Secretary of State

STATEMENT OF NEED AND FISCAL IMPACT

A Notice of Proposed Rulemaking Hearing or a Notice of Proposed Rulemaking accompanies this form.

Oregon Department of Fish and Wildlife, Fish Division 635
Agency and Division Administrative Rules Chapter Number

In the Matter of: Amendment of OAR Chapter 635, Divisions 005 and 006, related to commercial Dungeness crab fisheries.

Rule Caption: (Not more than 15 words that reasonably identifies the subject matter of the agency’s intended action.)

Establish a gear limitation program for the commercial ocean Dungeness crab fishery.

Statutory Authority: ORS 496.146, 506.109, 506.119, 506.129, 506.755, and 508.921

Other Authority:

Stats. Implemented: ORS 496.146, 506.109, 506.119, 506.129, 506.755, and 508.921

Need for the Rule(s): The rules are needed to establish enforceable commercial Dungeness crab pot limits to ensure the orderly conduct of this fishery; reduce the excess use of gear by the fleet; to minimize gear conflict with other fisheries; minimize crab wastage and reduce pot loss in the ocean; delegate authority for pot limit appeals to the Dungeness crab permit review board; and to maximize the value of the Dungeness crab resource.

Documents Relied Upon, and where they are available:

1. Not applicable.

The above documents are available for public inspection in the Department of Fish and Wildlife, Fish Division, Third Floor, 3406 Cherry Avenue NE, Salem, Oregon, between 8:00 a.m. and 4:00 p.m., on normal working days, Monday through Friday.

Fiscal and Economic Impact, including Statement of Cost of Compliance:

See attached.

How were small businesses involved in the development of this rule?

Department staff convened the Oregon Dungeness Crab Summit in July, 2005. All permit holders, processors, and interested persons were invited to participate and discuss gear limit needs and options with ODFW staff. ODFW presented an informational exhibit to the public at the October 2005 and March 2006 OFWC meetings at which industry members testified; distributed pertinent information in several mailings to the entire fleet and processors; established a written comment period, accepted and documented all phone calls and e-mails; and conducted three open conference calls with industry members during which potential pot limit plans and proposed rule changes were discussed.

Administrative Rule Advisory Committee consulted?:

If not, why?:

These proposed rule changes were developed through significant consultation with members of the ocean commercial Dungeness crab fleet.

Lance Thomson December 15, 2006
Signature Printed name Date

Administrative Rules Unit, Archives Division, Secretary of State, 800 Summer Street NE, Salem, Oregon 97310. ARC 925-2005
Fiscal and Economic Impact Statement for the February 9, 2007 Hearing
In the Matter of Rules Relating to Establishment of a
Gear Limitation Program for the Commercial Dungeness Crab Fishery

Fiscal and economic impact: The proposed rules will affect state agencies, units of local government and the public, respectively, as discussed below: Several pot limit options have been proposed for the Oregon Dungeness crab fishery. Three of the options involve a multi-tiered approach that would limit the number of pots that can be used by a specific permit holder. Vessels would qualify for a specific tier based on landings under that permit in the six seasons prior to the control date. Proposals include three or four tiers that range from 100 to 600 pots per vessel. An additional option would impose a fleet wide limit of 350 pots per vessel with removal of the limit 60 days after the start of the crab season.

Pot limitation proposals involve the general goal of improving fleet performance with objectives such as:

- reduction of waste;
- limitation of lost gear;
- minimization of gear conflicts; and
- generally allow for more orderly and efficient development of the fishery.

A. The state agencies, which could be affected by adoption of these rules, are the Oregon Department of Fish and Wildlife and the Oregon State Police. The Oregon Department of Fish and Wildlife would require additional staff and resources to administer the pot program. Personal services needs would include: buoy tag distribution, tracking and replacement; and communications with the Oregon fishing industry, California fishers and the appeals board. These tasks would require 0.5 full time employee (Public Services Representative) at a cost of $13,500 for the first eight months of the program in the first biennium and $40,348 for the following full biennium. Services and supplies costs in the first biennium would include: publicity and publications, postage, communication costs, other services and supplies, and Information Technology Services for database development. Supplies and services would total $34,825 for the first eight months and $20,000 for the following full biennium.

