mechanism to control effort in the fishery would be the use of a specified trip limit and an authorized number of potential fishing trips. The trip limit could be set equal for all vessels, in which case all vessels participating in the directed fishery would be authorized the same number of potential trips. Another option would be to establish differential trip limits and allow vessels to declare into a certain category of trip limit. Vessels would be authorized different numbers of potential trips depending on the trip limit category into which they declare.

- a. Incidental catch limits

- b. Males only
- c. Butchering/processing-at-sea
- d. Trap limits
- e. Gear requirements/restrictions
- f. Trip limits
- g. Controlled access system

#### **4.3.7 Non-Preferred Alternative 7: All Possible Measures**

This alternative includes all possible management measures except for an IVQ system (which would relegate most of the measures contained in this alternative as unnecessary). This alternative would provide the most flexibility to the Council to make slight changes to a variety of measures in order to achieve either a change in fishing effort or the amount and type of red crabs landed.

- a. Incidental catch limits
- b. Minimum size restrictions
- c. Males only
- d. Butchering/processing-at-sea
- e. Trap limits
- f. Gear requirements/restrictions
- g. Total allowable catch
- h. Trip limits
- i. Controlled access system
- j. Days-at-sea limits

#### **4.3.8 Non-Preferred Alternative 8: IVQ with Controlled Access**

As noted in the management measures section, there is currently a federal moratorium that prevents the implementation of any form of individual fishing quota (IFQ). However, this alternative was considered for the purposes of the DEIS. This management alternative, and the next alternative, represent options for a form of an IFQ system called an individual vessel quota (IVQ). Assuming that the current moratorium is lifted at some point in the future, and should the Council decide to fully develop and implement an IVQ system for the red crab fishery, it will develop a full FMP

Amendment. This process will involve an extended period of development and review, including a full scoping process and public review and comment process.

This alternative and the one following are not intended to represent the only types of IVQ programs that the Council may eventually consider. These alternatives are intended to indicate that the Council considers an IVQ system as one possible management strategy that may be appropriate for the red crab fishery and to suggest two basic alternatives for how this type of program could be designed.

This alternative would implement both a controlled access system to limit the number of vessels participating in the directed fishery and an individual vessel quota to allocate each vessel an individual percentage-based share of the TAC. As the TAC changed from year to year in response to changing stock conditions, the percentage of quota allocated to each vessel would not change, but the amount of quota would change accordingly. Other measures (incidental catch limits and gear requirements/restrictions) would also be implemented to address their relevant concerns. Measures such as trap limits, trip limits, DAS, etc., would not be necessary under this alternative.

- a. Incidental catch limits
- b. Gear requirements/restrictions
- c. Controlled access system
- d. Individual vessel quotas

#### **4.3.9 Non-Preferred Alternative 9: IVQ Only**

This alternative is very similar to the previous alternative, except that it would rely entirely upon an individual vessel quota system to control the harvest of red crabs in the directed fishery. A controlled access system intended to restrict the number of vessels participating in the directed fishery would not be used. Instead, any vessel with a history of red crab landings prior to the implementation of the FMP would be able to continue fishing for red crab, albeit at the same relative rate at which they previously fished. As the TAC changed from year to year in response to changing stock conditions, the percentage of quota allocated to each vessel would not change, but the amount of quota would change accordingly. Other measures (incidental catch limits, gear requirements and/or restrictions) would also be implemented to address their relevant concerns. Measures such as trap limits, trip limits, DAS, etc., would not be necessary.

- a. Incidental catch limits
- b. Gear requirements/restrictions
- c. Individual vessel quotas

#### **4.3.10 Non-Preferred Alternative 10: No action**

This alternative would preserve the status quo, whereby vessels fishing for red crab would not be subject to any restrictions. The no action alternative would likely assure that overfishing would occur in the red crab fishery. As a result, the sustainability of the red crab resource would be severely compromised; the red crab fishery would likely be unsustainable; historic participants could be eliminated from the fishery or at least become marginally viable; and the status of the stock would likely be degraded.

	Management Alternatives									
	Emergency Rule	Hard TAC and Trap Limits	Hard TAC, Trap and Trip Limits	Target TAC with DAS	Target TAC with DAS & Trip Limits	Trip Limits with # of Trips	All Possible Measures	IVQ with Controlled Access	IVQ Only	No Action
Measures	1	2	3	4	5	6	7	8	9	10
Incidental catch limits <sup>12</sup>	X	X	X	X	X	X	X	X	X	
Minimum size							X			
Males only		X	X	X	X	X	X			
Butchering/processing restrictions		X	X	X	X	X	X			
Trap limits	X	X	X	X	X	X	X			
Gear requirements/restrictions <sup>13</sup>	X	X	X	X	X	X	X	X	X	
Total allowable catch	X	X	X	X	X		X			
Trip limits	X		X		X	X	X			
Controlled access system <sup>14</sup>		X	X	X	X	X	X	X		
Days-at-sea limits				X	X		X			
Individual vessel quotas								X	X	

**Table 14: Cross-reference of management measures included in proposed management alternatives for Red Crab FMP.** Alternative 5 is the preferred alternative selected by the Council.

