**To: Dungeness Crab Task Force Members and Alternates, and other interested parties**
**From: Johanna Thomas and Maggie Ostdahl, EDF**
**Date: February 12, 2010**
**RE: Matching Dungeness crab management goals with appropriate tools**

**Introduction**

The Dungeness Crab Task Force has the opportunity to advance management of this important and valuable fishery. The DCTF benefits from the involvement and expertise of its stakeholders, and has made significant progress in discussions. However, due to resource and time restrictions, and as mentioned in the recent report to the Legislature, a number of issues as specified in SB1690 still await discussion and recommendation by the group. This next meeting of the DCTF is the time to make recommendations on the following broad concepts:

- short- and long-term objectives for improved management;
- the collection of information and data to inform management; and
- continuation of the DCTF into the future in some capacity.

We see the next meeting of the DCTF as a critical opportunity. We look forward to working with the other members of the DCTF towards achieving outcomes on the above priorities, but also believe that further work will be required.

The purpose of this memo is to outline how various proposed management tools can meet the goals and objectives discussed to date by the DCTF; and to give some examples of how these tools[1] have been applied elsewhere. This memo highlights how fishery information and data are used to monitor and adaptively manage a given fishery. We also highlight the increased potential of meeting many management objectives when some form of effective co-management is present.

## Management and Monitoring Goals and Objectives

Before designing and implementing specific management and monitoring tools, fishery managers need to identify and state the goals and objectives for management – so managers and fishery participants can design both the best management approaches, and the appropriate monitoring programs to know how management is meeting those goals. This is particularly critical if adaptive management is an approach that is being seriously contemplated. **Without stated goals or objectives, fishery managers have nothing to measure against in order to know whether the management tools need to be adapted.**

[1] Our remarks are generally focused on management tools that could be further evaluated for use in the commercial crab fishery, as that has been the main focus of DCTF discussions to date. However, assuming management goals and objectives for the fishery include both commercial and sport catch, effective and sustainable fishery management will need to include both sectors.

While the DCTF has not yet adopted a final set of recommended fishery management objectives, it has the opportunity to voice its opinion on the broad objectives Dungeness crab fishery management should be designed to meet. The following objectives were articulated during the October DCTF meeting.[2] We will use these as the basis for our discussion of management approaches:

- Cap or Reduce Fishing Capacity
- Slow or End Derby
- Increase Profitability
- Stabilize Product Flow
- Improve Safety
- Improve Enforceability
- Minimize Effort Shift
- Shared, Data-Based Management

## Management Tools

In the management of commercial invertebrate fisheries around the globe, the primary tools that have been used to achieve many of the objectives listed above fall into the following three general categories.

- Transferable effort programs (trap certificates, pot limits)
- Secure harvest privileges, such as TURFs (Territorial Use Rights for Fishing) or Transferable Quota
- Cooperatives with or without effort or quota allocations

## Meeting Objectives with Management Tools

### Objective: Reduce Fishing Capacity and Increase Profitability

The most effective ways to reduce fishing capacity, match it to the productivity of a stock, and allow capacity to adjust to changes in productivity are through secure harvest privileges and transferable effort programs. Limited entry alone is usually insufficient or slow – witness the failure to achieve capacity goals in the urchin and nearshore fisheries even after many years of attrition. The nearshore limited entry program has been more effective than most, because it includes a 2-for-1 permit acquisition provision. Buyouts can be effective in reducing capacity if accompanied by stringent controls on latent capacity and re-entry into the fishery. However, buyouts do not provide a flexible mechanism for the fleet to adjust to the inevitable changes in abundance and productivity that characterize most fishable stocks, and invertebrates like crab are especially variable. Non-transferable pot limits can also reduce fishing capacity, but – like

[2] We recognize that not all of these objectives are supported by the DCTF and anticipate that the final list of approved objectives will look different from this list to some degree.

buyouts – they do not provide the flexibility needed by the fleet to adjust to changes in crab abundance, market conditions, or other factors.