The Oregon State Police would expect to add patrols to provide enforcement on the fishing grounds. The main additional costs would involve the leasing of a vessel(s) for at sea enforcement and personal services costs of a state trooper. Preliminary annual cost estimates include 30 boat days for both leased and existing vessels at $34,000 and state trooper personal services of 1,000 hours at $44,410.

B. Units of local government may be affected by these rules. Fishing ports provide storage space and services for moving and loading crab pots. For example, the port of Newport may accommodate 15,000 to 20,000 pots in storage areas. Newport port storage fees are approximately $100,000 per year. The port of Coos Bay and other ports also provide services to crab fishing operations. A decrease in the number of pots utilized by the crab fleet could affect the level of services demanded by the fleet and associated fees. It is not possible to determine revenue impacts because of uncertainties related to the actual level of crab pot reductions. Pot declarations were 200,000 pots at the beginning of the 2005-06 season and all options would limit the total number of pots to approximately 150,000 pots. This reduction suggests that revenue related to pot storage could decrease by a similar proportion.
C. The public could be affected by the adoption of these rules as explained with the following background and pot limit discussion:

**Background**

The Dungeness crab fishery is among the most valuable and variable commercial fisheries in the state of Oregon. Annual revenue in 2005 dollars has ranged from $12.3 million in the 1991-92 season to $49.3 million in the 2004-05 season. The annual economic contribution expressed as personal income was nearly $80 million in 2004 although the general range has been between $20 million and $50 million during the last decade. The fishery has grown during the last five decades with a steady increase in effective fishing effort over the time period (Figure 1). The number of active vessels reached current levels during the 1976-77 season, and fluctuated between 314 and 465 vessels until the mid-1990s. Limited entry was enacted in the 1995-96 season with a total of approximately 440 permits. Since limited entry was initiated, the number of active vessels has ranged between 300 and 350 vessels. Each year approximately 100 vessels that have permits for the Oregon Dungeness crab fishery choose not to land crab in Oregon although some land crab in other states. Although limited entry has stopped new entrants, effective fishing effort has increased with vessel upgrades in both size and capacity and increasing numbers of pots per vessel. Until the last two record years, the average annual landings per active vessel have ranged between 10 and 55 thousand pounds.

![Figure 1. Average Annual Pots per Vessel and Catch per Pot 1970 to 2005](image1)

It is likely that pot numbers have increased because participants are attempting to maintain or increase their share of total catch. Declared total pot numbers and the average number of pots per vessel across all vessel lengths classes have increased over time. Annual revenue per pot and revenue per vessel have varied significantly over the last two decades, largely due to large annual variations in crab abundance. Annual active vessel real revenue has averaged $107 thousand per year and average annual real revenue per pot has averaged $270 (Figure 2). Revenue values on the individual level are highly variable depending on the level of vessel activity and associated investments for vessel upgrades and crab pots. Over the last decade the average revenue per active vessel ranged from several thousand dollars to approximately $400,000 per year while the average revenue per declared pot ranged from approximately $50 to nearly $440.

![Figure 2. Average Annual Revenue per Pot (2005$)](image2)

The bulk of seasonal landings, approximately 70 to 80 percent, are taken within the first two months of the fishery (Figure 3). The fishery is considered to be fully exploited with approximately 80 to 90 percent of legal sized male crabs harvested each year.
Recent Dungeness crab prices have been decreasing. The recent nominal average annual price peaked in the 2000-01 season at $2.12 per pound. The price declined to an average of $1.47 by the 2004-05 season. Record landings in the previous two seasons and associated inventories are likely to be the main cause. Other factors may have also contributed to the decline such as the availability of substitute products and shifts in marketed product form. During the 2004-05 season 66 wholesale fish dealers and 8 limited fish sellers handled crab product.

