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ANALYSIS OF RED KING CRAB DATA FROM THE 1996  
ADF&G TRAWL SURVEY OF NORTON SOUND

By

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## ABSTRACT

In August 1996, the Alaska Department of Fish and Game conducted a trawl survey of Norton Sound to provide information on the distribution and abundance of demersal fish and invertebrates. This report includes data on the abundance and biomass of red king crab *Paralithodes camtschatica*. Population estimates were generated using an area-swept method as done in past National Marine Fisheries Service trawl surveys of Norton Sound. Legal male biomass was estimated at approximately 1.6 million pounds, indicating legal red king crab biomass to be much lower than most previous survey assessments. This biomass estimate is 40% of the last trawl survey estimate from 1991 and 41% of the long-term average from 10 population assessments beginning in 1976.

## INTRODUCTION

The National Marine Fisheries Service (NMFS) conducted triennial stock assessment surveys of Norton Sound from 1976 to 1991. These surveys provided information on the distribution and abundance of demersal fish and invertebrates, and were summarized in Wolotira et al. (1977), NMFS (1982), Sample and Wolotira (1985), Stevens (1989), Stevens and MacIntosh (1986), and Stevens (1992). Additionally, pot surveys of Norton Sound were conducted by the Alaska Department of Fish and Game (ADF&G) in 1980, 1981, 1982, and 1985 (Lean and Brennan 1995) and were designed to provide: (1) annual distribution, abundance, and size class information; and (2) pre-season information to fishery managers regarding stock size and structure. Since 1976, red king crab population estimates for legal males have ranged from a low of 1.3 million pounds in 1982 to a high of 8.1 million pounds in 1976, averaging 3.7 million pounds (Table 1).

NMFS eliminated Norton Sound from the 1994 triennial survey due to budget constraints. The 1996 ADF&G trawl assessment survey was the first survey since the 1991 NMFS survey, and the first ADF&G trawl survey of Norton Sound. The purpose of the 1996 trawl survey was to provide information about spatial distribution, abundance, and population characteristics of red king crab *Paralithodes camtschatica*, as well as other marine life. This report includes data on the abundance and biomass of red king crab from the 1996 survey. The distribution of red king crab for the 1996 survey is explained in Blau et al. (1996).

## METHODS

The 1996 ADF&G assessment survey was conducted aboard the chartered FV *Peggy Jo* from August 7 through August 18. Survey methodology is described by Blau et al. (1996). The station sampling pattern previously established by NMFS was used. A 400 eastern otter trawl was towed once at each station; tows lasted approximately 30 minutes and averaged 1.4 nmi in length. All catches were sorted to the lowest taxon possible, counted and weighed. All king crabs were sampled from each trawl haul. Additionally, the number and weight of each species and sex was recorded. Once all king crabs, halibut, and Pacific cod were removed from the tow, the remaining catch was then subsampled.

There were 58 stations scheduled to be surveyed. Because additional charter days were available after surveying the original 58 target stations, selected stations were then resurveyed based on high catches of red king crab. By surveying areas in duplicate, estimates of variance between surveys for each grid can be calculated.

Legal males were defined as those with carapace widths  $\geq 121.8$  mm (4.75 in). Sublegal males requiring two or more molts to reach legal size had a carapace length (CL)  $\leq 89$  mm and pre-recruit males had CL  $> 89$  mm but less than the legal size (Powell et al. 1983). Juvenile females were those with CL  $< 72$  mm and adults had CL  $\geq 72$  mm.

### *Population Estimates*

For direct comparison to previous analyses, Norton Sound population estimates for red king crab were generated using the area-swept method (Alverson and Pereyra 1969). Variances were estimated assuming catch was binomially distributed (Seber 1982; page 22). The abundance was estimated for legal males, pre-recruit males, adult females, and juvenile females. Biomass was estimated for legal males using the average weight of legal males in the Norton Sound summer commercial fishery since 1989. All population estimates incorporated data collected from both the original survey and the resurvey for reduced variance estimation.

Using the area-swept method, the total catch in numbers,  $n$ , and the total area trawled,  $a$ , was computed for each area, summing across tows for those areas with multiple tows. Abundance for the  $j$ th area was then estimated as:

$$\hat{N}_j = n_j * \frac{A_j}{a_j}, \quad (1)$$

where  $A$  was the total area (Alverson and Pereyra 1969). The total abundance was estimated as:

$$\hat{N} = \sum_j \hat{N}_j. \quad (2)$$

The variance of  $\hat{N}$  was estimated as:

$$\hat{V}(\hat{N}) = \sum_j \hat{N}_j \left(1 - \frac{a_j}{A_j}\right) \frac{A_j}{a_j} \quad (3)$$

(Seber 1982; page 22). The biomass of legal males was estimated as the product of their abundance and the average weight of legal males in the commercial fishery.

## **RESULTS**

During the original survey, 48 stations of 58 were successfully trawled (Figure 1, Appendix A). Ten stations were assessed but not trawled due to unsuitable bottom for trawling. Following these surveys, 21 stations were successfully resurveyed, with a 4 to 11 day delay from the original survey dates. Resurveys were retowed at the same depth, in close proximity to the initial tow track, and for similar lengths at each respective station.

The estimated abundance of legal males was 534,446 red king crab with a biomass of approximately 1.6 million pounds (Table 2, Appendix B). The total survey area can be divided into open and closed summer commercial fishing zones (Figure 1). Legal male abundance was 426,011 for the open area and 108,435 for the closed area. The biomass estimate was generated using an average weight of 3.0 pounds for legal males in the Norton Sound summer commercial fishery for the past eight years. Weight data was not available for pre-recruit males or females. Pre-recruit male abundance was 376,458; juvenile female abundance was 654,242; and adult female abundance was 579,478. The coefficient of variation (CV) was fairly uniform between all population estimates, ranging from 9.8% to 13.4% (Table 2).