<sup>12</sup> All management alternatives (except “no action”) include some level of incidental catch limits, based on the FMP goal to “allow all fishermen the continued opportunity to land appropriate amounts of red crab as bycatch.”

<sup>13</sup> All management alternatives (except “no action”) include some degree of gear requirements and/or restrictions to deal implement gear markings, at a minimum, and to ensure that the directed fishery is regulated as trap only.

<sup>14</sup> Most management alternatives include a provision for a controlled access system, consistent with Objective 5 of the FMP, which states “develop a controlled access system to keep fishing capacity matched to the available resource.”

## **4.4 Other Measures and Alternatives Considered but Rejected**

### **4.4.1 Individual Vessel Quotas**

Although there is currently a federal moratorium that prevents the implementation of any form of individual fishing quota (IFQ), for the purposes of the DEIS, the Council considered options for a form of an IFQ system called an individual vessel quota (IVQ). Under this system, each vessel would be allocated a portion of the overall quota available to the fishery.

Assuming that the current moratorium is lifted at some point in the future, and should the Council decide to fully develop and implement an IVQ system for the red crab fishery, it will develop a full FMP amendment. This process will involve an extended period of development and review, including a full scoping process and public review and comment process.

The options outlined below are not intended to represent the only types of IVQ programs that the Council may eventually consider. The options outlined below are intended to indicate that the Council considers an IVQ system as one possible management strategy that may be appropriate for the red crab fishery and to suggest two basic ways to allocate quota should an IVQ system be fully developed.

Once allocated, the vessel would be free to land as much of or as little of their quota as they deem appropriate, but they may not exceed their IVQ. Under the system considered by the Council, quota or quota shares may not be bought, sold, traded, or otherwise transferred from one vessel to another. Any quota not used by a vessel will not be added to their quota allocation for a following year. Any landings by a vessel in excess of their quota will be deducted from their quota allocation for the following year. The allocation of quota in the red crab fishery does not directly or indirectly confer or imply any rights or real value to the vessel so allocated.

#### **4.4.1.1 Option 1: Quota based on history**

An IVQ system would assign an annual quota to each vessel qualified to fish in the directed red crab fishery based on their annual landings during some qualification time period (for instance the year prior to the control date). Thus, if a vessel landed 100,000 pounds of red crab in the year prior to the control date, they would be allocated an annual quota of 100,000 pounds. This type of program would allow vessels to continue to fish at previous levels but not expand their effort in the fishery.

#### **4.4.1.2 Option 2: Equal share of quota**

A variation of this measure would be to first qualify the vessels that may participate in the directed fishery (via a controlled access program) and then to allocate quota to all qualified vessels equally, regardless of differences in history in the fishery or prior landings. Thus, if five vessels qualify to participate in the controlled access directed fishery, each vessel would be allocated 20% of the annual quota.

#### 4.4.2 Fishing Seasons (seasonal closures)

The Council specified maintaining a twelve month fishery as an objective of the FMP (due to concerns over adverse impacts to fishing communities and market/economic constraints), thus consideration of fishing seasons would be inconsistent with this FMP objective. The PDT reviewed available scientific information on red crab biology, and determined that there is currently no evidence of strong seasonality for either molting or mating. Both molting and mating appear to occur year-round. At this point, there are no known reasons to implement fishing seasons, but as more information on this resource becomes available and if it becomes clear that there are distinct mating seasons, the Council may want to reconsider this type of measure. Market concerns also suggest that seasonal closures would be inefficient and not desirable. Current markets require a consistent supply of red crab product, year-round, to be maintained.

#### 4.5 Relationship of the Recommended Measures to Existing Applicable Laws

There are four types of existing laws and policies which may be applicable to this FMP and the measures and alternatives recommended by the Council. These include: other fishery management plans; treaties or international agreements; Federal law and policies; and state, local, and other applicable laws and policies. These will each be addressed in turn.

##### 4.5.1 Fishery Management Plans

There are many FMPs implemented for the U.S. EEZ within the same general geographic area as the Council's management area for the Red Crab FMP. The following list identifies all known approved FMPs developed for the U.S. EEZ along the Atlantic coast:

- New England Council:** Atlantic Herring FMP; Atlantic Salmon FMP; Monkfish FMP; Northeast Multispecies FMP; Sea Scallop FMP.
- Mid-Atlantic Council:** Atlantic Mackerel, Squid and Butterfish FMP; Bluefish FMP; Dogfish FMP; Summer Flounder, Scup and Black Sea Bass FMP; Surfclam and Ocean Quahog FMP; Tilefish FMP.
- South Atlantic Council:** Atlantic Coast Red Drum FMP; Coastal Migratory Pelagics FMP; Coral, Coral Reef and Live/Hard Bottom Habitats FMP; Golden Crab FMP; Shrimp FMP; Snapper Grouper FMP; Spiny Lobster FMP.
- Secretarial Plans (NMFS):** American Lobster FMP; Atlantic Billfish FMP; Atlantic Tunas, Swordfish and Sharks FMP.