Tables one and two provide fleet characteristics categorized by level of vessel landings. The tables show that on average larger vessels that fish higher numbers of pots take a disproportionately high proportion of total catch. Vessels with the highest annual catch levels and catch per unit effort take a large proportion of catch in the early season. This suggests that larger vessels fishing larger numbers of pots work more intensively early in the season when catch rates are highest. Benefits to increasing the scale of fishing operations include: ability to fish in more hazardous weather conditions; greater capacity allowing for longer trips with greater trip landings; and use of high effort levels when catch rates are highest.

Although the following tables do not fully characterize fishery elements related to production, they provide evidence of the incentives that fishermen face. Individuals seeking to grow their business will invest in inputs. Since the crab resource is limited, competition to maintain catch levels may also provide an incentive to increase fishery investments. Since vessel upgrades are limited by recent state legislation, barring purchase of a larger vessel, increasing the number of pots is one of few alternatives for those seeking growth of their business.

Table 1. Crab fleet characteristics of vessels with 04-05 landings categorized by vessel landing levels. Average landings of the last ten years are approximately 45% of the 04-05 record season shown below. Percentage does not add to 100 because approximately .3% of landings were not possible to attribute to a specific vessel.

<table>
<thead>
<tr>
<th>Catch Lbs. (x 1,000)</th>
<th>Number of Vessels</th>
<th>Length Avg Ft</th>
<th>Total Catch of Category</th>
<th>Avg catch per vessel</th>
<th>Percent Total Catch</th>
<th>Revenue per Vessel</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50</td>
<td>113</td>
<td>38.5</td>
<td>2,069,482</td>
<td>18,314</td>
<td>6.2%</td>
<td>$ 26,922</td>
</tr>
<tr>
<td>50-100</td>
<td>88</td>
<td>46.5</td>
<td>6,593,928</td>
<td>74,931</td>
<td>19.6%</td>
<td>$110,149</td>
</tr>
<tr>
<td>100-150</td>
<td>53</td>
<td>46</td>
<td>6,516,244</td>
<td>122,948</td>
<td>19.4%</td>
<td>$180,734</td>
</tr>
<tr>
<td>150-200</td>
<td>23</td>
<td>57.1</td>
<td>3,834,882</td>
<td>166,734</td>
<td>11.4%</td>
<td>$245,099</td>
</tr>
<tr>
<td>200-250</td>
<td>12</td>
<td>65.7</td>
<td>2,640,996</td>
<td>220,083</td>
<td>7.9%</td>
<td>$323,522</td>
</tr>
<tr>
<td>250-300</td>
<td>15</td>
<td>65.5</td>
<td>4,039,275</td>
<td>269,285</td>
<td>12.0%</td>
<td>$395,849</td>
</tr>
<tr>
<td>300-350</td>
<td>8</td>
<td>64.8</td>
<td>2,582,536</td>
<td>322,817</td>
<td>7.7%</td>
<td>$474,541</td>
</tr>
<tr>
<td>350-400</td>
<td>3</td>
<td>70.7</td>
<td>1,136,790</td>
<td>378,930</td>
<td>3.4%</td>
<td>$557,027</td>
</tr>
<tr>
<td>400-450</td>
<td>4</td>
<td>74.3</td>
<td>1,743,066</td>
<td>435,767</td>
<td>5.2%</td>
<td>$640,577</td>
</tr>
<tr>
<td>&gt;450</td>
<td>4</td>
<td>65.3</td>
<td>2,314,456</td>
<td>578,614</td>
<td>6.9%</td>
<td>$850,563</td>
</tr>
</tbody>
</table>
### Table 2. Crab fleet characteristics categorized by vessel landing levels.