A number of invertebrate fisheries around the world are managed with a seasonal Total Allowable Catch (TAC) and harvest privileges. Examples range from the highly capitalized Bering Sea crab fisheries in Alaska to a small Queensland spanner crab fishery in Australia. One of the most robust effects of using secure harvest privileges in fishery management is capacity reduction. Transferable, secure harvest privileges allow the individual business decisions of fishermen to determine allocations and the deployment of capacity, creating incentives to reduce fishing costs (i.e., fishing gear) in order to maximize the value of the allotted catch. Depending on the data available, TAC-setting procedures can range from the very simple (setting a TAC based on average landings) to the very complex (using an age-structured stock assessment) to something in between (projecting next year's abundance level from this year's abundance of young sub-legal crab). The current data limitations in the Dungeness crab fishery present some challenges if considering catch-based management, but TACs could be set either using average landings or sub-legal crab abundance or a combination of the two unless new data are collected.

Alternatively, transferable effort controls can be used. A Total Allowable Effort (TAE) level is set (essentially, a capacity goal) and then transferable trap limits are allocated under that TAE to maintain or reduce fishing capacity. Transferable effort programs are widely used for management throughout the Southern hemisphere (Australia, South Africa, Papua New Guinea), and in the Florida lobster fishery. This management model is effective because it directly addresses the typical invertebrate fishery trajectory (Figure 1). Although population crashes can occur if heavy fishing effort results in recruitment overfishing, a more common situation is excess effort. Crab, shrimp, lobster, and other invertebrates tend to be extremely fecund and highly resilient to fishing pressure, as evidenced by the ability of California lobster and crab populations to withstand very high catch levels over many decades. Most of these fisheries experience increases in effort which results in increased landings at first. At some point, however, each additional unit of effort contributes little to increases in landings. Additional effort is wasted, adding costs, safety issues, and potential ecological impacts without adding revenue.

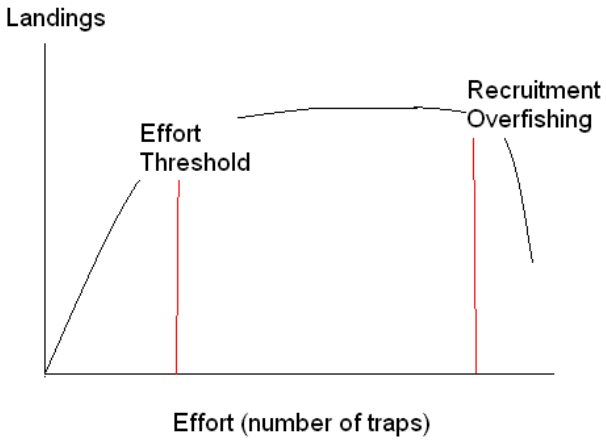


Figure 1. Typical invertebrate fishery trajectory

If industry participants and managers can identify this 'effort threshold' [3] it can serve as a capacity management goal that can be achieved through a transferable pot limit program. This effort target may be expressed in pot-lifts; or the rate of crabs/trap that justifies the cost of a fishing trip; or some other unit of effort. In the West Coast rock lobster fishery in Western Australia, managers with formal industry advice have generally maintained an annual catch rate between 1-1.5 kg/pot lift in the fishery for the past 60 years. In the Florida commercial trap sector of the spiny lobster fishery, a management target of 400,000 traps was set in 2001. Their transferable trap program reduced the total number of traps from well over 825,000 to fewer than 500,000, while maintaining the trap sector's overall catch.

**Objective: End Derby, Stabilize Product Flow, and Improve Safety**

According to Washington and Oregon representatives, pot limits did not end their crab derbies, nor did they stabilize product flow or achieve most other stated fishery management objectives. Therefore, it is unlikely that creating a similar pot limit system in California will accomplish these goals. Secure harvest privileges and transferable effort systems effectively address fishing derbies.

Cooperatives could function within the context of harvest privileges or transferable traps, or even potentially non-transferable pot limits, in order to achieve capacity reduction and other goals. If a system of transferable traps or harvest privileges is instituted, harvest privileges or shares of the total allowable effort could be allocated to cooperatives and managed by them.

