



Discussion Paper

Review and Reform of the Dungeness Crab Fishery

This paper is intended to summarize the issues and objectives for short-term and long term changes to the crab fisheries. Several options are proposed but are not necessarily the only options to be considered. A consultation process is included to solicit views on key objectives and how they can be achieved. This process will guide development of a crab management framework and provide recommendations for the development of the 2008 and 2009 Crab Integrated Fisheries Management Plans.

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SUMMARY

The purpose of this discussion paper is to describe the current status of the crab fishery, to identify the issues and interests of the participants, and to develop a management framework to ensure future sustainability and equitable sharing of the Dungeness crab resource in British Columbia.

A broad approach is necessary to review all the issues. Many crab harvesters have identified a need for change and have requested a longer term strategy. Concerns have been expressed regarding the high rates of discards that may be affecting the overall productivity of local stocks; sharing of crab between obligations for First Nations harvest for food, social, and ceremonial (FSC) purposes and recreational and commercial opportunity; and the potential to improve the commercial fishery through management changes. Adapting to the increasing sea otter populations, which prey on crabs, on the west coast of Vancouver Island and in the central coast will provide challenges for all harvesters.

Prior actions to limit effort in the commercial fishery have been only partially successful and the current commercial fishery is at or over capacity in many areas of the coast, leading to reduced opportunities for other users. Current attempts to share the resource through small seasonal or permanent area closures to the commercial fishery is time-consuming and results in difficult decisions for the Department as the data to base the decisions is limited. This process is not meeting the interests of the fishery participants or the Department.

A number of management options are presented but no easy or quick solutions are likely to meet the objectives presented. A combination of management measures will be required. Additionally, a government funded fleet reduction program will not be considered in this or other fisheries, as described in the Minister's speech April 12, 2007, in St. John's, Newfoundland,

“...In these challenging times, it is very important to provide the fishing industry with the tools to self-rationalize and consolidate. To restructure its fleets and enterprises to meet the changing demands of the global market. But let me be clear, the old 1990's style buy-backs are neither desirable nor possible. And time has shown that these do not work...”

A consultation process will begin in 2007 with the objective of implementing some short term measures in 2008 and to develop a crab management framework for 2009, before the next commercial area re-selection takes place. This process will take time, but significant work is required this year to get underway.

In the meantime, the Department will continue to consider some seasonal area closures to commercial fishing where warranted to accommodate First Nations harvest for FSC purposes and improved recreational access.

Changes are required to meet the objectives - the status quo is not an acceptable option.

DFO values and seeks your input about the future management of the crab fishery.

If you have comments and questions, please use the website to respond or contact your commercial area representative, recreational representative, First Nation, or the Department (contacts listed in Appendix 1).

A. INTRODUCTION

These are challenging times for fish and shellfish harvesters and managers. There are threats to long term biological sustainability like climate and ecosystem change and pressures on fish producing habitats. Economic viability of commercial fisheries is coming under increasing pressure from global competition and rising costs while access for all harvesters is being affected by an increasing focus on conservation and more precautionary management approaches. In British Columbia, the demand for access to the fisheries resource is growing among First Nations, recreational and commercial harvesters.

Charting a course for the future will involve foresight, understanding, and creativity of all fishery participants and government management agencies working together towards a common vision. Pacific Fisheries Reform announced by the Department in April of 2005 provides a vision of a sustainable fishery where the full potential of the resource is realized, Aboriginal rights and title are respected, there is certainty and stability for all, and fishery participants share in the responsibility of management. Further, fisheries will need to adapt to treaties with First Nations. Clearly, it is only by working together in a collaborative manner that this vision will be realized. (The vision and principles of Pacific Fisheries Reform are in Appendix 3.)

The Pacific Dungeness crab fishery faces many of the challenges described above, as well as unique problems of its own. Downturns in the Pacific salmon and herring fisheries have increased fishing pressure as harvesters diversify from the predominantly salmon focus of the past. Effort in the commercial crab fishery has seen significant increases from the mid 1990's (see Appendix 5). During this period, a number of First Nations have expressed concern about their ability to harvest legal sized crab for food, social, and ceremonial (FSC) purposes and the recreational fishery has expressed concerns about their ability to catch legal sized crab in some locations. Often, commercial area closures are requested to improve FSC and recreational opportunities. Given the complexity and controversy surrounding the crab fishery, solutions, while guided by the Pacific Fisheries Reform vision, will require the involvement of all fishery participants and other Canadians with an interest in the sustainability of the crab resource.

At the September 21, 2006 meeting of the Crab Sectoral Committee, all sectors indicated that the current management framework is not working and that a plan to move this fishery forward needs to be developed. As a result, a commitment was made to develop a discussion paper in 2007 to develop a new management framework and examine possible changes for 2008 and the future.

The purpose of this discussion paper is to set the stage for an inclusive comprehensive review and reform of the crab fishery. This initiative will serve to address the concerns expressed by crab fishery participants over possible threats to future sustainability and equitable sharing of the Dungeness crab resource in British Columbia. It is meant to describe Departmental objectives for the fishery, the current status of the fishery,

problems identified by fishery participants, and possible options for addressing those problems.

The next three sections summarize the issues driving crab reform, sets out the key objectives, and suggests management options for moving forward. A consultation process is outlined in section E. The remaining section and the appendices provide additional information on available reports, key contacts in the Department and industry, the vision and principles of Pacific Fisheries Reform, current management framework, and a summary of available crab data.

The Department invites your views of the future management of the crab fishery. The objective of the process is to get constructive dialogue from all users on the timelines, the objectives, and consideration of the options. A final decision on a new crab management strategy will be made by the Department based on the objectives and an evaluation of the input received.

The consultations will be broad to get input from all, but there will be a focus on multi-sectoral input through the Crab Sectoral Committee. DFO values and seeks input from all sectors: First Nations, representing a traditional involvement with crab fishing and priority to harvest for FSC purposes; commercial, representing the livelihood of many individuals providing important contributions to coastal economies; and recreational, representing a community of 300,000 people in coastal BC with significant social and economic benefits.

The target is to announce a new crab management strategy before 2009, when the commercial fishery re-selects the Crab License Area in which to fish. But changes could be considered for the 2008 fishery.

B. KEY ISSUES

Crab is a valuable fishery, with considerable importance to First Nations for FSC purposes and to recreational harvesters and a commercial landed value of \$27 million (in 2005) for 222 licensed vessels. The crab fishery can harvest several species of crab; however, the primary focus is Dungeness.

The current management framework for the Dungeness crab fishery is relatively passive, using the minimum size limit (165 mm, in place since 1914) for all harvesters and no retention of female crab in the commercial or recreational fisheries. There are effort controls, such as limited entry and trap limits, and a variety of seasonal and permanent commercial closures to allow First Nation harvest for FSC purposes and recreational harvest. (The current management framework is described in Appendix 4. Available data on the fishery is in Appendix 5.)

Dungeness crab has a broad range, from Alaska in the north to Mexico in the south. In the USA separate management plans exist for each state. These plans are summarized in a DFO document “Dungeness Crab Management in US Jurisdictions” and by Didier

(2002) for the commercial fisheries in coastal Washington/Oregon/California. Similar to BC, all US crab fisheries are managed to the minimum size limit (generally 6 ¼ inches in Washington/Oregon/California, 6 ½ inches in Alaska) and use many of the same management measures as in BC.

The key issues and concerns that the crab fishery currently faces are summarized below. These issues have been discussed at various Crab Sectoral Committee meetings and other meetings with users of the crab resource over the last several years.

Sustainability of the Fishery and Crab Abundance

The minimum size limit has met conservation requirements so far. Nevertheless, in many areas of the BC coast, there are concerns about the intensive fisheries and high discard rates. Repeated handling of undersized and female crab and any handling of soft-shell crab leads to mortality, reduced recruitment and abundance, and, possibly, conservation problems. Aspects of the intensive crab fisheries in the Fraser River delta have been studied (Zhang *et al.* 2002). This study showed that even at low assumed handling mortality rates of 10%, the future production of crab stocks is impacted when fishing at rates above ten crabs discarded to one legal crab kept.

In most crab areas, more crabs are released than retained. In two management areas, the discard rate (ratio of crabs released to legal crabs retained) have exceeded ten for portions of the year (see Appendix 4, Table 13).

Management measures, such as decreasing commercial trap limits, increasing escape ring size, and/or significant Crab Area wide commercial closures for a portion of the year can be taken to reduce handling mortality of soft, female and undersize crab. Improvements in stock abundances will likely be realized though measures designed to reduce handling mortality and increase productivity.

From experiences in Alaska, there is also a caution about depending on the minimum size limit for conservation. In Cook Inlet, Prince William Sound, and Yakutat areas Dungeness populations are designated as collapsed and are closed to commercial, sport, personal use and subsistence fisheries out of concern that stock abundance is insufficient to ensure sustainable use.

Harvesting Opportunities

The commercial fleet is the largest harvester in all management areas, taking the majority of the available legal crab. This has led to increasing concerns from First Nations and recreational harvesters about the availability of legal sized male crabs for harvest, particularly in south coast areas. The recreational sector has listed access to crab as one of their top three issues along with groundfish integration and halibut.

Currently, the Department has attempted to address access to First Nations for FSC purposes and to recreational harvesters through seasonal or permanent commercial closure of the relevant locations (e.g., a portion of Ucluelet Harbour). This is proving to

be a difficult process for the Department as the data to support the decisions is limited.

Management measures need to be taken to establish a process to guide sharing of opportunities to harvest legal sized crab. The current controls on the commercial fishery are not sufficient and alternatives need to be reviewed.

Commercial Restructuring

The Dungeness crab fishery continues to be one of the highest value fisheries in the Pacific Region, however, recent decreased catches, reduced prices, and increased costs (e.g., electronic monitoring, fuel) are reducing the economic viability. Much of the current management system (such as licence limitations, area licensing, trap limits, vessel length restrictions) was developed to control effort in the fishery and spread harvest over as long a period as possible. They have been only partially successful and do not allow the fishery the flexibility to adapt to changing conditions.