<table>
<thead>
<tr>
<th>Catch Lbs. (x 1,000)</th>
<th>Total Pots</th>
<th>Percent of total pots</th>
<th>Percent of total catch</th>
<th>Avg. pots/ per vessel</th>
<th>Avg. Catch/ per Pot</th>
<th>Avg. rev/ per pot</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50</td>
<td>37,674</td>
<td>21.9%</td>
<td>6.2%</td>
<td>333.4</td>
<td>54.9</td>
<td>$ 81</td>
</tr>
<tr>
<td>50-100</td>
<td>42,346</td>
<td>24.6%</td>
<td>19.6%</td>
<td>481.2</td>
<td>136.2</td>
<td>$ 200</td>
</tr>
<tr>
<td>100-150</td>
<td>36,824</td>
<td>21.4%</td>
<td>19.4%</td>
<td>694.8</td>
<td>176.9</td>
<td>$ 260</td>
</tr>
<tr>
<td>150-200</td>
<td>15,484</td>
<td>9.0%</td>
<td>11.4%</td>
<td>673.2</td>
<td>247.7</td>
<td>$ 364</td>
</tr>
<tr>
<td>200-250</td>
<td>10,088</td>
<td>5.9%</td>
<td>7.9%</td>
<td>840.7</td>
<td>261.8</td>
<td>$ 385</td>
</tr>
<tr>
<td>250-300</td>
<td>12,827</td>
<td>7.5%</td>
<td>12.0%</td>
<td>855.1</td>
<td>336.6</td>
<td>$ 495</td>
</tr>
<tr>
<td>300-350</td>
<td>6,771</td>
<td>3.9%</td>
<td>7.7%</td>
<td>846.4</td>
<td>485.4</td>
<td>$ 714</td>
</tr>
<tr>
<td>350-400</td>
<td>2,620</td>
<td>1.5%</td>
<td>3.4%</td>
<td>873.3</td>
<td>433.9</td>
<td>$ 638</td>
</tr>
<tr>
<td>400-450</td>
<td>3,850</td>
<td>2.2%</td>
<td>5.2%</td>
<td>962.5</td>
<td>452.5</td>
<td>$ 665</td>
</tr>
<tr>
<td>&gt;450</td>
<td>3,500</td>
<td>2.0%</td>
<td>6.9%</td>
<td>875</td>
<td>661.3</td>
<td>$ 972</td>
</tr>
</tbody>
</table>

There is a divergence in incentives between the individual and the crab fleet as a whole. From a fleet-wide perspective production is limited by the resource constraint. Since the current number of permits and associated investment are generally agreed to be more than sufficient to harvest the crab resource, it is clear that overcapitalization has already occurred. Yet, individuals would still continue to increase investment while a fleet-wide manager, or sole owner of the resource, would decrease investment.

Fleet performance should be assessed by net benefits after economic costs are considered. With continued increases in the use of gear and recent vessel upgrades it is likely that when costs are considered, average vessel earnings are decreasing over time. Vessel revenue is likely to increase with greater capital inputs. However, since the resource base is limited and fully exploited, increases in capital inputs will increase crab fleet costs without proportional increases in revenue. The recent record seasons and high crab abundance may have masked this trend. Economic cost data that are suitable for this purpose are not currently available to the Oregon Department of Fish and Wildlife.

Dungeness crab resource abundance is extremely variable and the fishery includes areas beyond Oregon waters. Owners and operators will base their decision of whether to fish on factors related to Dungeness resource abundance in Oregon waters and alternatives in other areas and fisheries. First they would question whether targeting Dungeness crab in Oregon would result in sufficient returns to cover costs. Secondly, even if profitable, they would question whether their next best alternative would be more profitable. Decisions to fish the entire season, a portion of the season or to not participate in the fishery are driven by a complex mix of factors related to fishing costs, fishing strategies, resource abundance and product prices in the Dungeness crab fishery and alternative fisheries. Therefore, the Dungeness crab fishery is diverse with respect to composition of the fishing fleet and fishing practices.

**Pot Limits**

The fleet-wide total number of pots would be limited to approximately 150,000 under all four options. The 04-05 declared pot number was approximately 185,000 pots and the most recent declaration estimate is approximately 200,000 pots. Fleet capitalization decreases could result in economic benefits associated with a more even flow of product over time. Specific economic benefits may include: improved efficiency related to increases in catch per unit effort and lower vessel costs, higher average product prices from a more even flow of product and production of higher valued products, and consumer benefits related to the availability of preferred products. However, current proposals are not likely to be sufficient for significant changes in seasonal landing patterns.
Enforcement will require the annual purchase of buoy tags for each crab pot. Buoy tag cost would be approximately $.80 per tag. Likely vessel costs would be $400 per year for the 500 pot tier, $240 per year for the 300 pot tier and $160 for the 100 pot tier assuming operators utilize their full pot tier limits. Including replacement tags, total costs would be approximately $160,000 per year for the entire crab fleet or $131,250 in the first biennium and $320,160 for the following full biennium.

