SPORT COMMERCIAL CONFLICTS IN DEVELOPMENT OF CALIFORNIA WETFISH FISHERY

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The systems approach, according to people who claim to know what it is all about, is a methodology for attaining complex scientific, economic, or social goals by taking into account just about everything that may affect the reaching of such goals. From my distant vantage point, the desired outcome of this symposium—the development of an economically viable wetfish fishery—is strongly dependent on the existing marine sport fishery of California. There seems little question that the sport fishery will have to be taken into account and understood thoroughly—its economics, its biological interaction with commercial species, and perhaps even more important, the enthusiasm and drive of its adherents.

I have been asked to attempt to say something sensible about the economic aspects of the sport fishery, and in particular, indicate how economic analysis might help resolve the competitive interaction of sport and commercial interests which sometimes impedes management policy for obtaining the greatest total use of fishery resources. I don't wish to imply that economics should provide the ultimate answers in such disputes, but I think quite often these considerations are not given proper attention. This is probably due to the fact that it has been very difficult to satisfactorily apply economic evaluation techniques to recreational fishing, which has resulted in considerable confusion.

I am a bit at a loss as to how to approach this topic for the present symposium. The interactive issue surrounding the anchovy harvest is quite a bit more complex than, for example, a single species, such as a salmon run harvested by both sport and commercial fisheries. In this latter situation it is quite clear that the activities of one group will affect the other, and it is relatively easy to estimate changes in such things as catch per effort, value of catch, and amount of effort for both fisheries under various schemes of rationing the biologically allowable catch. In this manner one can get a handle on the kinds of restrictions to place on the two fisheries which will come the closest to maximizing the total net economic yield from the stock; that is, the sum of the net yields to the two.

This simple, single species model would seem to go out the door in the present situation wherein not only does the interaction have to pass through one step of the food chain, but also, there are a great many species involved. Let me try, however, to present a simple model for which I will ask you to stretch your imaginations a bit. That is, I will ask you to put the sport fishery in the abstract, and think of it as taking some single, generalized predator. And, think of the commercial fishery as taking a single generalized prey, and thereby adversely affecting the predator population. I don't pretend that this simple model is at all useful in itself but, hopefully, it will at least provide a conceptual framework for talking about the problem. Actually, I plan on presenting this model rather briefly, for I want to spend some time talking about the fishery itself.

Getting back to the theoretical details, I haven't yet defined the concepts of net economic yield for either sport or commercial fisheries, although I alluded to these already. For a commercial fishery net economic yield is a relatively less abstruse concept than for a sport fishery. It is simply the difference between total gross revenue from the catch and all the vessel operating and other costs of getting it, including wages for fishermen and opportunity costs for invested capital.

For sport fisheries economists are fairly well in agreement that net yield is some measure of the quantity of money which people *would* be willing to pay for their right to fish if charged for this presently free (or nominally licensed) opportunity. Behind this concept is that fact that most fisheries, unlike other useful and valuable goods and services, are unowned. Hence, people have free access to most sport fisheries. However, if someone actually owned them and charged profit maximizing fees for their use, it is plain that people would pay, perhaps not happily, a good deal more than they now pay in terms of their actual fishing costs. To repeat, because this matter is not often understood clearly, it is this extra sum of money that they *would* pay, not the money they currently pay for their fishing costs that measures the net economic yield from the fishery.

The obvious difficulty with this concept is, how do you measure it, short of simply charging people higher and higher fees to see what they would pay. Hypothetical questions have been asked on surveys and other analytical tools have been applied. None of these are totally satisfactory but they are far better than having no answers at all in making resource decisions affecting sport fisheries.

Suffice it to say, people in general would almost certainly be willing to pay more for good quality fishing than poor quality fishing. Thus, for our generalized predator sport fishery one can hypothesize a monotonically increasing function relating net value per trip to average catch per trip.

A recent study we did on sport salmon fishing indicates a relationship such as this, but no one has yet been clever enough to precisely define it. I have postulated that it must reach some upper asymptote. People reach a saturation point—they would receive as much recreational pleasure (and, therefore, value) from catching say 10 fish as 20.