The Crab Area trap maximums were established to cap the total traps in each Crab Area, to prevent gear concentrations on the fishing grounds as a result of area reselection processes. They were not based on any fishery management or stock assessment analyses. Vessel trap limits and Crab Area trap maximums have only slowed effort increases in the commercial crab fishery. Effort can still increase as more vessels use all their trap limit and increasing hauling frequency. For example, in Crab Area H annual trap soak days went from 3.8 million in 1997 to 5.5 million in 2005 and averaged 6.4 million for 2001-2005.

Further, some of the increased effort does not appear to be very effective. From 2001 to 2005, the fishery in Crab Area H accounted for an average of 38% of the coast wide trap soak days and 32% of the trap hauls to land 10% of the total commercial harvest. During the same period, Crab Area I accounted for an average of 4% of the trap soak days and 11% of the trap hauls to land 8% of the harvest. (See Appendix 5, Tables 3, 4, and 5)

In addition, there are other concerns. One is sea otters, which are having an impact on crab stocks in areas of the west coast of Vancouver Island and the central coast. As crabs are consumed by the expanding otter population and crab stocks decline, movement of commercial crab licences out of these areas will concentrate effort and add to management complexity in other areas.

Another concern is vessel safety. As the commercial crab fleet is generally a small vessel fleet, any changes to the commercial fishery that might require gear transfers or may result in movement to other fishing grounds will need to consider safety concerns.

The commercial fishery needs a way to adapt safely to the increased pressures being placed on it. Management measures that need to be addressed include the current system of Crab Area selection, Crab Area and vessel trap limits, license and or trap stacking options, and vessel length restrictions. More flexibility will be required within the commercial fishery to allow for restructuring such that the fleet can adapt to the future fishery.

C. **OBJECTIVES FOR A SUSTAINABLE AND VIABLE CRAB FISHERY**

This section follows the vision and principles of Pacific Fisheries Reform (see Appendix 3) to propose the following objectives for the crab fishery.

Ensure conservation

Conservation is paramount and the primary focus of the Department. The minimum size limit for Dungeness crab will remain the primary conservation tool.

Improve crab abundance

Current management practices are likely reducing crab productivity and the potential abundance in highly utilized areas. Intensive fisheries with high discard rates of undersize and female crab and any discards of soft shell crab have resulted in productivity concerns. Management options focused on decreasing discard rates and handling mortality should be considered to improve crab abundance.

Respect Aboriginal and treaty rights of First Nations

First Nations access to crab for FSC purposes has priority following conservation.

Access to legal sized Dungeness crab for FSC purposes has been a longstanding issue in many areas. Proposed management options will have the goal of improving access.

Provide stable resource access

Following FSC access, both the recreational and commercial fisheries are legitimate users of the crab resource and improved methods of distributing fishing opportunity between these two groups and First Nations needs to be developed. A broader approach to improving access is required, rather than a proliferation of a number of small seasonal or permanent area closures.

Enable the commercial fishery to self-adjust

The current commercial fishery is at or over capacity in most Crab Areas. The future commercial crab fishery will require flexibility to adapt to changing conditions safely, whether economic (e.g., markets, costs), biological (e.g., harvest fluctuations, displacement because of sea otter expansion), or sharing the resource with First Nations and recreational harvesters.

Improve fishery monitoring and catch reporting

Accurate estimates of catches and biological information are required to provide the information necessary for assessment and management and to allow the evaluation of possible management actions. In particular; biological information is required on soft

shell periods and commercial discard ratios and catch and effort information is required from recreational and First Nation fisheries.

Improve responsibility and accountability

The advisory process needs to be a forum for all harvest sectors. The advisory process should encourage a participation in operational decision making and program delivery through respectful dialogue.

Ensure compliance

Measures will be adopted to provide confidence that adequate compliance is achieved and to ensure the fishery proceeds in a fair and equitable manner.

D. MANAGEMENT OPTIONS FOR DISCUSSION

The Department believes that significant changes are required to meet the objectives outlined above. The status quo approach to management of the fishery is not an acceptable option.

The following set out a number of possible management actions for meeting the above objectives. No single option will adequately address all the objectives; a combination of options will need to be considered.

These are not the only possible options. The key objectives, these options and possible alternatives, and ways that they can be implemented to meet the objectives need to be reviewed and discussed through consultations.

Option 1. Commercial Seasonal Crab Area Closures

Objectives: Improve crab abundance
Aboriginal and treaty rights of First Nations
Stable resource access

Seasonal Crab Area-wide closures already exist in Crab Areas A, I, and J. These can be introduced to Crab Areas currently open year round (Crab Areas B, G, E and H). These seasonal closures would be initially three to six months between April-September, which would include a portion of the main crab moulting period. Seasonal closures over a large geographic area are expected to reduce competition between traps and improve access for First Nations and recreational harvesters. These closures may allow more legal size crabs to move into shallow waters and also improve shore-based crab harvesting opportunities during the spring-summer low tides.

The closures would be refined in subsequent years as additional information is collected, such as biological information on the soft-shell period and harvest information on discard

rates in each Crab Area.

Considerations:

- Will decrease handling mortality and increase overall productivity and sustainability of crab stocks if discard rates are reduced.
- Will allow First Nations and recreational harvesters the first opportunity to harvest legal size crabs after the main period when sublegal male crabs moult and become available to harvest as hard-shell legal size and may increase access over the long term if overall productivity increases.
- All US commercial (and recreational except in Alaska) fisheries are closed for a portion of the year. The closure almost always includes the main crab moulting times to avoid soft-shell crab.
- Will present vessel safety concerns as commercial vessels in Crab Areas B, G, E, and H are generally small in size and have not been required to remove gear from the water in the past. Current vessel length restrictions and other options need to be reviewed to better facilitate safe transport of gear.
- Benefits depend on seasonal closures being timed to avoid soft-shell period and reducing periods of high discard rates. The collection of biological and harvest information is essential to monitor and adjust the closures.
- Will affect marketing strategies for Crab Areas with year round commercial access. The closures would likely prompt intensive fisheries at the start of the fishery when the majority of legal sized crabs are available. Considerations can be explored to minimize impacts of seasonal closures by staggering closure periods in different Crab Areas, considering major US openings, and implementing graduated openings.
- May be worthwhile to pilot in Crab Area H, which has the lowest average monthly catch rates, highest levels of effort, and highest discard rates of all Crab Areas. Crab Area H is also the main area of concern from First Nations and recreational harvesters about availability of legal sized crab.

In addition to seasonal commercial Crab Area closures, other longer term options could be considered.

Biologically Based Seasonal Closures with active in-season management.

In-season management to biological parameters (e.g., catch rates, discard ratios, shell conditions) could be done, similar to the spawner index sampling used in the prawn by trap fishery.

- May allow for more flexible fishing opportunities throughout the year.
- Requires comprehensive in season sampling, the development of in-season management triggers for each management area, and a re-opening strategy.

Soft shell closures for all sectors in high use areas.

Crab Areas I, J, and portions of H are highly utilized by all sectors and closures during soft shell periods for all sectors would further reduce mortality associated with handling soft crab.

- Reduce soft-shell crab handling, which can have a mortality rate greater than 50 percent depending on the soft-shell condition. (Tegelberg, 1970).
- In Washington, Oregon, and California, all crab fisheries are closed during known soft-shell periods.
- Areas I and J currently have seasonal 6 and 7 month seasonal closures of the commercial fishery, however this area is highly utilized by First Nations and recreational fishers throughout the year and closures to all sectors should be considered during the moulting period.

Option 2. Closure of Large Scale Areas within Each Crab Area – Establishment of Set-aside areas for FSC and Recreational Access

Objectives: Aboriginal and treaty rights of First Nations
Stable resource access

Local area closures have been the primary tool used to increase opportunities for FSC and recreational harvesters. As an alternative, significant portions of each crab area could be closed to the commercial fishery. Rather than review small closures individually, comprehensive closures and a process to adjust closure areas or durations could be considered.

The intent would be to create non-commercial areas or seasons to allow FSC and recreational access, or to protect soft-shell crab.

Considerations:

- Several such seasonal closures already exist on the North Coast.
- Will be difficult to decide how many, how large, where, and when the closures would be within each Crab Area.
- Closures may be more appropriate for each Crab Area as each group would have some say in the management of ‘their’ area.
- Seasonal closures of the commercial fishery may replace the need for the current commercial closures and requests for future seasonal or permanent area closures.

Option 3. Establish Total Allowable Catches

Objectives: Improve crab abundance
Aboriginal and treaty rights of First Nations

Stable resource access

A total allowable catch (TAC) could be set for the fishery. The intent of TACs would be twofold: limit the number of legal-sized crab harvested to allow a greater portion of crab to grow and to establish defined shares for each sector.

Considerations:

- Setting a TAC for each Crab Area would be challenging due to the difficulties and cost of assessment to establish Science based quotas.
- Considerable discussion would be necessary on setting the TAC and even more on sector shares.
- Puget Sound crab fisheries are managed to a TAC with a 50/50 split between Treaty and non-Treaty fisheries and a split between commercial and recreational by management area. The TACs appear to be conservative and are set with minimal assessment. (Note – There is still a minimum size limit and seasonal soft-shell closures)
- Requires accurate in-season catch information from all sectors to manage.
- Would still require management measures to protect undersize, female and soft shell crab, and the minimum size limit would remain.
- May require a system of tracking and distributing fishing activity (i.e. quota areas) would be required, to ensure effort is not concentrated.

In addition to establishing TACs, other, longer term options could be considered.

Individual Quotas for Commercial Fishery

Transferable individual quotas (IQs) could make the commercial industry more flexible and able to adapt.

- Will provide a mechanism for commercial harvesters to adjust their fishing to meet their market demands at the lowest cost.
- IQs are not widely accepted and considerable discussion would be required, especially to determine individual quota shares.
- Would require validation programs to ensure compliance.

Option 4. Differential Size Limits

Objectives: Aboriginal and treaty rights of First Nations
Stable resource access

Raising the commercial size limit by 5mm (to 170mm) while leaving the recreational and First Nation FSC size limit at 165mm may provide recreational and First Nation harvesters with the opportunity to harvest crabs that have newly moulted into legal size.

The intent is to allow First Nation FSC and recreational harvesters the first opportunity to catch newly moulted legal sized crab.