Prediction of pot limit economic impacts on the Oregon Dungeness crab fishery are complicated by wide annual variations in resource abundance, inadequate effort data and the complexity of fishing decisions related to crab and other fisheries. The fishing fleet is mobile and diverse both with respect to scale and in alternative opportunities for crab and other species both within and outside Oregon. Pot limit outcomes will potentially occur in both the short and long-term at levels that include the fleet and individual vessel.

Many pot declarations are potentially biased because fishing participants may have behaved strategically due to concerns with future pot allocation. In other cases the actual number of pots fished as the season progresses may not match the number declared for a number of operational reasons related to weather, vessel condition and resource abundance. Evaluation of pot limits requires measurement of effective effort as opposed to nominal fishing effort. Effective effort depends on the number of pots actually fished, soak times and other factors related to their use. Since these data are unavailable, it is uncertain whether the actual fleet-wide number of pots fished or effective fishing effort would decrease from the status quo.

Proposed options would limit total pot numbers for the entire fleet at 150,100 pots. The number of pots declared for the fishery has averaged approximately 153,600 since limited entry was initiated in 1995 with the 2004-05 season declared number at approximately 185,000 pots. Proposed options would require a reduction of approximately 35,000 pots from the 2004-2005 declared estimate. Option A1 would constrain pot numbers of 231 vessels relative to declarations made at the beginning of the 2004-2005 season. For vessels making landings during the 2004-05 season, total pots would be reduced by approximately 54,000 from their declared estimate to 116,000. Vessels that did not fish in Oregon waters during the 2004-05 season account for the remaining 34,000 of the total 150,000 pots. However, effective effort and the number of pots actually fished may vary considerably from these numbers. The following assumes that the pot declarations are approximations of pots actually fished.

If effort is considered only on the basis of declared and estimated pot numbers for vessels that fished and pots are fully utilized in the fishery throughout the season, a proportional decrease in catch might be anticipated. However, several factors would compensate for potential decreases in total catch. First, it is unlikely that all pots declared at the beginning of the season are actually fished, and in most cases declared pots are not fished for the entire season (Figure 4). Fishing effort decreases as the season progresses with most fishing effort deployed in the first two to three months of the season. To provide an indication of pot utilization, the number of pots declared or estimated for the vessel multiplied the number of landings per vessel during the month was used. This illustrates that the fleet could compensate for the decrease in pot numbers.
under Option A by increasing effort in later months of the season. However, data required to determine the actual number of pots fished as the season progresses are unavailable.

Secondly, as the number of pots is constrained, there is an incentive for fishers to change operations to mitigate for the constraint. It is likely that soak times, location choice, searching strategies and general use of pots will be modified to improve catch per unit effort. Finally, catch per unit effort also drops off quickly as the season progresses because of resource abundance declines (Figure 5). A decrease in pots actually fished is likely to increase the catch per pot. If total catch were to decrease during this initial period, higher catch per pot in early and subsequent months would be likely to compensate for initial declines in landings. A more even flow of product over time could provide positive price effects. In the short run, a decrease in early season landings is possible because of pot reductions and pot reallocation. However, it is unknown whether a greater proportion of vessels with permits will participate in the fishery and the degree to which existing vessels that currently fish less than their pot limit will increase fishing effort. In the long run, it is likely that the fleet will compensate for pot limits and return to historical landing patterns. Since significant changes at the fleet level are not anticipated, processor or community impacts are also not likely to be significant. For example, Washington pot limits have not resulted in significant changes in the timing of landings.

Table 4. Average change in pot numbers and revenue per active vessel assuming current catch per pot. Revenue is based on the average price of $1.47 per pound and the average catch per pot scaled to average landings of the last ten years.