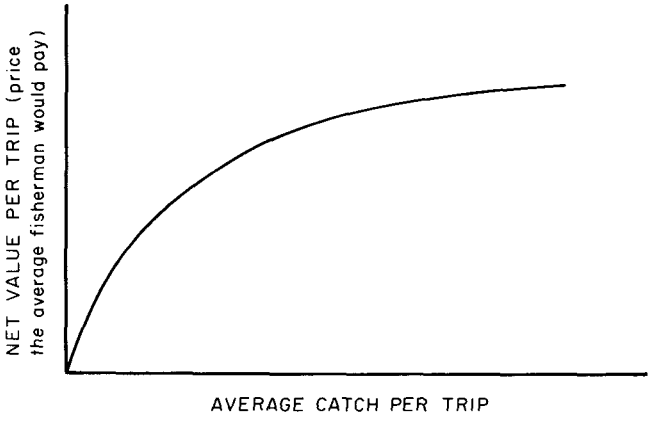

FIGURE 1

Another similarly shaped curve can be postulated relating catch per effort to total effort (Figure 2). Again, this is conjectural. It simply reflects that there is a limit, imposed by population and leisure time constraints, on the amount of sport fishing effort taken.

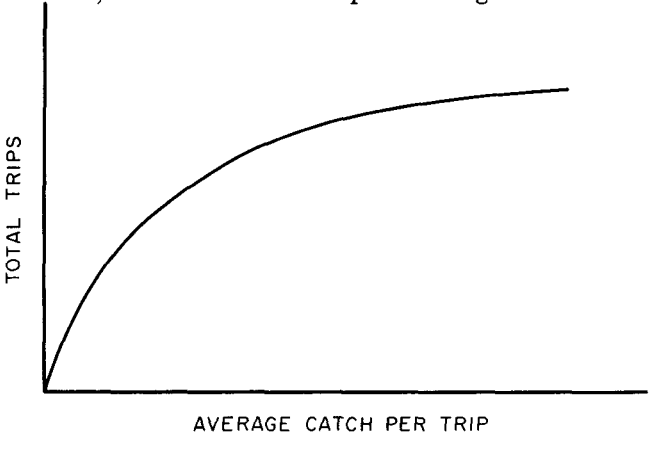

FIGURE 2

Putting these two relationships together we get the obvious one relating total net value (total trips times net value per trip) to total catch, of a similar shape to the preceding ones.

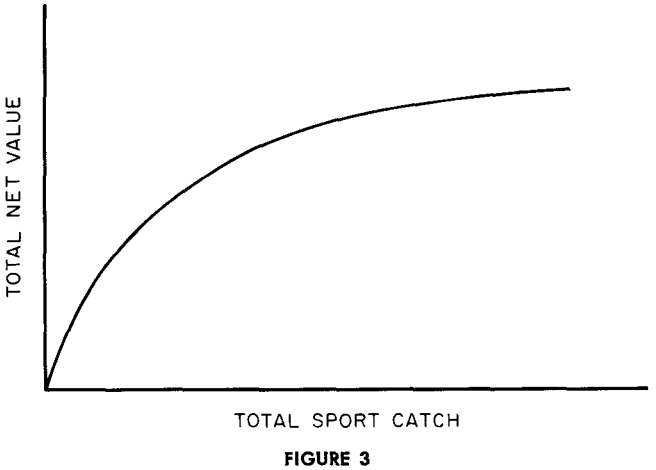

FIGURE 3

Now, a similar curve can be postulated for the commercial fishery relating net value to catch. We will assume that various quotas can be imposed, up to the maximum sustained biological yield. At some level of catch, additional units of gear become competitive with each other and existing ones. Thus, from this level of catch onward, equal increments in catch will require greater and greater increments in gear. If fishing costs are proportional to numbers of units of gear, and revenues are proportional to catch, this implies the following type of curve.