The 1996 ADF&G survey is the first Norton Sound trawl survey providing any resurvey information. The original survey and resurvey data (Figure 2) provide for replicate abundance estimates with a corresponding variance between surveys for each station retowed. Standard errors were estimated between legal male abundance estimates for the 21 stations originally surveyed and then resurveyed (Table 3). The resulting coefficient of variation was 35.9%.

Length frequency distributions for male and female red king crabs show males encompassing a larger range of sizes with larger crabs typically male (Figure 3). For males, carapace lengths ranged from 25 mm to 173 mm (mean = 85 mm), while female sizes spanned from 23 mm to 110 mm (mean = 69 mm). Legal males from the 1996 summer commercial fishery for Norton Sound ranged in size from 101 mm to 147 mm (mean = 117.1). In comparison (Figure 4), legal males from the 1996 trawl survey ranged in size from 102 mm to 173 mm (mean = 117.9 mm).

## DISCUSSION

The 1996 Norton Sound trawl survey differed from past surveys in survey design and trawl gear. The total area surveyed in Norton Sound in 1976, 1979, and 1982 was slightly larger than the area surveyed from 1985 to the present. Additionally, the number of successful trawls has varied between surveys, having a direct effect on biomass estimation. The trawl used on all six NMFS surveys in Norton Sound from 1976 to 1991 was a 83-112 trawl, whereas the trawl used in 1996 was a 400 eastern. The 83-112 trawl has a similar footrope configuration to the 400 eastern and tows similarly over rough bottom. It is unlikely that catch selectivity differences exist between the 83-112 trawl used in the past and the 400 eastern used in 1996 (Robert Otto, NMFS, personal communication).

The area-swept method assumes that catch is proportional to the area physically trawled and crab density (Ricker 1940, Gulland 1964). This assumption is likely satisfied. The method also assumes that crab density in the area physically trawled is representative of that in the grid section in which a trawl is located. The variance estimator assumes that the probability a crab is located within the trawl area is equal to the relative size of the trawl area; a uniformity assumption. The validity of these assumptions is difficult to assess. However, the distribution of crab within an area is likely dependent on a variety of factors, such as bottom topography and patterns of seasonal migration. Given the relatively large size of the sampling grid, these assumptions may be violated. The degree to which potential violations of these assumptions may bias the estimator is unknown.

The 1996 population estimate using the area-swept approach for legal males is lower than most previous NMFS trawl surveys and ADF&G pot surveys (Table 1). The 1982 ADF&G pot survey biomass estimate of approximately 1.3 million pounds of legal male red king crab was the only survey with a lower biomass estimate than the 1996 trawl survey. The biomass estimate from the 1996 trawl survey is 40% of the 1991 estimate and 41% of the long-term average beginning in 1976 (Figure 5).

The CV of the legal male abundance estimate was estimated to be 12.9%. The CV of 35.9% based on a comparison of original survey and resurvey abundance estimates is substantially larger, and the discrepancy is troubling. The difference may reflect a violation of the binomial assumption leading to under-estimation of variance. Conversely, crab movement between surveys may have artificially inflated the second estimate. If the resurveys can be considered to provide true replication, the second estimate of the CV is an essentially non-parametric estimate, and would probably be most accurate. While it is difficult to conclusively determine which estimate is most accurate, a CV of 12.9% seems, intuitively, low for a survey of this type.

Research into alternate estimators and sampling designs prior to the next survey seems warranted. An ideal estimator would be efficient, be robust to the characteristics of the data, and provide a direct evaluation of the estimator's precision. Additional research using multiple tows within a fixed area might provide insight into potential alternatives. One alternative sampling design would be a randomly located paired sample for each grid to help guard against patchy distributions and provide variance estimates. The two surveys conducted for each grid should be spaced temporally as close together as possible to minimize any possible distributional changes relating to crab movement. A design such as this would be similar to resurveying the entire survey area except using random locations within each grid rather than using a systematic design as done in the past. To keep survey costs similar to past studies but the survey area the same, individual grids may need to be reduced in number and enlarged in size.

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Table 1. Results of the population assessment surveys conducted for red king crab in Norton Sound since 1976.