<table>
<thead>
<tr>
<th>Tier</th>
<th>Vessels</th>
<th>Avg. Potent. change in Pots per Vessel</th>
<th>Avg. Revenue per Pot</th>
<th>Avg. Change Revenue per Vessel</th>
<th>Avg. Vessel Change with Redistribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 (increase)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>100 (decrease)</td>
<td>14</td>
<td>(133)</td>
<td>$63</td>
<td>$(8,379)</td>
<td>$(3,579)</td>
</tr>
<tr>
<td>100 (no change)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>300 (increase)</td>
<td>48</td>
<td>97</td>
<td>$79</td>
<td>$7,663</td>
<td>$22,063</td>
</tr>
<tr>
<td>300 (decrease)</td>
<td>126</td>
<td>(231)</td>
<td>$106</td>
<td>$(24,486)</td>
<td>$(10,086)</td>
</tr>
<tr>
<td>300 (no change)</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>500 (increase)</td>
<td>11</td>
<td>92</td>
<td>$135</td>
<td>$12,420</td>
<td>$36,420</td>
</tr>
<tr>
<td>500 (decrease)</td>
<td>91</td>
<td>(305)</td>
<td>$164</td>
<td>$(50,020)</td>
<td>$(26,020)</td>
</tr>
<tr>
<td>500 (no change)</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

On the individual vessel level outcomes will depend on the scale of the vessel and the degree to which pot limits constrain its operation. Table 4 identifies changes in average pot numbers per vessel in each pot limit tier. The average revenue per pot is based on 04-05 landings of active vessels in each tier and scaled to the average of the last ten years. The average change in revenue per active vessel is the product of the average change in the number of pots and the average revenue per pot. The average revenue change/vessel in column five of Table 4 does not consider the redistribution of catch from potential revenue lost to vessels currently fishing more
pots than their tier will allow. The reduction in pot numbers is likely to result in the redistribution of catch across the fleet resulting in higher average catch and associated revenue per pot. If redistributed evenly across the total 150,100 pots allowed under proposed options, the average revenue per pot would increase by approximately $48 per pot/year. The last column includes this increase in proportion to the number of pots allowed per vessel in each tier.

The estimates provided in Table 4 are highly uncertain for a variety of factors related to possible reactions to pots limits. Vessels currently fishing more pots than their pot limit will compensate by changing fishing strategies and substitution, but those fishing significantly higher numbers than their tier limit would be likely to incur negative impacts. In these cases the average impacts provided above may underestimate revenue losses. Relatively few vessels take a disproportionately large portion of total landings. For example, 34 of 323 vessels landed over 33% of total landings during the 04-05 season. Many of these vessels rely on intensive fishing early in the season when catch rates are high. Conversely, vessels with a good catch history, but fishing fewer pots that are not constrained by pot limits would be likely to increase revenue from higher catch per pot. Table 4 assumes vessels currently fishing fewer pots than their proposed limit will increase up to their pot limit as shown in columns five and six of Table 4. The proportion of fishers who will decide increase pots up to their tier limit is unknown. Higher catch rates per pot may also attract a greater number of permitted vessels that do not participate in the Oregon fishery in a given year.

Generally, Washington pot limits do not appear to have had a significant impact on vessel ranking in the Washington fleet between 1998 and 2005. Of the 35 vessels constrained by pot limits relative to 1998, the last season of unconstrained fishing, 22 improved their fleet ranking while 13 vessels decreased in fleet ranking in 2005. These data are preliminary and buoy tag requirements were only included in the most recent year. Yet these data indicate that vessels have been able to maintain and enhance their position relative to the rest of the fleet. It is likely that individual skill and operation modifications have enabled fishers to mitigate for pot limits. However, further examination of this information and consideration of changes in vessel net earnings should also be considered.