Considerations:

- Reviewed in a PSARC paper (Phillips and Zhang (2004)) and found that this option would result in an initial decrease in the commercial catch by 10 to 30 percent (by weight) and that landings should stabilize at 80 to 90 percent of current landings over the long term, with the exception of Crab Area J which would stabilize at 60 to 70 percent of current landings.
- This paper also cautioned that this approach may not have the anticipated result without further management actions such as soft shell closures, active management of the commercial fishery using CPUE or discard ratios, the development of appropriate escape ring diameters for all sectors, and the adoption of minimum soak times.
- Crab may not necessarily be caught by recreational or First Nations harvesters if commercial gear is still in the area and ‘out baiting’ other traps.
- May not be effective everywhere due to different growth patterns in different areas of the coast.
- To be enforceable, would have to be a coastwide requirement.
- Differential size limits are used in coastal Washington, Oregon, and California (commercial 6¼, recreational 6 inches in Coastal Washington and 5¾ inches for Columbia River south). No evaluation is available to indicate whether effective at improving recreational opportunity, but enforcement concerns have been noted.

Option 5. Reduced Commercial Crab Area Trap Maximums and Vessel Trap Limits

Objectives: Aboriginal and treaty rights of First Nations
Stable resource access

Both commercial Crab Area trap maximums and vessel trap limits could be reduced. The intent would be to reduce commercial effort to allow the commercial fishery to operate longer before catch rates decline.

Vessel trap limits and Crab Area trap maximums would be adjusted through discussions on what the Crab Area can support given future constraints on the fishery.

Considerations

- Many commercial harvesters currently use less traps per vessel in areas E, G, and H, than allocated. Several reasons exist, such as poor fishing rates, low prices, and higher operating costs. Trap decreases in these areas should be initiated in 2008. In areas A, B, I and J harvesters currently use nearly all their trap allocation, however trap reductions may be considered as part of longer term

goals to restructure the commercial fishery.

- Significant reduction of the number of commercial harvesters and associated trap inventory coast wide will be required over the long term to allow the remaining fleet to distribute such that a viable commercial fishery can continue. Increasing First Nations and recreational harvest and expanding sea otter populations will require a reduction in the commercial fishery of this magnitude.
- May reduce congestion of gear on the fishing grounds.
- Minimum soak times may be needed to address gear turnover rates.
- Any reduction could be phased in over several years.

Option 6. Increase Escape Ring Size

Objectives: Improve crab abundance

Increasing the size and number of escape rings, e.g., 2 escape rings of 110 mm, could be required for each commercial trap. Current commercial escape ring size is 100mm, except Crab Area B which has required the use of 110mm escape rings since 1998, and only one escape ring is required in a trap.

The intent of this change would be to reduce handling mortality of undersize, soft-shell, and female crabs by increasing opportunity for undersized crab to escape while the trap is on the bottom.

Considerations:

- There would be a cost to modifying traps to the larger escape rings. This could be partially addressed by phasing in over 2 or 3 years.
- The majority of trap designs used commercially already have two escape rings.
- Some harvesters currently report using escape rings larger than the 100mm requirement and have indicated reduced catch of undersize and female crab.
- The efficiency of escape rings is reduced when the number of legal sized crab is low and undersized crabs have less incentive to leave the trap.
- Adoption of minimum soak times in conjunction with increased escape ring size may be effective in reducing handling mortality.

In addition to increased escape ring size and number in commercial traps, other, longer term options could be considered.

Require Escape Rings for Recreational and First Nation Harvesters

No escape rings are currently required in the FSC or recreational fisheries. Making escape rings a requirement would allow undersized crab an opportunity to escape on the bottom, reducing discard rates.

- Short soak times may make the escape rings ineffective in these fisheries.
- Many recreational and First Nation harvesters use commercial traps, which have the escape rings.

Option 7. Trap Stacking

Objectives: Commercial fleets will be enabled to self-adjust

Trap stacking and transferability options can be considered as both short term and long term options. The intent is to allow the fleet to adjust itself. For example, a 50 trap transfer block could be set with the minimum number of traps 50 and the maximum twice the individual trap limit.

Considerations

- Trap stacking options cannot be considered without trap reductions as this would likely result in an increase in the number of traps actively fished as average trap use by commercial vessels in many Crab Areas is significantly lower than the current allocation.
- Provides harvesters opportunity to adjust their operation to their scale of operations and interest.
- The current system of area licensing will need to be addressed and how movement between Crab Areas would or would not occur.

Option 8. Commercial Licence Retirement

Objectives: Commercial fleets will be enabled to self-adjust

A voluntary licence retirement program could remove commercial industry capacity. The intent would be to reduce commercial effort in order to allow the commercial fishery to operate longer before catch rates decline and to increase First Nation FSC and recreational opportunity. A government funded retirement program is not considered to be an option at this time. The in his speech to announce a New Approach to Canadian Fisheries the following statement was made in regard to buy-back options:

“...In these challenging times, it is very important to provide the fishing industry with the tools to self-rationalize and consolidate. To restructure its fleets and enterprises to meet the changing demands of the global market. But let me be clear, the old 1990’s style buy-backs are neither desirable nor possible. And time has shown that these do not work...”

Considerations

- Voluntary retirement program may not be able to retire enough licenses.
- Without other measures, the commercial fleet could be just as efficient.

- Main consideration – who pays. Industry funded adjustment mechanisms (e.g., Alaska king and snow crab) could be explored. Government funding is not considered to be an option at this time.

Other Concerns

Vessel Stability and Safety issues

Commercial

Continue to work with commercial harvesters, Transport Canada, and WorkSafe BC to address vessel safety and stability issues as they arise in the fishery.

First Nations and Recreational

Requirement for sinking lines for trap buoys due to safety and navigational concerns.

Improve Information Collection

Continue efforts to improve catch and effort data is required from all sectors to determine if reform is meeting the objectives.

Commercial

Increased sampling will be required to meet long term objectives of crab reform and ensure scientific basis to the fishery. The level of biological sampling information required will depend on the management options carried forward for the future fishery.

First Nations and Recreational

Department will move forward with First Nations and the recreational sector to improve reports of catch and effort.

In the short-term the Department could consider changes to the creel survey program to collect catch and effort information in select recreational areas and working with First Nations for information in key areas. In the long-term a more comprehensive coast-wide system needs to be considered along with the data reporting, storage, and analysis requirements.

Consultative processes

Work to improve First Nations and recreational fishery involvement in the current consultation and sectoral advisory processes and increase consultations at local levels.

E. CONSULTATION PROCESS

The Department wants your views of the future management of the crab fishery. The objective of the process is to get constructive dialogue from all users on the timelines, the objectives, and the options. Decisions on a new crab management strategy will be made by the Department based on the objectives and an evaluation of the input received.

The consultations will be broad to get input from all, but there will be a focus on multi-sectoral input through the Crab Sectoral Committee. The input of each fishery sector shall be equally respected: commercial, representing the livelihood of many individuals providing important contributions to coastal economies; recreational, representing a community of 300,000 people in coastal BC with significant social and economic benefits; and First Nations, representing a traditional involvement with crab fishing and priority to harvest for FSC purposes.

The target is to announce a new crab management strategy for the 2009 fishery, but changes can be considered for the 2008 fishery.

The following timeline is proposed for consultation.

June – September 2007

- fan out of the discussion paper and initiation of consultation
- July 19, 2007 Crab Sectoral Committee - initial feedback on the discussion paper; determine future consultations; consider working group to examine options and process.
- Area and local meetings with coastal First Nation groups, SFAB committees, and commercial sector
- bi-lateral meetings with individual First Nations as requested

September 27, 2007 Crab Sectoral Committee

- table input to date and evaluate management options for inclusion in the 2008 Integrated Fishing Management Plan for crab (meeting focus is 2008 management plan)

October 2007 – Feb 2008

- Fall Community Consultations to provide an opportunity in coastal communities for First Nations, recreational harvesters and commercial harvesters to informed and provide input on crab reform.
- meetings to thoroughly explore the objectives and options to meet them
- finish meetings with broader coastal First Nation groups, area SFAB, and commercial sector

March 2008 Crab Sectoral Committee

- review of consultation comments and advice received by the Department

March – August 2008

- Department review of input, development of a management strategy for review by the Minister

September 2008

- announce crab management strategy (necessary before commercial Crab Area re-selection begins)

For further information, check the following website. The website will be updated with additional information (e.g., meeting dates, reports) as they become available:

www-comm.pac.dfo-mpo.gc.ca/pages/consultations/consult_e.htm

If you have comments and questions, please use the website to respond or contact your commercial Crab Area representative, recreational representative, First Nation, or the Department (contacts listed in Appendix 2).