| Year              | Date                      | Research Agency | Gear  | Effort    | Number of Red King Crab Captured <sup>a</sup> |                          |         | Population Estimates of Legal Male Crab <sup>c</sup> |           |
|-------------------|---------------------------|-----------------|-------|-----------|---|--------------------------|---------|--|-----------|
|                   |                           |                 |       |           | Sublegal Males                                | Legal Males <sup>b</sup> | Females | Numbers  | Pounds    |
| 1976              | 9/2 - 9/5,<br>9/16 - 10/7 | NMFS            | Trawl | 158 Tows  | 768   | 555                      | 180     | 3,119,800  | 8,111,480 |
| 1979              | 7/26 - 8/5                | NMFS            | Trawl | 71 Tows   | 46  | 194                      | 40      | 837,241  | 2,511,723 |
| 1980 <sup>d</sup> | 7/4 - 7/14                | ADF&G           | Pots  | 397 Lifts | 443   | 3,290                    | 158     | 1,900,000  | 6,600,000 |
| 1981              | 6/28 - 7/14               | ADF&G           | Pots  | 718 Lifts | 4,097   | 3,415                    | 1,933   | 1,285,195  | 4,755,221 |
| 1982              | 7/6 - 7/20                | ADF&G           | Pots  | 689 Lifts | 5,019   | 2,001                    | 424     | 353,273  | 1,271,783 |
| 1982              | 9/5 - 9/11                | NMFS            | Trawl | 50 Tows   | 322   | 107                      | 265     | 970,646  | 2,620,744 |
| 1985              | 7/1 - 7/14                | ADF&G           | Pots  | 642 Lifts | 6,086   | 4,645                    | 181     | 907,579  | 2,414,644 |
| 1985              | 9/16 - 10/1               | NMFS            | Trawl | 78 Tows   | 266   | 163                      | 151     | 1,203,000  | 3,369,000 |
| 1988              | 8/16 - 8/30               | NMFS            | Trawl | 82 Tows   | 258   | 141                      | 218     | 1,037,000  | 3,038,000 |
| 1991              | 8/22 - 8/30               | NMFS            | Trawl | 53 Tows   | 202   | 178                      | 105     | 1,384,000  | 4,009,000 |
| 1996              | 9/7 - 9/18                | ADF&G           | Trawl | 69 Tows   | 250   | 67                       | 168     | 534,446  | 1,603,339 |

<sup>a</sup> Number of crab captured on ADF&G pot surveys represent data standardized for a 24-hour soak.

<sup>b</sup> Legal male red king crab were defined as at least 106 mm in carapace length for the 1976 NMFS survey; 105 mm for the 1979 and 1985 NMFS survey; and at least 121 mm in carapace width for all ADF&G surveys.

<sup>c</sup> Population estimates are valid for the date of the survey, (i.e., either before or after the summer commercial fishery).

<sup>d</sup> The 1980 estimate has been revised from the original estimate of 13.4 million pounds. The original estimate was thought inaccurate due to under-reporting of recovered tagged crab.

Table 2. Norton Sound red king crab abundance (numbers) and biomass (pounds) estimates based on the 1996 ADF&G trawl survey.

|                           | Legal Male<br>Biomass | Legal Male<br>Abundance | Pre-Recruit<br>Male<br>Abundance | Juvenile<br>Female<br>Abundance | Adult Female<br>Abundance |
|---------------------------|-----------------------|-------------------------|----------------------------------|---------------------------------|---------------------------|
| Estimate                  | 1,603,339             | 534,446                 | 376,458                          | 654,242                         | 579,478                   |
| Standard Error            | 206,483               | 68,828                  | 50,602                           | 64,196                          | 64,971                    |
| Lower Confidence Interval | 1,198,632             | 399,544                 | 277,278                          | 528,418                         | 452,134                   |
| Upper Confidence Interval | 2,008,047             | 669,349                 | 475,638                          | 780,066                         | 706,822                   |
| Coefficient of Variation  | 12.9%                 | 12.9%                   | 13.4%                            | 9.8%                            | 11.2%                     |

∞

Table 3. Abundance estimates and standard errors for legal male red king crab for those stations sampled twice during the 1996 Norton Sound ADF&G trawl survey.

| Abundance      |                 |                |                |                |                          |
|----------------|-----------------|----------------|----------------|----------------|--------------------------|
| Station Number | Original Survey | Resurvey       | Average        | Standard Error | Coefficient of Variation |
| 124            | 22,672          | 0              | 11,336         | 16,031         | 141.4%                   |
| 125            | 17,871          | 11,595         | 14,733         | 4,437          | 30.1%                    |
| 126            | 8,439           | 0              | 4,219          | 5,967          | 141.4%                   |
| 130            | 0               | 0              | 0              | 0              | 0.0%                     |
| 131            | 0               | 37,661         | 18,831         | 26,630         | 141.4%                   |
| 132            | 0               | 0              | 0              | 0              | 0.0%                     |
| 133            | 25,317          | 0              | 12,658         | 17,902         | 141.4%                   |
| 134            | 0               | 37,661         | 18,831         | 26,630         | 141.4%                   |
| 151            | 10,333          | 0              | 5,167          | 7,307          | 141.4%                   |
| 152            | 0               | 0              | 0              | 0              | 0.0%                     |
| 153            | 0               | 0              | 0              | 0              | 0.0%                     |
| 157            | 0               | 0              | 0              | 0              | 0.0%                     |
| 158            | 0               | 0              | 0              | 0              | 0.0%                     |
| 159            | 0               | 0              | 0              | 0              | 0.0%                     |
| 160            | 24,111          | 0              | 12,056         | 17,049         | 141.4%                   |
| 161            | 60,278          | 12,554         | 36,416         | 33,746         | 92.7%                    |
| 183            | 65,100          | 12,765         | 38,932         | 37,007         | 95.1%                    |
| 184            | 23,369          | 0              | 11,685         | 16,525         | 141.4%                   |
| 185            | 0               | 12,658         | 6,329          | 8,951          | 141.4%                   |
| 186            | 0               | 12,350         | 6,175          | 8,732          | 141.4%                   |
| 187            | 33,507          | 35,882         | 34,695         | 1,679          | 4.8%                     |
| <b>Sum</b>     | <b>290,997</b>  | <b>173,126</b> | <b>232,061</b> | <b>83,347</b>  | <b>35.9%</b>             |