Fishing vessels or firms produce fishing effort and the average and marginal cost of effort are in part dependent on the level of effort that the firm produces. Operators decide on a mix of inputs including vessel capacity, labor, pot number and other factors to maximize returns to their investment. Assuming a U-shaped average cost curve, average costs will decrease with increasing returns to scale, but increase after reaching a minimum because of decreasing returns related to fixed inputs such as the size of the fishing vessel. In the long run all inputs are somewhat variable, but Oregon statutes currently limit crab vessel upgrades. At some point adding more pots will increase costs because the operator will no longer be able to utilize them efficiently. Some segments of the fleet currently operate at scales suited to proposed pot limits. These vessels should benefit from potentially higher catch rates while vessels currently using greater numbers of pots will be at a disadvantage. In the long run vessels will adjust by adopting strategies and substituting inputs to compensate for the pot limit constraint. The level of substitution that is feasible and the net impact on individual vessels are not possible to predict due to data constraints. In some cases vessels may be able to maintain total revenue by changing operations, but vessel costs could increase because of these changes.

Permit values in general and for specific segments of the fleet many also be affected depending on the relative efficiency of proposal outcomes. Pot limits are likely to result in permit values that more closely follow allowed pot numbers instead of fishery conditions or vessel capacity. For example, Alaska Dungeness crab permit prices are nearly in direct proportion to the number of pots allowed under the permit at approximately $15,000 per 75 pots. Currently, the cost of Oregon Dungeness crab permits vary according to vessel size with a cost of $800 per foot for
vessels 26 feet or smaller, $1,100 per foot for a 38 foot vessel and $1,500 to $2,000 per foot for a 58 foot vessel. It is likely that potential pot management has been factored into these prices. According broker web page postings, Oregon and Washington crab permit asking prices appear comparable with a price of $60,000 for a 50 foot Oregon vessel permit and $65,000 price for a 50 foot Washington permit with 300 pots. Although direct comparisons are difficult to make without more detailed information, the pot limit permits have retained significant value in both Washington and Alaska and appear similar to current permit values in Oregon.

Pot limits may also affect employment, especially if crew size were reduced for vessels with the greatest reductions in pots. Lower demand for crab pots may also reduce employment in businesses that produce crab pots. Employment data and potential changes in vessel inputs are not sufficient to estimate likely impacts for these potential concerns.

Additional factors involve congestion on the fishing grounds, navigation concerns, lost gear, crab handling and related mortality, safety at sea and post harvest losses. In general, a more orderly fishery should improve efficiency in most of these categories. However, these benefits are dependent on the actual reduction of pots utilized on the fishing grounds. The early season rush to take advantage of high catch rates would still take place with associated safety concerns related to fishing in severe weather. Potential improvements in handling mortality are difficult to predict and would depend on the relationship between fewer pots and soak times. If handling of female and undersized crab were to decrease with pot limits, benefits would accrue from reduced mortality. The actual changes in the number of pots fished will also determine the benefits related to congestion, interactions with other fisheries, navigation and lost gear. If the declared number of pots is reduced by approximately 25% from 200,000 (the most recent estimate made at the beginning of the 2005-2006 season) to 150,000, it is likely that lost gear will decrease in direct proportion. For example, if 10% of gear is lost annually then the number of pots lost will decrease in direct proportion from 20,000 to 15,000. Interactions with other fisheries such as salmon trolling may cause negative impacts related the ability to fish grounds and gear interactions. A decrease in the number of pots fished would be likely to result in a decrease in these interactions. It has also been reported that pots are sometimes set to reserve real estate or to scout areas for more intensive fishing. Pot limits should make this practice less likely and allow access to preferred grounds for vessels fishing fewer pots. Although difficult to quantify pot limits should generally benefit the fishery in the areas cited above. Benefits are also likely to accrue from development a foundation from which further fishery improvements can be implemented.