F. REFERENCES

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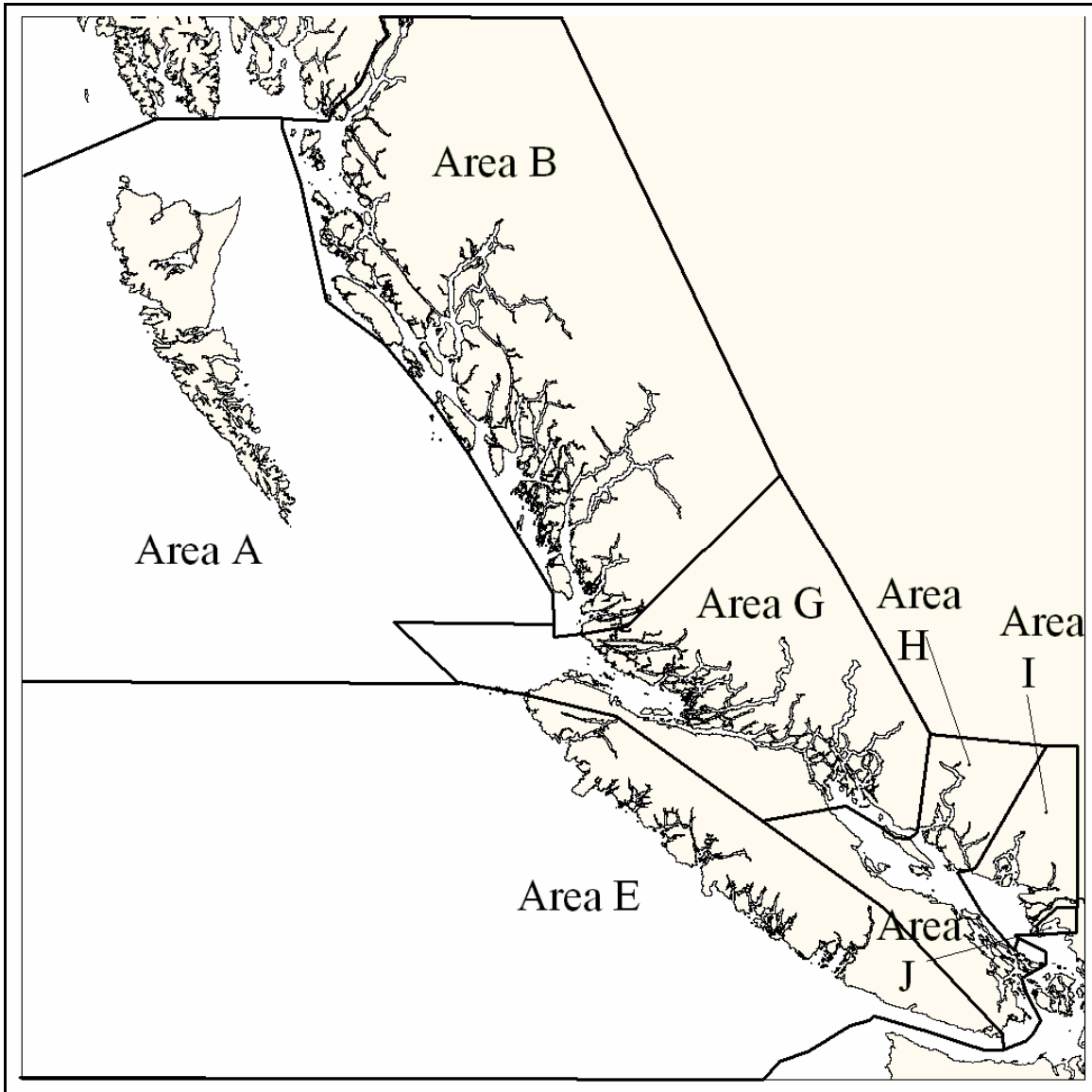
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General Crab information:

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APPENDIX 1: MAP OF COMMERCIAL CRAB LICENSE AREAS



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APPENDIX 3: VISION AND PRINCIPLES OF PACIFIC FISHERIES REFORM

April 14, 2005

VISION AND PRINCIPLES FOR PACIFIC FISHERY REFORM

In response to the Joint Task Group report on Post-Treaty Fisheries, and the First Nations Panel Report, *Our Place at the Table*, DFO has developed the following vision from which changes to the fishery will stem, and a list of principles that will provide an overall framework for change.

Long-term vision of Pacific fishery reform:

- Full economic and social potential of the resource is achieved.
- First Nations fishing interests are defined and reconciled with the interests of all Canadians.
- There is public, market and participant confidence that the fishery is sustainable.
- Participants are self-reliant and able to self-adjust.
- Participants are treated fairly and equitably and are involved in decision-making and share accountability for the conduct of the fishery.
- Costs of management are shared by those who benefit from the harvest.
- All fishery participants enjoy certainty and stability necessary for business planning.
- Equitable treaty-based fisheries are achieved.

Principles – The introduction of changes to the management of Pacific fisheries will be consistent with these principles:

- Conservation is paramount (consistency with the Wild Salmon Policy)
- Consistent legal framework
 - Pacific fish resources are a common property resource managed by the Minister of Fisheries and Oceans;
 - They must be conducted under an integrated management plan authorized by the Minister; and
 - Commercial participants fish under the same priority of access and similar rules.
- Aboriginal and treaty rights of First Nations
 - First Nations access to food, social and ceremonial fisheries will be respected; and
 - First Nations interests in increased economic access will be addressed in a manner consistent with Canada's treaty process.
- Fair transfer of fishing opportunity
 - Transfer of economic fishing opportunity to First Nations will be accomplished through voluntary licence retirement from willing sellers, and within existing programs, to mitigate impacts on established fishers.

- Stable resource access and allocation
 - Certainty will be provided for allocations between harvest sectors (First Nations, recreational and commercial);
 - Allocation policy as it pertains to recreational access to Chinook and Coho will be maintained;
 - Certainty of harvest share will be provided to commercial participants; and
 - Commercial harvesters will enjoy a similar level of certainty regarding fisheries access.
- Responsibility and accountability
 - First Nations and stakeholders will assume a greater role in operational decision making and program delivery through effective co-management processes.
- Management regimes for commercial fishery
 - Fleets will be enabled to self-adjust;
 - Resource management practices will be designed to optimize economic performance while meeting conservation objectives;
 - Fleets will have the capacity to assume a larger share of the cost of management of their fishery;
 - Catch monitoring and independent validation will be implemented; and
 - Measures will be adopted to provide confidence that adequate compliance is achieved.
- Transition and adjustment
 - Existing government programs will be coordinated to best meet the needs of those impacted by change.

APPENDIX 4: CURRENT MANAGEMENT STRATEGIES

Conservation Measures

All Sectors

- **Size limit** for all sectors. No Dungeness crab smaller than 165mm (measured in a straight line through the widest part of the carapace, from outside the points) can be retained by any harvester (in place since 1914).
- **Biodegradable escapement mechanisms** for every trap fished (e.g., rot cord, rot panel, or rot panel alternative) to prevent ghost fishing by lost traps.

Recreational

- **Non-retention of females crab** for recreational harvesters beginning in 2007 by condition of license.

Commercial fishery

- Commercial harvesters can retain only Dungeness, red rock, and golden and red king crab (with amended conditions); First Nations and recreational harvesters may retain all species of crab
- **Non-retention of females** is required in the commercial fishery.
- **Escape holes** required in traps to allow opportunity for undersized crab to escape. In Crab Area B escape hole must be at least 110 mm in diameter, and at least 100 mm in all other Crab Areas. First Nations and recreational traps do not currently require escape holes.
- All commercial harvesters are required to **release soft shell crab**, defined as a crab whose shell is not fully hardened and yields to finger pressure. A crab with a durometer measurement of 70 units or less is defined as a soft-shell crab.
- Seasonal **soft-shell closures** are used in management Crab Areas A, I, and J to protect moulting and soft shell crabs. These closures were established in the 1990's and were based on historic sampling which suggested that moult timing occurred annually at roughly the same time throughout the area. The other four Crab Areas (B, E, G, and H) are open year round.

First Nations' access for FSC purposes

- The Department's policy on the management of First Nations fishing identifies harvests for FSC purposes as the first priority after conservation.
- Permanent and seasonal commercial closures have been implemented in select areas where necessary to improve access to crab.

Effort Control

Commercial Fishery

- The *crab licence (R)* was introduced with *area licensing* in 1990. *License limitation* followed in 1991, and eventually the number of commercial crab licenses was reduced and established at the current number of 222 (Appendix 4, Table 1). Of the current 222 commercial crab licenses, 16 are allocated to First Nations groups through AFS agreements communal commercial crab licenses (FR).
- The commercial crab fishery is managed and licensed using seven Crab Areas (see Appendix 1) management areas. At the initiation of area licensing, five Crab Areas were established (A to E), however, Crab Area C (Johnstone Straits and Gulf of Georgia) and Crab Area D (Fraser River and Boundary Bay) were split in 1997 resulting in the seven Crab Areas today. In 1997, vessels began selected their fishing area for a three year period, currently 2006 to 2008.
- Since the current system of three year Crab Area selection began, the number of licenses within each Crab Area has varied significantly with the exception of Areas G and J. The last Crab Area selection in 2006 saw significant increases of licenses in Crab Areas A, I and J, while Crab Areas B, E, and H saw significant decreases.
- Vessel *trap limits* were implemented as early as 1991 in the Tofino (Clayoquot Sound) fishery, 1995 in the Fraser River and 1998 in Crab Area B. In 2000, vessel trap limits were introduced for the remaining Crab Areas. At the time, vessel trap limits were established in each Crab Area through consultation with industry. Crab Area trap maximums were determined as the number a traps that may be fished by vessels in each of the Crab Areas in 2000. As a result, Crab Area trap maximums and individual vessel limits were established (Table 2). The area trap maximums established an upper limit to overall gear inventories in each Crab Area, to prevent the risk of additional gear conflict as a result of licence re-distribution with Crab Area re-selection.
- The vessel trap limits vary by Crab Area and are also based on vessel length in Crab Area A. Crab Area trap maximums have been adjusted at the request of harvesters in Crab Area A from the previous quota of 36,200 to 35,000. In Crab Area I, the vessel trap limit was reduced from 300 to 200 traps at the request of harvesters. Vessel trap limits have also been adjusted in Crab Areas A and J in 2006 and Crab Area H in 2003 when an increased number of vessels selected to fish in these Crab Areas would have exceeded the Crab Area trap maximum.
- Setting and hauling of crab traps is permitted only between one hour before sunrise and one hour after sunset in Crab Areas G, H, I, and J

Recreational

- Recreational harvesters must have a British Columbia *Tidal Waters Sport Fishing Licence* to harvest any species of fish including shellfish. To date in

2006/07, 307,894 recreational licenses have been purchased; 236,239 residents and 71,655 non-residents. There is no indication of how many fish crab.

First Nations

- The First Nations harvest of crab for FSC purposes is regulated through the *Aboriginal Communal Fishing Licences Regulations* made under the *Fisheries Act*. **Communal licences** are issued annually to First Nations under the authority of these regulations and include a mechanism for designating individuals and vessels to fish under the authority of that licence, outline the harvest area, any harvest or gear limitations, as well as the harvest reporting requirements.

Sharing the Resource

- Numerous permanent and seasonal commercial fishery closures have been established in select areas to allow access by First Nations and recreational users. Most were established for First Nation access.
- In some locations, First Nation members have expressed a desire to maintain a traditional harvest in the intertidal and shallow subtidal zone, during the low tides of the year.
- For recreational harvesters, special management exists in some areas such as Fulford Harbour and the Nimpkish Estuary where gear/catch restrictions vary.
- There are also a number of closures/advisories for navigation, marine reserves, and contamination (e.g., dioxin).