If considering cooperatives, effective governance and the attribution of both costs and benefits to a cooperative entity are important for success. Fishing could be coordinated by the leadership of the cooperative to control supply and gain market power, thus ending the derby, stabilizing product flow, and improving prices. Examples around the U.S. include Community Development Quotas in Alaska, the Cape Cod Hook Fisherman's Association, and the Morro Bay community-based fishing association. Cooperatives can be organized regionally; if exclusive access privileges are granted, effort shift problems are solved. This is how the highly successful Mexican lobster fishery off the Pacific coast of Baja California is managed: effort allowances are allocated to each cooperative, which then sub-allocate effort to their members. Nine of the cooperatives coordinate their activities with each other, and their fishery has been certified by the Marine Stewardship Council. In this case, sufficient data were available to conduct a stock assessment which was used to ascertain that the total lobster take was consistent with maximum sustainable yield; however, a TAC is not set.

[3] Cindy Thompson conducted a preliminary analysis, presented to the DCTF in October, in which she identifies this threshold on a vessel basis and concludes that there is significant excess capacity in the crab fleet – on average between 1996 and 2007, about 26% of the existing vessels in the fleet are needed to take the available harvest based on low, medium and high catch years. There is currently no reliable estimate of numbers of crab pots used in California, but survey and anecdotal estimates range from 130,000 to 200,000 pots to harvest the last decade's varied seasonal landings from about 3 million to 24 million pounds. A 2002 report by the Pacific States Marine Fisheries Commission included pot count estimates for California from 1950-1977 – depending on the season about 20,000 to 50,000 pots were used to harvest seasonal landings varying from 1 to 20 million pounds.

**Objective: Minimize Effort Shift and Improve Enforceability**

Staggered start dates for different regions as tools for minimizing effort shift have been discussed by the DCTF. While the so-called "fair start" clauses in Washington may have addressed some localized problems there, they effectively created effort shift problems in California. These are compounded by the fact that the season starts in California earlier than the coastal crab fishery in the neighboring states.

Area or regional management may be a more robust way to minimize effort shift and accomplish other goals, such as encouraging peer-enforcement and stewardship. Area or regional management controls can be used in conjunction with harvest privileges or transferable effort to meet management goals and objectives. For instance, the Western Australia rock lobster fishery is managed under a transferable effort system, but is also divided into three zones, which distributes effort across the fishery and enables managers and fishery representatives to effectively address zone-specific issues.

**Objective: Shared, Data-Based Management**

The farther a management regime moves in the direction of dedicating access or effort privileges in the form of secure harvest privileges, transferable traps, or exclusive access areas, the greater the incentives become for cooperation and science based management. These management tools support increased and improved data collection and science to inform management. And as the capacity for research and science based management increases, the potential for collaborative management increases. The state can articulate performance standards and the co-management entity is accountable for taking measures to achieve the standards.

## Integration of Management Tools and Concluding remarks

Because the Dungeness crab fishery – like all fisheries – will have multiple objectives, several different management tools will likely have to be combined in order to achieve all of them. For example, a Total Allowable Effort cap based on input from the industry on profitability thresholds (e.g., minimum number of crabs per pull) could be put in place to meet the capacity reduction goal. The fishery is large, diverse, and contentious, making static allocations of effort under the TAE difficult or impossible. A market-based approach such as a transferable trap permit program that relies on individual decisions to buy or sell effort units to adjust effort over time may be most appropriate. Initial effort allocations could be based on a formula that accounts for multiple criteria, including years in the fishery and level of investment as well as landings history. Over the longer term, output based measures such as secure harvest privileges to individuals or cooperatives with catch allocations may have significant advantages, as they represent a stronger access privilege and more valuable assets than limited entry licenses or transferable trap certificates, and create stronger incentives to collect data and conserve the stock.

Regardless of whether a TAE or TAC is used as the primary management target, cooperatives can be effective for achieving the goals of stabilizing product flow and maintaining prices. If the cooperatives include technical capacity for data gathering, monitoring, and the development of

management recommendations, they can become co-management entities that can achieve the goals of science-based, shared management.

We suggest that the DCTF should articulate a common vision for governance and science-based management, and then work with fishery managers to design the institutions and arrangements consistent with this vision. For example, a potential vision could be a fishery with a co-management entity made up of industry representatives capable of recommending management goals to the legislature, developing management measures to achieve those goals, and being accountable to the management goals. In that case, a co-management entity with significant technical capacity to gather data, administer contracts, evaluate information, develop recommendations, and resolve disputes would be required.