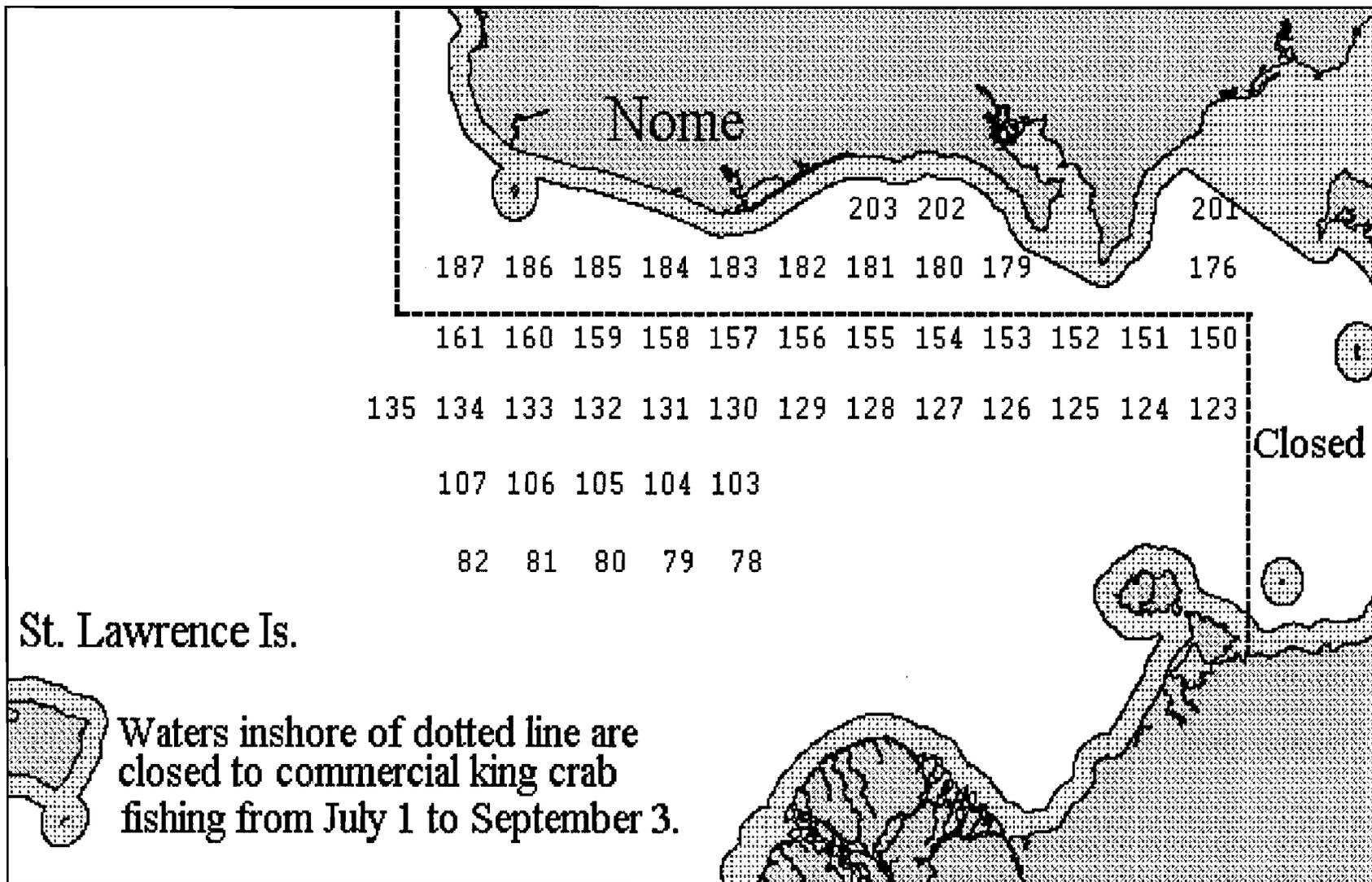


Figure 1. ADF&G 1996 Norton Sound trawl survey sampling stations showing the open and closed zones for the summer commercial fishery.