Catch Reporting

Commercial

- Commercial harvesters provide catch and effort data through harvest logs, report landings and value through fish slips, provide biological data through a biological sampling program and provide trap haul locations through an electronic monitoring program. (This information is summarized in Appendix 5.)
- The information is relatively good, although evidence of misreporting and underreporting of catch.

First Nations

- Total harvest for FSC purposes is unknown. Communal licenses stipulate catch reporting requirements; however, compliance with requirements has been limited. Additionally, there is no centralized data base where reported FSC landings are tabulated.
- The Department is working with First Nations to address both issues.

Recreational

- There is no requirement or process for recreational harvesters to record or report crab harvest.
- Some information is collected from creel surveys, which are conducted at specific areas of the coast to gather recreational harvest and effort information. Data from creel surveys has not been fully evaluated, but may provide some additional indications as to trends in recreational harvest and catch rates for specific areas.
- The only reliable information is tidal water recreational licence sales. From April – December 2006, 307,894 recreational licenses were issued; 236,239 by Canadians and 71,655 by visitors. All tidal water licences permit shellfish harvesting; there is no indication of how many people intended to fish crab.
- The only estimate of recreational harvest comes from the national Survey of Recreational Fishing in Canada, which is conducted every five years. The 2000 survey provided a coastwide catch estimate of 727,472 pounds or 330 tonnes, about 10% of total landings in 2000 (commercial harvest 2,790.2 tonnes; Appendix 5, Table 6).
- The Department is working with the Sport Fish Advisory Board to address recreational catch reporting.

APPENDIX 5: COMMERCIAL CATCH AND EFFORT DATA

The commercial fishery is required to complete harvest logs on each days fishing and submit sales slip for each landing. A biological sampling program (beginning in 2005) and electronic monitoring (beginning in 2001 for Crab Area A, 2006 for other Crab Areas) has improved commercial fishery monitoring. Commercial fishery information from licensing, harvest logs, fish slips, and biological sampling are briefly described below. Data tables and charts follow.

Fishery Effort

- Effort in the commercial fishery has been summarized annually from logbook data by calculating the number of trap soak days (Table 3), the number of trap hauls in each Crab Area (Table 4) and the total number of crab landed (Table 5).
- Effort, measured as trap soak days and trap hauls, is highest in Crab Area H where levels have increased substantially from 1997 until recent years where it appears that poor catch levels have resulted in decreased effort (Table 3). Effort in Crab Areas I and J has remained relatively consistent over the years, as both fisheries occur during predetermined periods. Crab Areas B, E, and G have shown relatively consistent effort levels over this period. Crab Area A has had significant fluctuations in effort due to the cyclical nature of the fishery driven by periodic recruitment events that result in large increases in crab abundance.

Landings and Landed Value:

- Total landings by Crab Area calculated from fish slips are presented in Table 6 and in Figure 1. A summary of landed value and average earnings per license are presented in Table 7 and Table 8, and have been calculated using average price information collected from fish slips. Earnings per license (Table 8) have been calculated for the years since license limitation.
- Overall landings from the commercial crab fishery coast wide are driven by the large fluctuations in production from Crab Area A. Generally, landings in all Crab Areas fluctuate with the cyclical nature of crab stocks; however, Crab Areas G and H have shown downward trends in recent years. Crab Area E has also seen a decrease in landings which may be partially explained through the reduction of available crab due to sea otter predation. A decline has also been seen in other parts of Crab Area E indicating an overall reduction in stock abundance.
- Landed value has varied significantly and is affected not only by total landings, but also by the price. The average price calculated from fish slips peaked in 2000, decreased until 2004 and then increased slightly in 2005 (Table 7). As a result, in areas where landings have also decreased, the average earning per license has dropped significantly. For example, the average earning per license in Crab Area E was \$86,391 in 2000 and decreased to \$42,189 in 2005. Similar decreases have occurred in Crab Areas G and H as well.

Catch Rates:

- Catch rates in the commercial fishery have been summarized annually (Table 9 and Table 10) and as a monthly average (Table 11, Table 12, Figure 2 and Figure 3) as both average crab per trap haul, and crab per trap soak day from logbook data.
- Average annual catch rates in areas except areas B, E, H, and G have remained relatively constant at low levels over the period of 1997 to 2005. Annual average catch rates both as crabs per trap and crab per trap soak day have shown an increasing trend in Crab Areas I and J, and have varied significantly but remained at high levels in Crab Area A.
- Monthly catch rates averaged over the period of 1997 to 2005 demonstrate the seasonality of the fisheries in most areas. Catch rates generally peak in spring and early summer in areas open year round, or at the time of opening in areas A, I and J. In area B, even though the area is open year round, the peak catch rates occur in October, which correspond with the opening of large seasonally closed areas.

Discard Rates (Catch Release Ratios):

- Discard rates of crabs returned to the water have been calculated from observer reports and biological sampling data collected from the fishery. These discard rates are calculated as the ratio of the number of crabs discarded to the number of legal crabs retained. Average monthly average discard rates are shown in Table 13 and Figure 4.
- Discard rates vary greatly both by month and by Crab Area. Crab Area H, which has the greatest fishing effort of all the Crab Areas, also has the highest discard rates which are in excess of ten discards to one legal crab for several months of the year.

Table 1: Number of commercial licenses per Crab License Area 1990 – 2006

Year	A	B	E	C	G	H	D	I	J	Total
1990	29	83	121	161			100			494
1991	18	38	63	54			48			221
1992	19	40	70	53			42			224
1993	25	38	63	55			43			224
1994	35	34	54	52			48			223
1995	41	35	46	59			42			223
1996	50	28	37	57			49			221
1997	53	20	43		15	42		31	16	220
1998	52	21	43		15	42		28	19	220
1999	52	21	43		15	42		28	19	220
2000	48	19	39		14	47		36	19	222
2001	48	19	39		13	48		36	19	222
2002	48	19	39		13	48		36	19	222
2003	41	17	42		13	55		36	18	222
2004	41	17	42		13	55		36	18	222
2005	41	17	42		13	55		36	18	222
2006	56	11	35		14	43		41	22	222

Table 2: Maximum vessel trap limits and total trap limit by Crab License Area

License Area	Vessel Trap Limit	Trap Maximum	Vessel Trap Limit (2006-2008)
A	less than 42.5' - 600 42.5' to 46' - 800 46' to 52' - 1,000 excess of 52' - 1,200	35,000 (*Initially 36,200 but adjusted by request of industry)	less than 42.5' - 510 42.5' to 46' - 680 46' to 52' - 850 excess of 52' - 1020
B	400	7,600	400
E	500	19,500	500
G	500	6,500	500
H	500	24,000	500
I	300	10,800	200
J	200	3,800	173

Table 3: Commercial trap soak days per Crab License Area 1997-2005 (calculated from logbook data)

Area	1997	1998	1999	2000	2001	2002	2003	2004	2005
A	6,295,243	5,297,083	3,751,589	2,738,770	2,852,916	3,865,152	4,234,382	4,780,809	4,506,247
B	1,039,459	1,162,772	832,111	1,040,642	1,117,219	1,053,694	990,803	1,155,567	1,031,619
E	1,717,448	2,704,053	2,620,787	2,766,857	2,918,247	2,944,843	2,949,817	2,615,313	2,234,928
G	895,758	895,859	1,037,355	1,356,282	1,501,531	1,638,632	1,377,238	1,181,614	1,091,091
H	3,788,696	5,019,127	5,704,211	5,772,975	6,411,588	6,853,299	6,775,221	6,366,245	5,535,416
I	805,424	706,373	723,588	955,594	822,084	681,344	684,710	644,281	704,736
J	453,350	448,658	568,603	478,862	574,016	464,968	457,982	435,087	385,012

Explanatory Note: Soak days are calculated as 1 trap soaked for 1 day = 1 trap soak day. 10 traps soaked for 10 days equals 100 trap soak days.

Table 4: Commercial trap hauls by Crab License Area 1997-2005 (calculated from logbook data)

Area	1997	1998	1999	2000	2001	2002	2003	2004	2005
A	804,276	654,660	585,377	397,771	468,652	584,901	685,359	914,459	717,006
B	377,416	314,877	267,282	370,612	360,129	379,577	311,712	325,469	292,218
E	431,442	561,221	422,683	521,094	537,709	508,491	574,329	492,307	356,907
G	104,003	98,571	110,687	145,481	169,538	154,131	135,030	104,230	99,165
H	569,594	759,847	789,318	982,887	1,145,214	1,223,282	1,097,242	939,904	857,241
I	383,080	379,094	374,548	532,476	407,426	315,710	330,894	336,961	368,901
J	255,078	289,215	326,432	277,834	317,992	290,997	276,481	265,868	232,758

Table 5: Number of Dungeness crab landed in the commercial fishery by Crab License Area 1997-2005 (from logbook data)

Area	1997	1998	1999	2000	2001	2002	2003	2004	2005
A	2,340,565	1,336,074	1,809,016	1,178,425	3,706,671	2,387,775	5,636,421	8,244,128	4,176,912
B	274,193	206,932	195,583	257,118	256,066	330,610	362,213	268,500	255,804
E	613,377	640,111	346,340	624,795	853,049	671,631	951,041	714,995	431,118
G	190,063	173,132	172,813	221,181	289,947	257,908	235,654	175,153	205,241
H	609,938	691,184	581,696	832,950	830,154	934,461	843,893	681,654	669,508
I	467,064	555,945	496,362	613,018	706,187	594,526	533,212	717,558	685,416
J	228,493	208,748	178,316	206,427	231,209	296,922	330,340	351,983	340,199

Table 6: Commercial Dungeness crab landings (tonnes) by Crab Licence Area 1980 to 2005 (from sales slip data)