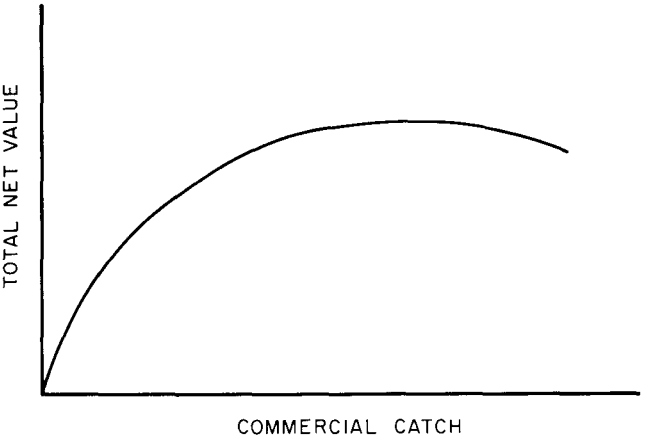

FIGURE 4

Let us now begin by assuming, as in the present case, that the sport catch is unrestricted by the commercial fishery or by anything other than the behavior and natural abundance of the fish. Fishing is good, and we are way out on the right of the curve in Figure 3. Now a commercial fishery begins, which causes the sport catch to decline. The nature of the relationship would be directly inverse in the single species situation, but less obvious, of course, in the prey-predator situation of present concern. However, we assume some cause-effect relationship between the two populations. Initially (referring to the two curves) the incremental losses in sport values will be small compared to the incremental gains in commercial value as the commercial fishery develops. We can assume a point of maximum total value where the incremental losses and gains are equal:

$$\frac{\Delta V_1}{\Delta C_1} = \frac{\Delta V_2}{\Delta C_2}$$

Note, however, that there is nothing herein implying that an optimum point can be reached only with a balance between the two (Figure 5 and Figure 6). Depending on the relationships themselves, there may be situations where total exclusion of one or the other fisheries might maximize total value.

Thus far, I have been pretty theoretical and it is tempting to continue on this line without referring to the specific fishery problem at hand, since I know relatively little about any aspects of it—the sport fishery, the biology of the many species involved, the commercial fleet, or the fish meal industry. However,

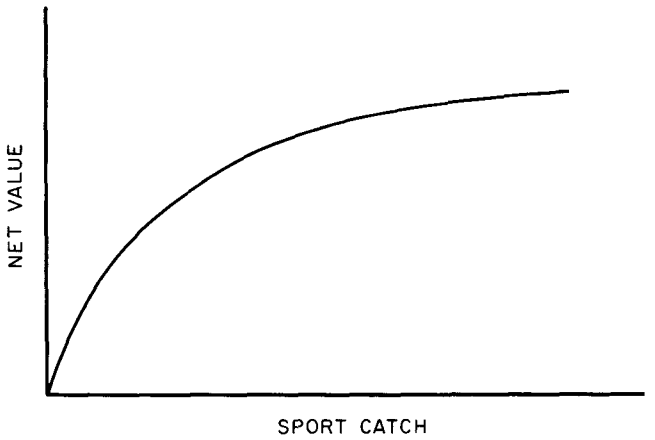

FIGURE 5

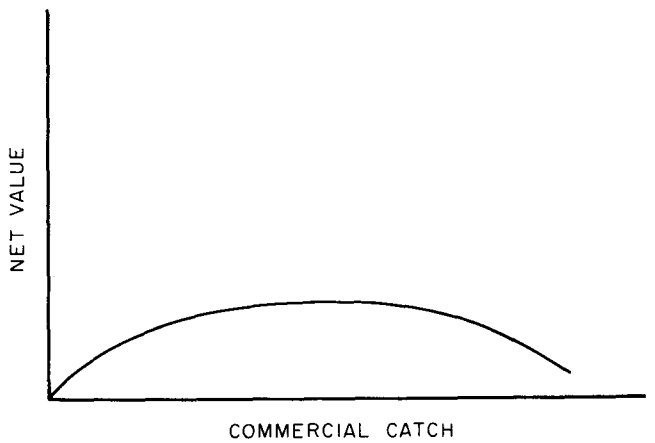

FIGURE 6

at the risk of ending up with footprints on my tongue, let me speculate on the development of the wet fish fishery per se from the economic framework presented so far. If I am wrong in some of my ensuing speculation someone will hopefully tell me, and I will go home having learned something.

First, I should comment on the implied fact that there *would* be some affect on the sport fishery from a commercial anchovy harvest at any level. I am sure that this issue is opened to question. Probably a modest catch of say 100,000 tons would have an imperceptibly small effect from what has been estimated as the standing stock. But, I don't know the level which the harvest is ultimately supposed to reach, and I would have to take the view that a commercial harvest which *did* take a significant portion of the surplus anchovy production would have a really noticeable effect on the sport fishery harvest and consequent value. Therefore, I think the possibility of a deterioration in sport fishing is distinct, and should not be dismissed. If it really can be proved there would be no negative effect on the sport fishery, and—more important—if the sport interests can be convinced of this, everything I have said becomes academic, since the problem disappears.