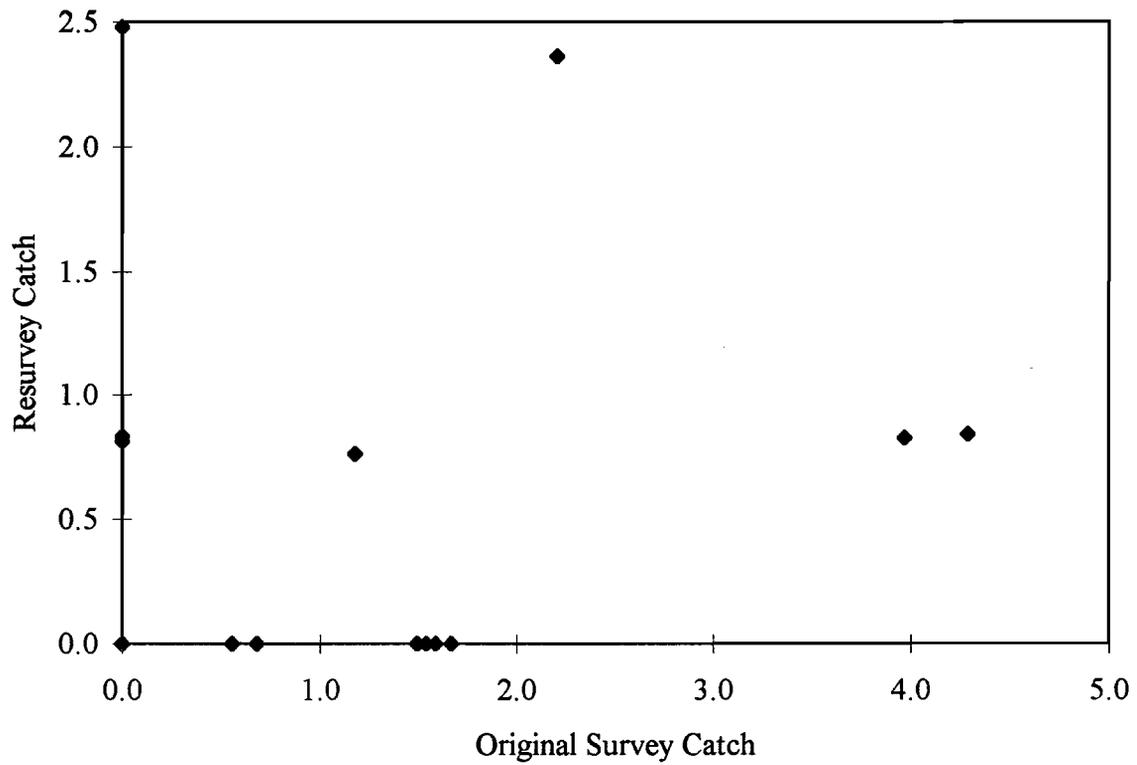


Figure 2. Legal male red king crab standardized catches for stations trawled during the original survey and the resurvey conducted by ADF&G in Norton Sound, 1996.

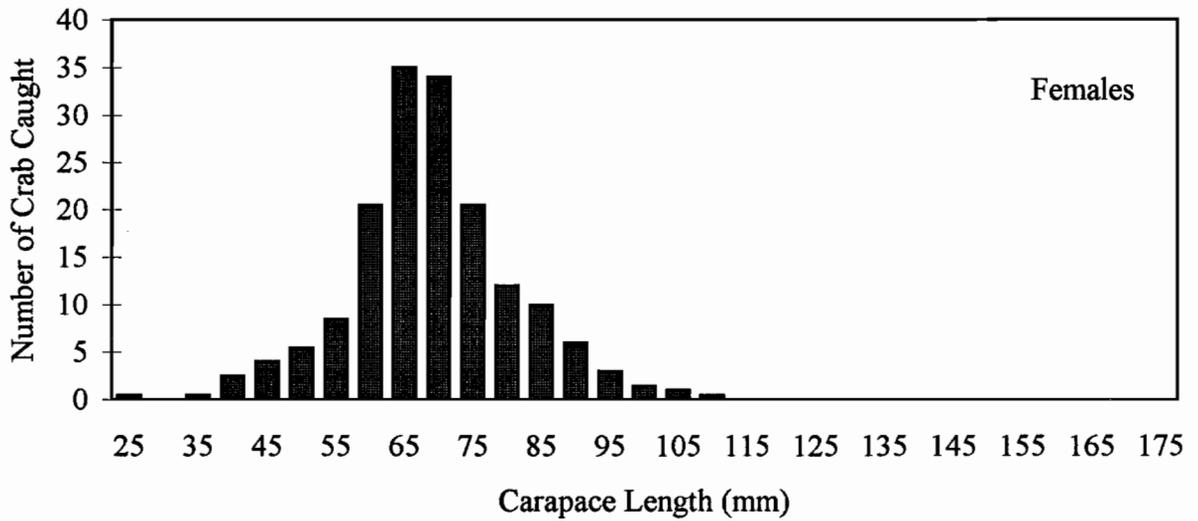
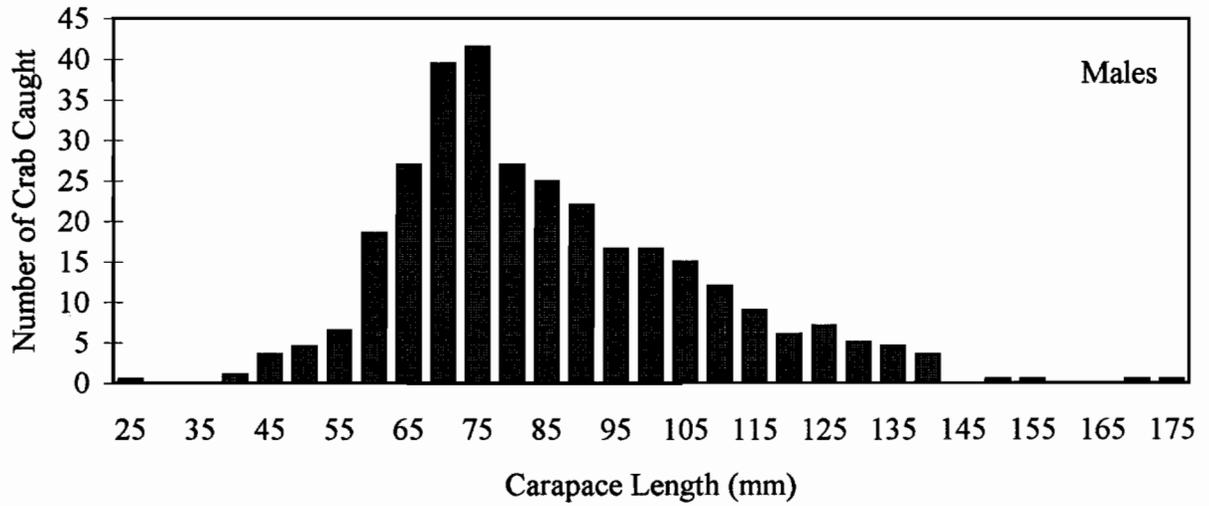


Figure 3. Length distributions for male (top) and female (bottom) king crab captured during the 1996 Norton Sound ADF&G trawl survey.