<u>Year</u>	<u>Area A</u> (QCI)	<u>Area B</u> (NCCM)	<u>Area E</u> (WCVI)	<u>Area C</u> (GS/JS)	<u>Area G</u> (JS)	<u>Area H</u> (GS)	<u>Area D</u> (FR/BB)	<u>Area I</u> (FR)	<u>Area J</u> (BB)	<u>Total</u>
1980	901.0	107.0	226.0	215.0			252.0			1701.0
1981	548.4	126.3	238.6	171.7			229.5			1314.5
1982	257.3	78.8	274.5	127.4			260.5			998.5
1983	141.6	160.9	238.9	141.6			274.0			957.0
1984	152.3	141.8	243.1	277.5			340.9			1155.6
1985	166.3	107.6	356.9	180.8			352.5			1164.1
1986	219.0	98.9	419.4	261.0			321.2			1319.5
1987	257.6	135.4	583.2	230.1			424.3			1630.6
1988	378.6	139.6	308.1	225.3			456.3			1507.9
1989	351.5	237.3	294.2	227.6			407.9			1518.5
1990	777.7	275.2	347.3	314.6			414.6			2129.4
1991	447.9	434.8	355.0	305.2			314.9			1857.8
1992	1600.3	418.5	505.8	362.0			447.1			3333.6
1993	4798.0	282.2	298.8	419.1			491.1			6289.2
1994	4272.5	354.8	384.9	537.2			445.9			5995.3
1995	2728.8	474.1	256.8	434.1			645.4			4539.2
1996	3362.8	405.5	272.5	575.7			401.6			5018.1
1997	2110.3	225.6	470.5	562.7	133.5	499.4	502.2	340.3	161.9	3871.3
1998	1113.6	170.6	491.9	613.6	124.1	489.5	584.8	478.2	106.6	2974.5
1999	1464.8	165.4	258.3	520.3	122.5	397.8	539.4	429.9	109.5	2948.2
2000	928.3	185.3	433.7	688.0	136.4	551.6	554.9	449.8	105.1	2790.2
2001	3301.8	181.3	630.1	841.3	211.3	625.1	689.0	578.8	110.2	5643.5
2002	1787.3	247.0	520.6	912.8	192.3	720.5	647.6	504.5	143.1	4115.3
2003	4671.0	250.5	734.8	810.7	175.4	635.3	606.8	497.6	109.2	7073.7
2004	7208.3	198.8	589.2	650.5	128.8	521.7	741.7	585.0	156.7	9388.7
2005	3228.2	223.6	342.2	617.0	141.1	475.9	738.6	609.0	129.6	5149.6

Table 7: Average price and landed value of commercial Dungeness crab landings 1980 – 2005 (from sales slip data)

Year	Average Price \$/KG	Area A (QCI)	Area B (NCCM)	Area E (WCVI)	Area C (GS/JS)	Area G (JS)	Area H (GS)	Area D (FR/BB)	Area I (FR)	Area J (BB)	Total
1983	\$3.47	\$491,206	\$558,157	\$828,736	\$491,206			\$950,497			\$3,319,800
1984	\$3.94	\$600,673	\$559,261	\$958,789	\$1,094,463			\$1,344,514			\$4,557,700
1985	\$4.05	\$674,171	\$436,205	\$1,446,854	\$732,954			\$1,429,016			\$4,719,200
1986	\$4.29	\$939,551	\$424,299	\$1,799,304	\$1,119,738			\$1,378,008			\$5,660,900
1987	\$3.96	\$1,019,215	\$535,721	\$2,307,478	\$910,409			\$1,678,777			\$6,451,600
1988	\$3.94	\$1,492,847	\$550,613	\$1,214,820	\$888,311			\$1,799,209			\$5,945,800
1989	\$3.97	\$1,395,508	\$941,909	\$1,168,081	\$903,444			\$1,619,457			\$6,028,400
1990	\$4.19	\$3,257,490	\$1,152,510	\$1,454,581	\$1,317,840			\$1,736,706			\$8,919,127
1991	\$4.49	\$2,010,780	\$1,952,170	\$1,593,757	\$1,370,430			\$1,413,672			\$8,340,808
1992	\$3.30	\$5,284,390	\$1,381,890	\$1,670,203	\$1,195,272			\$1,476,272			\$11,008,026
1993	\$2.96	\$14,195,237	\$834,977	\$883,886	\$1,240,016			\$1,453,012			\$18,607,128
1994	\$4.27	\$18,259,109	\$1,516,302	\$1,644,893	\$2,295,902			\$1,905,757			\$25,621,963
1995	\$5.11	\$13,937,309	\$2,421,371	\$1,311,637	\$2,217,227			\$3,296,220			\$23,183,764
1996	\$4.71	\$15,850,105	\$1,911,283	\$1,284,231	\$2,713,465			\$1,892,876			\$23,651,961
1997	\$7.10	\$14,980,395	\$1,601,221	\$3,339,868	\$3,994,791	\$947,685	\$3,545,122	\$3,564,889	\$2,415,709	\$1,149,290	\$27,481,164
1998	\$6.75	\$7,519,505	\$1,151,964	\$3,321,520	\$4,143,290	\$837,976	\$3,305,314	\$3,948,820	\$3,229,012	\$719,809	\$20,085,100
1999	\$6.92	\$10,134,325	\$1,144,683	\$1,787,352	\$3,599,551	\$847,550	\$2,752,288	\$3,731,973	\$2,974,380	\$757,606	\$20,397,883
2000	\$7.77	\$7,211,314	\$1,439,525	\$3,369,250	\$5,344,810	\$1,059,640	\$4,285,170	\$4,310,807	\$3,494,325	\$816,482	\$21,675,706
2001	\$6.52	\$21,541,674	\$1,182,671	\$4,110,598	\$5,488,857	\$1,378,550	\$4,078,238	\$4,495,176	\$3,776,171	\$718,960	\$36,818,976
2002	\$6.63	\$11,847,206	\$1,637,252	\$3,450,823	\$6,050,540	\$1,274,670	\$4,775,870	\$4,292,648	\$3,344,103	\$948,545	\$27,278,469
2003	\$5.40	\$25,243,852	\$1,353,671	\$3,971,076	\$4,381,354	\$948,176	\$3,433,240	\$3,279,138	\$2,689,234	\$590,161	\$38,229,091
2004	\$4.97	\$35,859,674	\$989,207	\$2,931,328	\$3,236,132	\$640,719	\$2,595,413	\$3,689,945	\$2,910,257	\$779,688	\$46,706,286
2005	\$5.18	\$16,707,830	\$1,157,261	\$1,771,086	\$3,193,337	\$730,275	\$2,463,062	\$3,822,689	\$3,151,933	\$670,756	\$26,652,203

Explanatory Note: Average price calculated from sales slips. Landed value calculated using as the average price multiplied by the total landings shown in Table 6.

Table 8: Average landed value per license 1990-2005 (from sales slip data)

Year	Area A (QCI)	Area B (NCCM)	Area E (WCVI)	Area C (GS/JS)	Area G (JS)	Area H (GS)	Area D (FR/BB)	Area I (FR)	Area J (BB)	Total
1990	\$112,327	\$13,886	\$12,021	\$8,185			\$17,367			\$18,055
1991	\$111,710	\$51,373	\$25,298	\$25,378			\$29,452			\$37,741
1992	\$278,126	\$34,547	\$23,860	\$22,552			\$35,149			\$49,143
1993	\$567,809	\$21,973	\$14,030	\$22,546			\$33,791			\$83,068
1994	\$521,689	\$44,597	\$30,461	\$44,152			\$39,703			\$114,897
1995	\$339,934	\$69,182	\$28,514	\$37,580			\$78,481			\$103,963
1996	\$317,002	\$68,260	\$34,709	\$47,605			\$38,630			\$107,022
1997	\$282,649	\$80,061	\$77,671		\$63,179	\$84,408		\$77,926	\$71,831	\$124,914
1998	\$144,606	\$54,855	\$77,245		\$55,865	\$78,698		\$115,322	\$37,885	\$91,296
1999	\$194,891	\$54,509	\$41,566		\$56,503	\$65,531		\$106,228	\$39,874	\$92,718
2000	\$150,236	\$75,764	\$86,391		\$75,689	\$91,174		\$97,065	\$42,973	\$97,638
2001	\$448,785	\$62,246	\$105,400		\$106,042	\$84,963		\$104,894	\$37,840	\$165,851
2002	\$246,817	\$86,171	\$88,483		\$98,052	\$99,497		\$92,892	\$49,923	\$122,876
2003	\$615,704	\$79,628	\$94,549		\$72,937	\$62,423		\$74,701	\$32,787	\$172,203
2004	\$874,626	\$58,189	\$69,794		\$49,286	\$47,189		\$80,840	\$43,316	\$210,389
2005	\$407,508	\$68,074	\$42,169		\$56,175	\$44,783		\$87,554	\$37,264	\$120,055
Average	\$350,901	\$57,707	\$53,260	\$29,714	\$70,414	\$73,185	\$38,939	\$93,047	\$43,744	\$106,989

Explanatory Note: Average earnings per license calculated from the total landed value per license area shown in Table 7 divided by the number of licenses in each license area from Table 1.

Table 9: Average annual catch rate - number of legal crabs per trap haul - 1997-2005 (calculated from logbook data)

Area	1997	1998	1999	2000	2001	2002	2003	2004	2005
A	2.91	2.04	3.09	2.96	7.91	4.08	8.22	9.02	5.83
B	0.73	0.66	0.73	0.69	0.71	0.87	1.16	0.82	0.88
E	1.42	1.14	0.82	1.20	1.59	1.32	1.66	1.45	1.21
G	1.83	1.76	1.56	1.52	1.71	1.67	1.75	1.68	2.07
H	1.07	0.91	0.74	0.85	0.72	0.76	0.77	0.73	0.78
I	1.22	1.47	1.33	1.15	1.73	1.88	1.61	2.13	1.86
J	0.90	0.72	0.55	0.74	0.73	1.02	1.19	1.32	1.46

Explanatory Note: Annual averages calculated as the total number of crabs landed (Table 5) divided by the total number of trap hauls (Table 4).