Option A summary:

- Not likely to affect total fleet annual landings or revenue;
- Not likely to have a significant impact on local communities;
- Not likely to impact processors due to significant changes in timing or volume of landings;
- May result in marginal decreases in early season landings that would be taken later in the season (likely to occur in the short-term but not the long-term as fishers adjust to the new rules);
- Indeterminate effect on economic efficiency when all program costs and impacts are considered;
- Likely to improve efficiency related to navigation concerns, handling, fishing grounds congestion, gear loss and general waste;
- Have different impacts at the vessel level depending on the scale of vessel operation;
- May increase the number of active vessels in the fishery;
- Would redistribute declared pots from vessels with declarations higher than their tier to reductions of approximately 50,000 pots and to vessels currently fishing less than their tier; and
- Provide a foundation from which fishery management may be improved.
Option B would decrease the number of pots for all vessels to 350 with a fleet wide total of 151,550 pots for the first two months of the season. For the rest of the season pots would not be limited. Many of the potential impacts cited for the earlier options occur for similar reasons under Option B, but impacts would be likely to increase in proportion to the greater pot reductions for vessels fishing greater numbers of pots. An earlier version of Option B would have reduced pots to 200 per vessel. For the modified proposal, of the 317 declarations made for the 2004-2005 season, 234 were greater, 4 were equal and 79 were less than 350 pots. The average decrease in pot number would be 298 pots for those vessels currently declaring more than 350 pots. There were 79 vessels declaring an average of 131 less than the 350 pot limit. In the short-run early season landings may be impacted.

For the reasons stated earlier, incentives will be strong for fishers to attempt to compensate by modifying pot use. The potential decrease in catch resulting from the pot limit constraint during the first two months would be made up during the next several months as the season is opened up to unconstrained fishing effort. Effort would still be likely to take all of the available resource over the entire season, but the timing of landings could be shifted to later periods. If this shift were significant, the resulting average price per pound over the entire season could increase with higher associated revenues. These benefits are likely to decrease over time as fishers adjust their fishing operations in the long-run.

Figure 6 illustrates the typical timing of landings and Figure 7 shows the resulting prices. In addition to quantity landed, prices are influenced by other factors such as substitute products, seasonal markets, product quality and product form. Generally as the season progresses landings decrease and prices increase. Summer landings are relatively low because prices generally decrease due to lower product quality. In 2005, the price per pound increase was not as pronounced, likely due to the record landings of the 2004-2005 season and inventories of frozen crab held by processors and wholesalers. The economic outcome of a more even flow of product over the crab season will depend on whether there are changes in crab products, their relative value and external factors related to markets. One concern is adequate supply for the early season holiday market, but data concerning its volume and prices specific to that time period and use are unavailable.

On the individual vessel level Option B impacts could be more extreme. For those vessels operating at the appropriate scale, net benefits would be likely to increase with greater catch per pot and associated revenue. Vessels fishing larger numbers of pots that are least suited to this constraint would be likely to face reductions in total revenue and an increase in cost per unit effort.
In summary Option B would:

- Potentially decrease early season landings;
- Potentially increase total fleet revenue due to a shift in landings and potentially higher prices in later months;
- Have a greater potential impact on larger vessels fishing greater numbers of pots; and
- Improve the economic performance of vessels operating at the appropriate scale.

In summary, the forecasting of potential impacts associated with crab pot limits are hampered by data constraints. The greatest potential for negative economic impacts involves those vessels fishing the greatest number of pots, with the highest landings and highest revenue per vessel. Those vessels fishing approximately the same number of pots as their tier level will be most likely to incur positive impacts related to improved catch per pot. On a fleet wide basis total revenue and the timing of landings are not expected to change significantly. Benefits from a more even flow of landings are possible, but changes are likely to diminish as fishers adjust their fishing operations in the long-run. In Washington it appears that pot limits have not slowed landings during the early periods of the fishery. Economic impacts on processors and local communities are not anticipated.

Benefits from controlling congestion and conflicts on the fishing grounds are likely, but not possible to quantify. Additional benefits related to decreasing release mortality and other practices that result in waste will depend on how pot limits affect vessel operations and fishing strategies.

The rules are believed to be fully compatible with legislative direction on the goals of wildlife management in Oregon.

Virtually all businesses affected by these rules are believed to be "small businesses." The number of small businesses affected by this rule and the types of those businesses are as described in this fiscal impact statement.

We do not believe that a less intrusive or less costly alternative adaptation to only small business is consistent with the purpose of the rule.