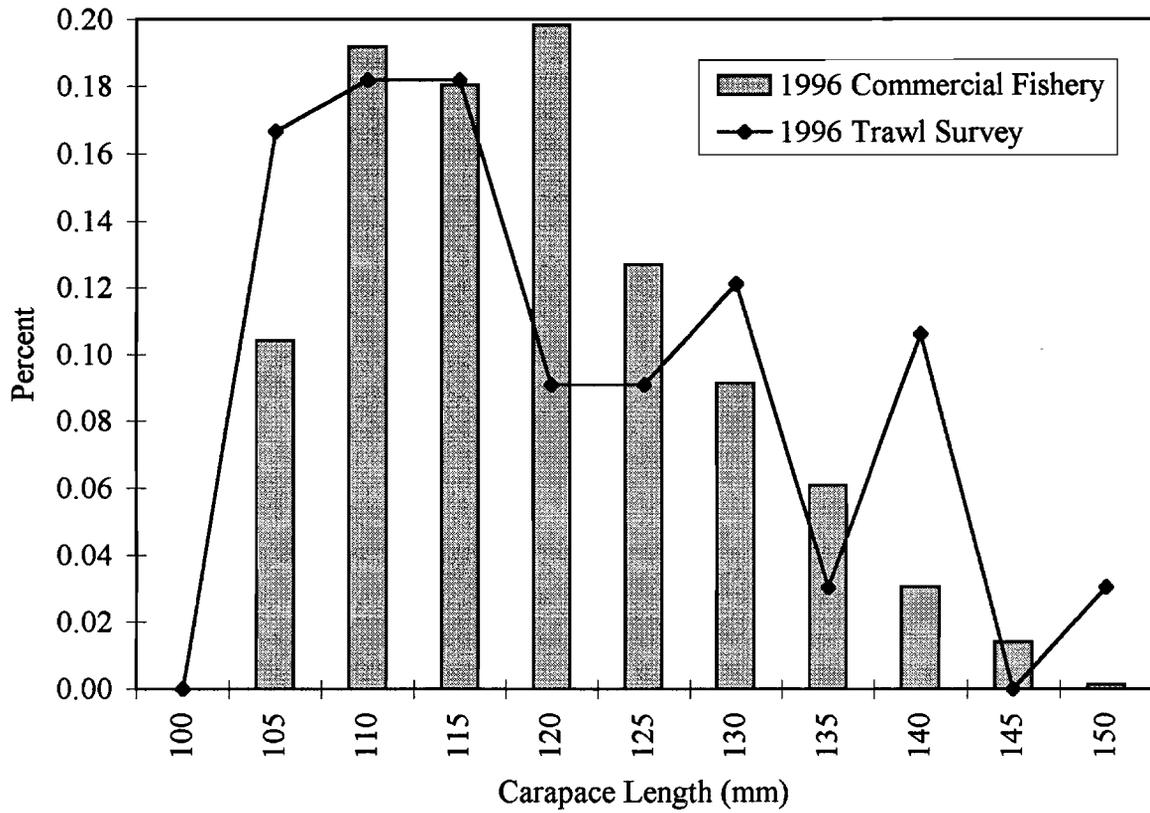


Figure 4. Length distributions of legal male red king crab from the 1996 ADF&G trawl survey and the 1996 summer commercial fishery.