Table 10: Average annual catch rate – number of legal crabs per trap soak day - 1997-2005 (calculated from logbook data)

Area	1997	1998	1999	2000	2001	2002	2003	2004	2005
A	0.37	0.25	0.48	0.43	1.30	0.62	1.33	1.72	0.93
B	0.26	0.18	0.24	0.25	0.23	0.31	0.37	0.23	0.25
E	0.36	0.24	0.13	0.23	0.29	0.23	0.32	0.27	0.19
G	0.21	0.19	0.17	0.16	0.19	0.16	0.17	0.15	0.19
H	0.16	0.14	0.10	0.14	0.13	0.14	0.12	0.11	0.12
I	0.58	0.79	0.69	0.64	0.86	0.87	0.78	1.11	0.97
J	0.50	0.47	0.31	0.43	0.40	0.64	0.72	0.81	0.88

Explanatory Note: Annual average catch rate as Crabs per Trap Soak day calculated as the total number of soak days (Table 3) divided by the total number of crab landed (Table 4).

Table 11: Average monthly catch rate – number of legal crabs per trap haul - 1997-2005 (calculated from logbook data)

Area	Annual Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
A	5.30	2.51	2.28	2.05	2.24	3.03	17.05	10.18	5.80	4.80	4.27	3.89	3.85
B	0.80	0.58	0.65	0.67	0.64	0.78	0.75	0.78	0.78	0.76	1.11	0.79	0.60
E	1.33	1.26	1.08	1.06	1.24	1.51	1.60	1.40	1.22	1.15	1.28	1.54	1.29
G	1.71	1.44	1.34	1.33	1.50	2.06	2.33	2.27	1.80	1.56	1.40	1.43	1.39
H	0.80	0.66	0.59	0.60	0.81	1.00	1.07	0.86	0.71	0.75	0.79	0.76	0.68
I	1.57						4.57	1.76	0.88	0.74	0.83	0.85	
J	0.94							1.87	1.05	0.90	0.80	0.65	0.66

Explanatory Note: Average monthly catch rates as crab per trap haul are calculated using the using the total number of crabs landed in each given month (each January for the 9 year period added together) divided by the sum of trap hauls for the given month (each January for the 9 year period added together).

Table 12: Average monthly catch rate – number of legal crabs per trap soak day - 1997-2005 (calculated from logbook data)

Area	Annual Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
A	0.80	0.26	0.27	0.25	0.27	0.42	3.33	2.73	1.06	0.77	0.56	0.39	0.39
B	0.26	0.07	0.12	0.17	0.18	0.30	0.29	0.22	0.21	0.23	0.55	0.26	0.12
E	0.25	0.19	0.17	0.19	0.26	0.38	0.37	0.28	0.22	0.20	0.22	0.25	0.18
G	0.18	0.12	0.13	0.13	0.15	0.25	0.30	0.25	0.20	0.16	0.12	0.13	0.13
H	0.13	0.08	0.08	0.09	0.15	0.20	0.21	0.14	0.11	0.12	0.12	0.11	0.09
I	0.80						4.99	1.36	0.38	0.28	0.26	0.29	
J	0.56							1.77	0.92	0.71	0.37	0.16	0.12

Explanatory Note: Average monthly catch rates as crab per trap soak day are calculated using the using the sum of the total number of crabs landed in each given month (each January for the 9 year period added together) divided by the sum of trap soak time for the given month (each January for the 9 year period added together).

Table 13: Average monthly discard rates – number of crab released / number of crab retained 1991 and 2006 (calculated from commercial fishery observer and biological sampling program data)

Area	Annual Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Sample Years ²
A ¹	0.51		1.19	1.05	0.87	0.43	0.28	0.23	0.51	1.14	1.16	1.43		2001-2005
B	2.85	3.64			3.88	1.82	4.54	3.68	4.51	0.63	2.89			2001-2005
E	4.47	3.38	5.26	5.04	6.85	3.29	6.62	2.00	4.30	9.23	3.89	4.03	2.86	2001-2006
G	2.10	0.98	0.94	1.59	7.80	2.01	1.59	1.60	3.09	1.58	3.09	2.87	1.81	2001-2005
H	6.13	2.83	4.72	12.58	7.25	5.20	6.67	5.60	12.68	11.16	10.40	3.79	3.83	2001-2006
I	2.56						1.13	2.59	9.46	6.22	4.42	10.50	18.82	91, 94, 95, 97, 01- 03, 05, 06
J	4.33							1.98	5.23	3.69	3.65	7.57	1.32	95, 97 to 2006

¹ Area A data from soft shell sampling program from 2001 to 2005

² Not all months sampled in all years.