One of the key issues surrounding the proposed commercial fishery is whether or not a limitation on the amount of new gear to the fishery is being planned. There has been enough talk about the concept of limited entry over the past decade that I am sure most of you are aware that commercial fisheries cannot be expected to achieve high and, therefore, desirable net yields if the amount of gear cannot somehow be held below the level which tends to prevail when there is low cost, unlimited access for all who wish to fish. In the model I presented, I assumed that some positive net yield would accrue to the commercial fishery, which might justify its development even though causing some devaluation of an existing sport fishery. If, however, the expected net yield situation for a fully developed commercial fishery is low —as it seems almost certain to be without some initial planning for a legally limited but hopefully highly efficient fleet—then I see little economic justification for promoting its development beyond a modest level which might perhaps put the few old sardine boats still around back into some useful activity.

This conclusion is based simply on the economic conditions of almost all of the other commercial fisheries around the country, which you know have unlimited entry. As commercial enterprises these usually turn out to be very mediocre performers, in terms of both wages and returns on investment. I see no reason why an anchovy fishery as it developed would not follow the tired, familiar pattern of other commercial fisheries in this country. Profits may be good at first, particularly if the fishery first utilizes the old sardine vessels which have been paid off long ago. However, such profits will attract other boats as the fishery builds, and eventually the investment impetus is likely to carry the amount of gear and manpower to an undesirably high level, where average catches are too low to yield even opportunity wages and investment earnings. These situations tend to persist for a long time since it is much harder to disinvest and get out of the fishery than it was to get in.

Potentially productive men and capital become trapped, so to speak, earning less and, therefore, producing less or adding less to the overall economy, than if they had not entered the fishery in the first place. Thus, in the final analysis a nonlimited entry fishery may negatively affect the gross regional product or whatever measure of economic productivity chosen. This does assume, I should point out, that there exists an abundance of nonfishing employment and investment opportunities in the region, which I think is a reasonable assumption.

To reiterate these points, a modest increase in the quota which would allow existing, presently underutilized vessels an opportunity for a good return, would make sense economically. But without limited entry I see little economic justification for promoting the fishery beyond such a point. It would almost surely end up a loser and run the risk of devaluating the existing sport fishery, which certainly is yielding a very high, though hard to measure, economic return. However, a new fishery such as this would seem to be well suited for applying the limited entry concept, since there is no great vested interest or large fleet to worry about buying out. Extreme efficiency could be

encouraged. In this way the chances for high net yields could justify from an economic standpoint the substantial development of such a commercial fishery even with some risk to the sport fishery.

So far, I have only been talking about the fish catching segment of the potential industry. Might not the potential profits in the meal processing end of the industry justify its development without having to consider the fishing segment at all? Here again, I am speculating, but my general impressions are that at present the profitability of the fish meal industry in this country is not high relative to other investment, and the future is perhaps too uncertain to give this as any economic justification for large scale promotion of the fishery.

I base this conclusion on only a casual knowledge of the current state of the industry. (1) I have seen two admittedly small scale meal operations in Washington run into financial difficulty in recent years; (2) the present industry on the coast seems to have smoldered along for several years unable to offer fishermen enough of a price on hake, for example, to get a serious fishing effort mounted; (3) from what I hear, there is not even a demand for the present low quota—though there are some arguments about economies of scale in the industry; and (4) the upper price of fish meal is limited by prices of competing plant-based meals.

No doubt if something seriously affected the world supply of fish meal such as a crash of the Peruvian anchovy fishery, the profit potential for the industry in California would greatly improve. This may be too speculative to be a reason in itself to run the risk of devaluating the sport fishery. The sport fishery, after all, is probably the most dynamic of its kind in the world, and is *currently*—not merely *potentially*—yielding some very high returns. I urge that a great deal of weight should be given this fishery even though only a gross economic analysis might be made, and that serious thought be given as to how to develop a *long term, economically viable* commercial industry before moving ahead very far on it.