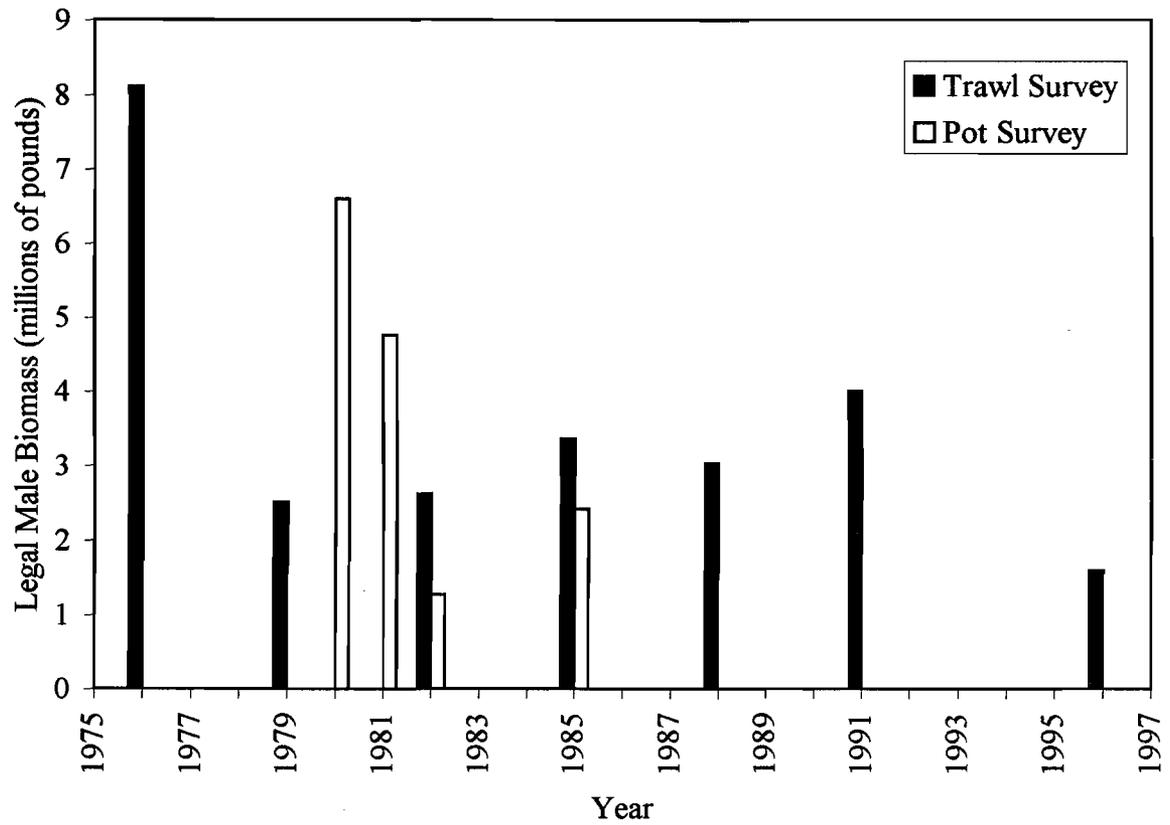


Figure 5. Biomass estimates for legal male red king crab derived from Norton Sound trawl and pot surveys, 1976-1996.

Appendix A. 1996 Norton Sound ADF&G trawl survey data of legal male red king crab for each station sampled during the original survey and the resurvey. Information for each station includes: catch, area trawled, total area of the grid containing the given station, and the estimated abundance.

| Original Survey |                 |                             |                           |           | Resurvey       |                 |                             |                           |           |
|-----------------|-----------------|-----------------------------|---------------------------|-----------|----------------|-----------------|-----------------------------|---------------------------|-----------|
| Station Number  | Catch (numbers) | Area Trawled (square miles) | Total Area (square miles) | Abundance | Station Number | Catch (numbers) | Area Trawled (square miles) | Total Area (square miles) | Abundance |
| 78              | 0               | 0.0086                      | 100                       | 0         |                |                 |                             |                           |           |
| 79              | 0               | 0.0086                      | 100                       | 0         |                |                 |                             |                           |           |
| 80              | 1               | 0.0080                      | 100                       | 12,554    |                |                 |                             |                           |           |
| 81              | 0               | 0.0083                      | 100                       | 0         |                |                 |                             |                           |           |
| 82              | 1               | 0.0084                      | 100                       | 11,867    |                |                 |                             |                           |           |
| 103             | 0               | 0.0084                      | 100                       | 0         |                |                 |                             |                           |           |
| 104             | 0               | 0.0086                      | 100                       | 0         |                |                 |                             |                           |           |
| 105             | 2               | 0.0093                      | 100                       | 21,546    |                |                 |                             |                           |           |
| 106             | 12              | 0.0087                      | 100                       | 138,091   |                |                 |                             |                           |           |
| 107             | 3               | 0.0084                      | 100                       | 35,882    |                |                 |                             |                           |           |
| 123             | 2               | 0.0099                      | 100                       | 20,253    |                |                 |                             |                           |           |
| 124             | 2               | 0.0088                      | 100                       | 22,672    | 124            | 0               | 0.0086                      | 100                       | 0         |
| 125             | 2               | 0.0112                      | 100                       | 17,871    | 125            | 1               | 0.0086                      | 100                       | 11,595    |
| 126             | 1               | 0.0118                      | 100                       | 8,439     | 126            | 0               | 0.0080                      | 100                       | 0         |
| 127             | 0               | 0.0090                      | 100                       | 0         |                |                 |                             |                           |           |
| 128             | 1               | 0.0086                      | 100                       | 11,685    |                |                 |                             |                           |           |
| 129             | 0               | 0.0093                      | 100                       | 0         |                |                 |                             |                           |           |
| 130             | 0               | 0.0094                      | 100                       | 0         | 130            | 0               | 0.0081                      | 100                       | 0         |
| 131             | 0               | 0.0090                      | 100                       | 0         | 131            | 3               | 0.0080                      | 100                       | 37,661    |
| 132             | 0               | 0.0087                      | 100                       | 0         | 132            | 0               | 0.0086                      | 100                       | 0         |
| 133             | 2               | 0.0079                      | 100                       | 25,317    | 133            | 0               | 0.0083                      | 100                       | 0         |
| 134             | 0               | 0.0082                      | 100                       | 0         | 134            | 3               | 0.0080                      | 100                       | 37,661    |
| 135             | 0               | 0.0093                      | 100                       | 0         |                |                 |                             |                           |           |
| 150             | 0               | 0.0092                      | 100                       | 0         |                |                 |                             |                           |           |
| 151             | 1               | 0.0097                      | 100                       | 10,333    | 151            | 0               | 0.0078                      | 100                       | 0         |
| 152             | 0               | 0.0097                      | 100                       | 0         | 152            | 0               | 0.0080                      | 100                       | 0         |
| 153             | 0               | 0.0099                      | 100                       | 0         | 153            | 0               | 0.0084                      | 100                       | 0         |
| 154             | 1               | 0.0105                      | 100                       | 9,494     |                |                 |                             |                           |           |
| 155             | 2               | 0.0092                      | 100                       | 21,700    |                |                 |                             |                           |           |
| 156             | 1               | 0.0125                      | 100                       | 7,995     |                |                 |                             |                           |           |
| 157             | 0               | 0.0092                      | 100                       | 0         | 157            | 0               | 0.0084                      | 100                       | 0         |
| 158             | 0               | 0.0092                      | 100                       | 0         | 158            | 0               | 0.0086                      | 100                       | 0         |
| 159             | 0               | 0.0086                      | 100                       | 0         | 159            | 0               | 0.0087                      | 100                       | 0         |
| 160             | 2               | 0.0083                      | 100                       | 24,111    | 160            | 0               | 0.0084                      | 100                       | 0         |
| 161             | 5               | 0.0083                      | 100                       | 60,278    | 161            | 1               | 0.0080                      | 100                       | 12,554    |
| 176             | 0               | 0.0092                      | 100                       | 0         |                |                 |                             |                           |           |
| 179             | 0               | 0.0105                      | 100                       | 0         |                |                 |                             |                           |           |
| 180             | 1               | 0.0112                      | 100                       | 8,935     |                |                 |                             |                           |           |
| 181             | 0               | 0.0086                      | 100                       | 0         |                |                 |                             |                           |           |
| 182             | 0               | 0.0095                      | 100                       | 0         |                |                 |                             |                           |           |
| 183             | 6               | 0.0092                      | 100                       | 65,100    | 183            | 1               | 0.0078                      | 100                       | 12,765    |
| 184             | 2               | 0.0086                      | 100                       | 23,369    | 184            | 0               | 0.0086                      | 100                       | 0         |
| 185             | 0               | 0.0086                      | 100                       | 0         | 185            | 1               | 0.0079                      | 100                       | 12,658    |
| 186             | 0               | 0.0083                      | 100                       | 0         | 186            | 1               | 0.0081                      | 100                       | 12,350    |
| 187             | 3               | 0.0090                      | 100                       | 33,507    | 187            | 3               | 0.0084                      | 100                       | 35,882    |
| 201             | 0               | 0.0099                      | 91                        | 0         |                |                 |                             |                           |           |
| 202             | 0               | 0.0089                      | 86                        | 0         |                |                 |                             |                           |           |
| 203             | 0               | 0.0092                      | 83                        | 0         |                |                 |                             |                           |           |
| Sum             | 53              | 0.4414                      | 4,760                     | 590,998   | Sum            | 14              | 0.1730                      | 2,100                     | 173,126   |