Dungeness Crab Landings 1980 - 2005

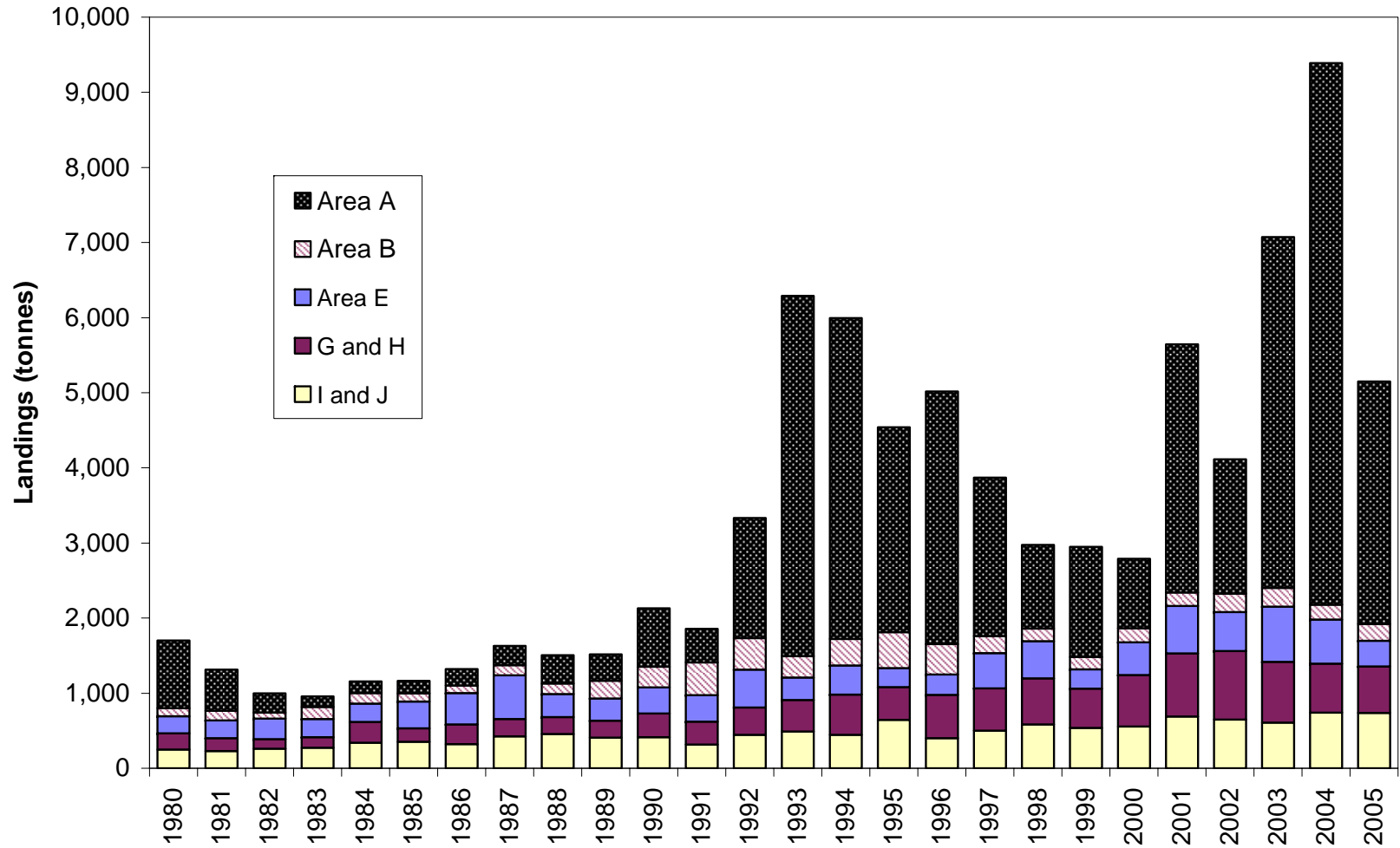


Figure 1: Crab landings by license area 1980-2005

**1997-2005 Average Legal Crabs per Trap Haul
(Areas A and I Plotted on Secondary Axis)**

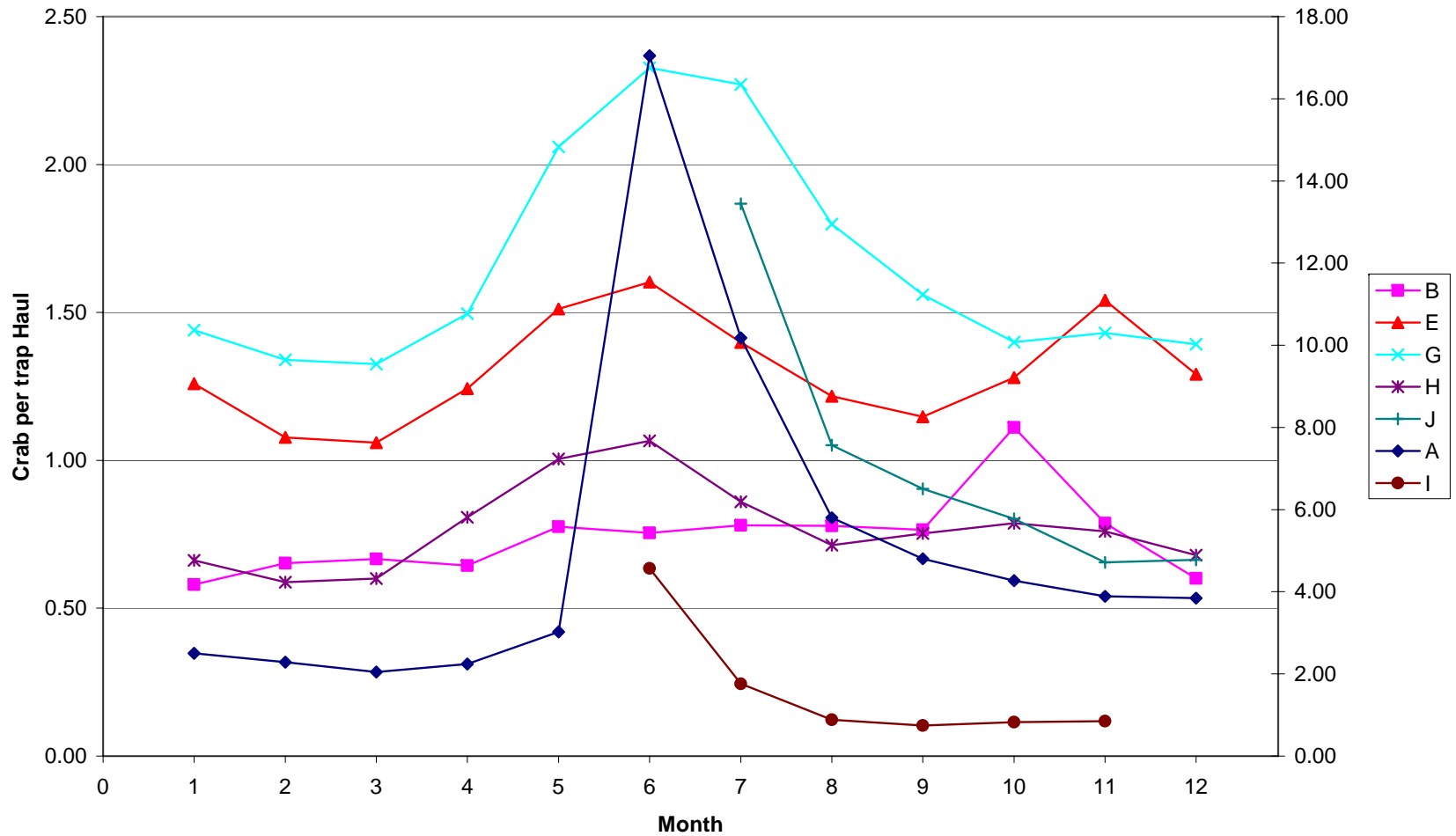


Figure 2: Average monthly catch rate - crab per trap haul - by Crab Licence Area (data in Table 11)

**Average Monthly Catch Rate From Logbook Data 1997-2005
(A, I and J Plotted on Secondary Axis)**

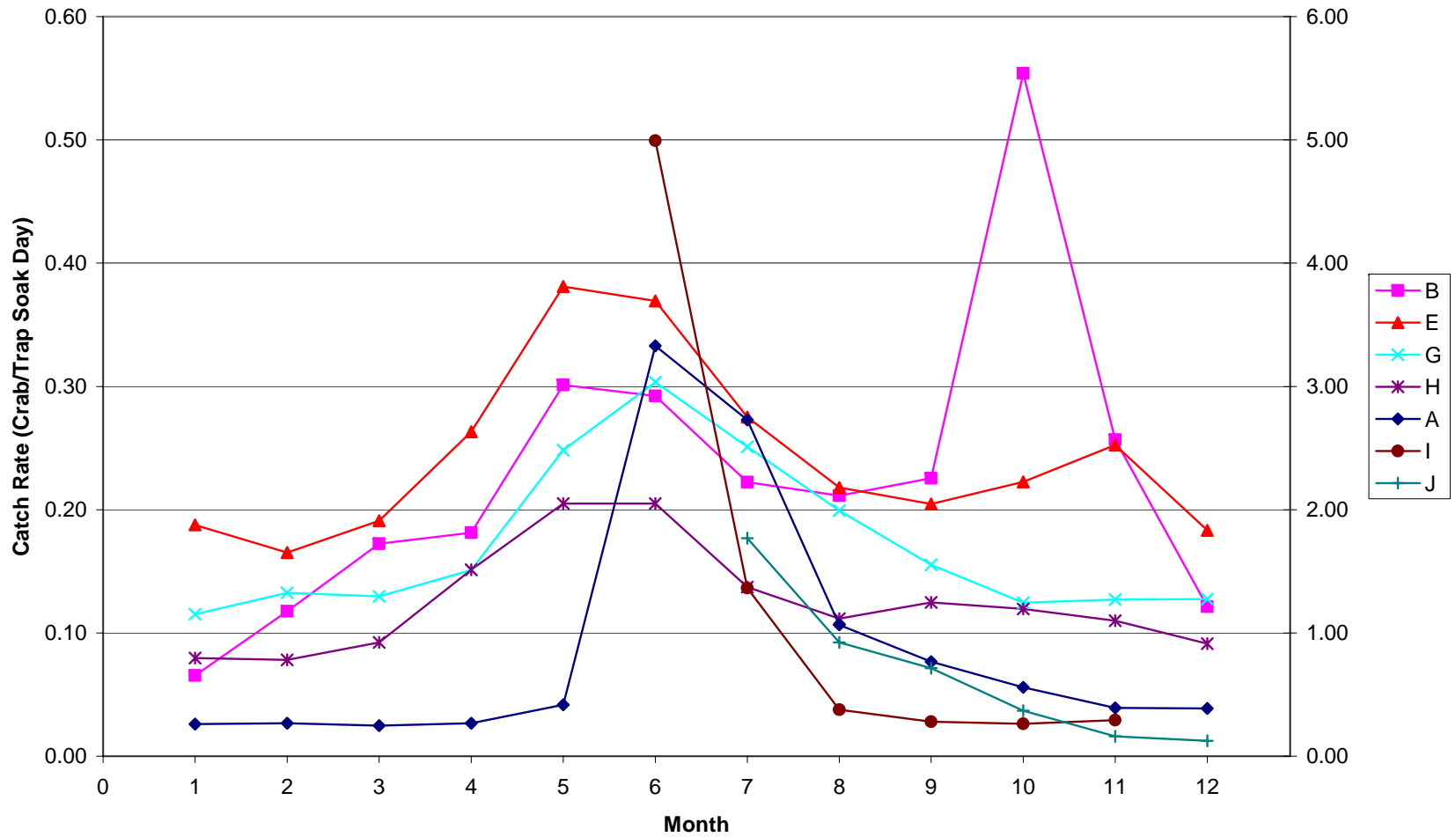


Figure 3: Average monthly catch rate - crab per trap soak day- by Crab License Area (data in Table 12)

Monthly Average Discard Ratios

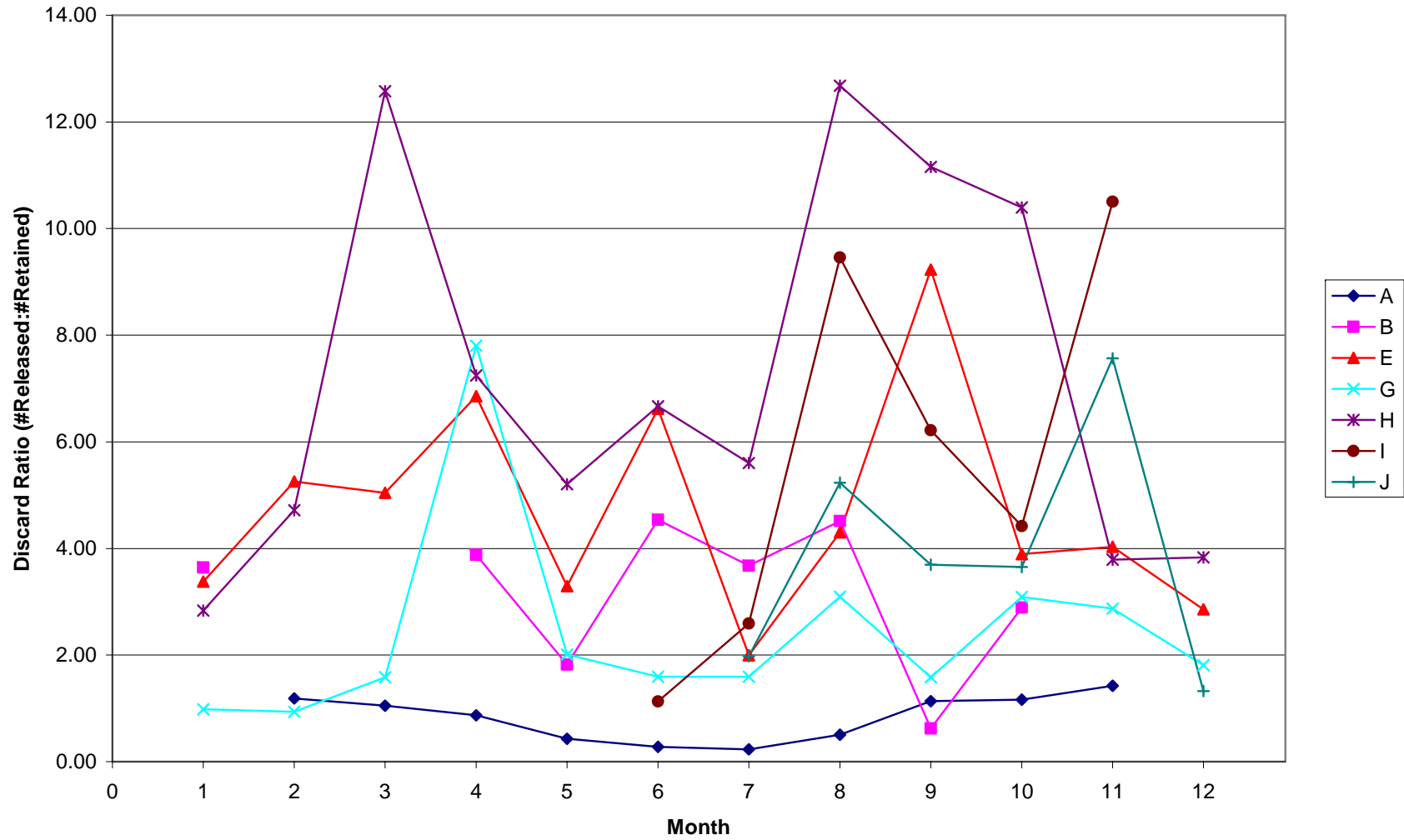


Figure 4: Average monthly discard ratio –crab released / crab retained – by Crab Licence Area (data in Table 13)