Due to the limited geographic distribution of the red crab fishery (approximately 400 - 800 meters in depth from the Hague Line south to Norfolk Canyon), there are actually very few interactions between this fishery and any fisheries managed under the above FMPs. For the New England Council, only the monkfish fishery has been identified as one with a potential interaction with the red crab fishery. For the Mid-Atlantic Council, all fisheries with the possible exception of the tilefish fishery occur in

water shallower than the red crab fishery. The only South Atlantic Council-managed fishery with some potential interactions is the golden crab fishery. Of the Secretarial FMPs, only the American lobster fishery has been identified as one with potential interactions with the red crab fishery. Thus there are four management plans with the potential for some interaction with the red crab fishery: the FMPs for monkfish, tilefish, golden crab, and American lobster.

The monkfish fishery is largely a trawl fishery with some dredge fishing also occurring. Most of the monkfish fishery occurs over the continental shelf in conjunction with the groundfish and/or sea scallop fisheries. Some monkfish fishing occurs in deep water where red crabs may occur. The principle interaction between these two fisheries is that there may be some degree of bycatch and discard mortality of red crabs in the monkfish fishery. The Red Crab FMP identifies this potential interaction as a research and information need and a potential management concern. Should future research and data collection provide information confirming this interaction and its severity, the Council may consider taking appropriate action to reduce the bycatch of red crabs in the monkfish fishery. This action may take the form of fishing restrictions on the monkfish fishery.

The tilefish fishery occurs in relatively deep water (100 - 300 meters) but is prosecuted almost entirely with bottom longlines (approximately 93% of all landings) (MAFMC 1999). It appears that the red crab and tilefish fisheries may abut one another, but there is probably little interaction between the two with the possible exception of some of the deep-water canyons (Hudson, Block and Veatch Canyons). Because both fisheries primarily use static fishing gear (pots in the case of the red crab fishery and longlines in the case of tilefish), any interactions are expected to be negligible. It is not foreseen that the Red Crab FMP will have any effect on the tilefish fishery, nor vice versa.

The golden crab fishery is identified as occasionally including red crab, but the South Atlantic Council concluded that the populations of golden and red crabs are sufficiently separated from one another to be managed separately (SAFMC 1995). Thus there are very few interactions likely between these two FMPs. Depending on the management unit selected by the Council, there may be a geographic area of overlap between the two Council's areas of management jurisdiction. This could be a cause for concern if there were significant landings of red crabs aboard golden crab vessels and/or significant landings of golden crab aboard red crab vessels fishing in this intersection zone. However, based on the South Atlantic Council assessment, this seems unlikely.

The offshore lobster fishery, managed under the NMFS' American Lobster FMP, is a fishery with some history of direct interaction with the red crab fishery. It has been reported that some offshore lobster vessels occasionally target red crab and may land higher than "incidental catch" levels of red crab. Under normal operating conditions, these two fisheries appear to be segregated according to depth, with the lobster fishery occurring in more shallow water. The Red Crab FMP will establish limits on the incidental catch of red crab by any vessel not authorized to participate in the directed red crab fishery. These limits may affect the operations of some vessels in the offshore

lobster fishery if they are prohibited from harvesting and landing as much red crab as they otherwise would. In order to ensure the enforceability of some management measures such as gear restrictions that limit the number of traps that can be fished for red crab, the Council may establish a lobster-red crab fishery demarcation line such that only red crab traps would be allowed to be set deeper than the demarcation line.

#### **4.5.2 Treaties or International Agreements**

Foreign fishing is prohibited within the U.S. EEZ for anadromous species and continental shelf fishery resources beyond the EEZ out to the limit of U.S. jurisdiction under the Convention of the Continental Shelf unless authorized by an international agreement which existed prior to passage of the Magnuson-Stevens Act and is still in force and effect or authorized by a Governing International Fishery Agreement which has been issued subsequent to the Magnuson-Stevens Act. There are no pre- or post-Magnuson-Stevens Act agreements affecting deep-sea red crab.

#### **4.5.3 Federal Law and Policies**

All applicable Federal laws and policies, including the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA) are identified and discussed in Section 12.0 of the FMP.

#### **4.5.4 State and Local Laws, Regulations and Policies**

There are no state or local laws, regulations, or policies that apply to the deep-sea red crab fishery.