Appendix B. 1996 Norton Sound ADF&G trawl survey data of legal male red king crab for each station sampled, combining the original survey and the resurvey. Information for each station includes: catch, area trawled, total area of the grid containing the given station, and the estimated abundance.

| Station Number | Catch (numbers) | Area Trawled (square miles) | Total Area (square miles) | Abundance |
|----------------|-----------------|-----------------------------|---------------------------|-----------|
| 78             | 0               | 0.0086                      | 100                       | 0         |
| 79             | 0               | 0.0086                      | 100                       | 0         |
| 80             | 1               | 0.0080                      | 100                       | 12,554    |
| 81             | 0               | 0.0083                      | 100                       | 0         |
| 82             | 1               | 0.0084                      | 100                       | 11,867    |
| 103            | 0               | 0.0084                      | 100                       | 0         |
| 104            | 0               | 0.0086                      | 100                       | 0         |
| 105            | 2               | 0.0093                      | 100                       | 21,546    |
| 106            | 12              | 0.0087                      | 100                       | 138,091   |
| 107            | 3               | 0.0084                      | 100                       | 35,882    |
| 123            | 2               | 0.0099                      | 100                       | 20,253    |
| 124            | 2               | 0.0174                      | 100                       | 11,508    |
| 125            | 3               | 0.0198                      | 100                       | 15,140    |
| 126            | 1               | 0.0198                      | 100                       | 5,047     |
| 127            | 0               | 0.0090                      | 100                       | 0         |
| 128            | 1               | 0.0086                      | 100                       | 11,685    |
| 129            | 0               | 0.0093                      | 100                       | 0         |
| 130            | 0               | 0.0175                      | 100                       | 0         |
| 131            | 3               | 0.0170                      | 100                       | 17,663    |
| 132            | 0               | 0.0172                      | 100                       | 0         |
| 133            | 2               | 0.0162                      | 100                       | 12,350    |
| 134            | 3               | 0.0161                      | 100                       | 18,600    |
| 135            | 0               | 0.0093                      | 100                       | 0         |
| 150            | 0               | 0.0092                      | 100                       | 0         |
| 151            | 1               | 0.0174                      | 100                       | 5,732     |
| 152            | 0               | 0.0177                      | 100                       | 0         |
| 153            | 0               | 0.0183                      | 100                       | 0         |
| 154            | 1               | 0.0105                      | 100                       | 9,494     |
| 155            | 2               | 0.0092                      | 100                       | 21,700    |
| 156            | 1               | 0.0125                      | 100                       | 7,995     |
| 157            | 0               | 0.0175                      | 100                       | 0         |
| 158            | 0               | 0.0178                      | 100                       | 0         |
| 159            | 0               | 0.0172                      | 100                       | 0         |
| 160            | 2               | 0.0167                      | 100                       | 12,008    |
| 161            | 6               | 0.0163                      | 100                       | 36,899    |
| 176            | 0               | 0.0092                      | 100                       | 0         |
| 179            | 0               | 0.0105                      | 100                       | 0         |
| 180            | 1               | 0.0112                      | 100                       | 8,935     |
| 181            | 0               | 0.0086                      | 100                       | 0         |
| 182            | 0               | 0.0095                      | 100                       | 0         |
| 183            | 7               | 0.0171                      | 100                       | 41,054    |
| 184            | 2               | 0.0172                      | 100                       | 11,640    |
| 185            | 1               | 0.0165                      | 100                       | 6,052     |
| 186            | 1               | 0.0164                      | 100                       | 6,100     |
| 187            | 6               | 0.0173                      | 100                       | 34,654    |
| 201            | 0               | 0.0099                      | 91                        | 0         |
| 202            | 0               | 0.0089                      | 86                        | 0         |
| 203            | 0               | 0.0092                      | 83                        | 0         |
| Sum            | 67              | 0.6144                      | 4,760                     | 534,446   |