



Why Have Lobster Landings of the 1990's Been So High?

by
Jay S. Krause



MAINE

DMR

DEPARTMENT OF MARINE RESOURCES

MARINE SCIENCES LABORATORY, WEST BROTHERS, MAINE 04092

Lobster and Crab Fisheries Division

Lobster Information Leaflet No. 26
October 1995

WHY HAVE MAINE LOBSTER LANDINGS OF THE 1990'S BEEN SO HIGH?

Ironically, ever since the Gulf of Maine American lobster, Homarus americanus, stocks were recently determined to be overfished (Stock Assessment Review Committee Document 93; 18 July 1993), nearshore Maine lobster landings have been at or near record levels. Preliminary 1994 landings of nearly 39 million lbs. exceed the previous record high established in 1991 by about 26% (Figure 1). Moreover, the average annual catch throughout the 1990's of 31 million lbs. is 29% greater than the long standing record harvest set in 1889. In view of the excellent catches of the last several years and the apparent well-being of today's lobster fishery, we are frequently asked "How can the lobster resource be overfished and still yield record landings?"

To answer this question we might first consider "Why are there so many lobsters?" Although many have given much thought to this matter, there is no single or definitive answer to this question. We can say that enhanced recruitment along with increases in fishing effort have certainly occurred and are chiefly responsible for the higher production. Increases in recruitment (lobster entering the legal size range) might be attributed to a number of factors such as:

- 1) elevated water temperatures which could enhance survival of

- different life history stages and accelerate growth;
- 2) lower predation (natural mortality) of lobster by depressed groundfish stocks; and
 - 3) greater larval production and yield in weight per recruit resulting from the 1988-89 increases in the minimum legal size.

Another factor which should not be dismissed or ignored is the effect baited traps might have on lobster growth and survival. According to expanded estimates determined from DMR's port-sampling survey, in 1994 lobster fishers hauled their traps nearly 39 million times. If we assume each newly set trap contains on the average about 2 lbs. of bait, we can then calculate that Maine fishers used about 78 million lbs. of bait in 1994. Understanding that since 1978, when escape vents were first required in Maine, the majority of sublegal-sized lobsters have been able to freely enter and exit traps; thus traps have served as feeding stations for a portion of the lobster population. Obviously lobster derive some benefit from the bait "handouts", the effect of which has not been documented and is certainly open to speculation. It's noteworthy that lobster landings in the Scotia-Fundy Region of Canada increased dramatically throughout the 1980's and early 1990's (Figure 2), yet because of trap limits and limited entry the numbers of traps and subsequently the amount of bait have remained relatively constant. Moreover, based on anecdotal information along with early catch records, Maine's nearshore lobster population at the turn of the 20th century was apparently quite

sizeable even though much less bait was available for lobster to feed upon since fishers used about 85% fewer traps than today.

With regard to changes in fishing effort, according to DMR's port-sampling survey the average number of traps per boat has steadily increased from 472 in 1990 to 557 in 1994, while during the 1980's the average was 391 traps per boat (Figure 3). In comparison, today's fishers are using about 40% more traps than the average fisher used throughout the 1980's. Not only is more gear now being deployed than ever before, but present-day traps are more efficient so there's been a significant gain in fishing power (the relative vulnerability of lobster to the fishing gear). About 90% of the traps are now of wire construction and nearly half of all traps are 4-ft in length with double parlors (Figure 3), thus improving the traps' retention capabilities and efficiency with longer soak times (set-over days). Larger traps will tend to catch more lobsters as the potential for saturation (over-crowding) within traps is less likely. In addition, the recent upward adjustment of escape vent openings to correspond with the 1988-89 minimum size increases has enhanced trap efficiency, a fact well recognized by successful fishers. Traps providing optimum escapement of undersized lobster through escape portals have been shown to have greater legal catches and would be expected to cause less culls. Of course, technological advances in marine electronics (color depth finders, GPS, Loran, etc.), hydraulic pot haulers, and larger, faster boats have allowed fishers to not only expand their fishing areas (now

exploiting regions farther from shore which previously received little or no fishing pressure), but to fish more traps and to fish these traps more effectively. Color flashers enable fishers to locate productive lobster habitat and, if desired, navigational instrumentation such as GPS and Loran will allow easy relocation of these areas.

In association with increases in fishing effort it's also quite likely that the warmer water temperatures of the 1990's have increased lobster catchability. At higher temperatures metabolic rates will increase, causing lobster to search more actively for food and subsequently become more vulnerable to traps. Unless there's an increase in population size any rise in catchability will only cause a short term elevation in catch; however, even temporary upward shifts in catchability might influence fishers to expand the boundaries of the fished population, possibly leading to a long term increase in landings.

As indicated by the above discussion, there are several factors contributing to the high lobster landings of the 1990's. Where landings have increased over a broad geographical area encompassing both the U.S. and Canada, one might reasonably argue that some environmental event, such as temperature, is a major contributor to the high abundance of lobsters (Figure 2). If this is the case, it's likely that the favorable climatological conditions of today will eventually swing the other way, possibly causing lower levels

of lobster abundance. Considering today's high fishing pressure coupled with the likelihood of continued effort escalation, an unfavorable shift in environmental conditions could result in a severe decline in lobster stock size. For this reason it's important not to ignore the signs of overfishing, but rather to move ahead with management measures for future safeguarding of the resource.

Although it is commonly accepted that levels of fishing effort are too high, many industry members, legislators, and even a few biologists question whether lobster are recruitment overfished, i.e., fishing at a level whereby the stock may be reduced to the point where it may not be able to replace itself. Even if lobster stocks as a whole are not recruitment overfished as determined by the Stock Assessment Review Committee (convened by the National Marine Fisheries Service), there's no doubt but lobster are at least fully exploited and growth overfished. A population is considered growth overfished when animals are removed at such a small size that the total landed weight is significantly less than what it could be if harvesting were delayed until a larger size. Accordingly, the overall yield of lobster could be significantly increased by delaying harvest until a larger size could be attained. In other words, any reduction in fishing mortality and/or increase in the minimum size would help alleviate growth overfishing and, at the same time, move us away from a recruitment overfished condition. Moreover, the lobster fishery is

well recognized as being grossly overcapitalized so economic benefits would be realized from any trap reduction program. There's general agreement that current catch levels could be maintained with drastic reductions in the number of traps, perhaps as high as 50-75% fewer traps. Gear conflict problems which are quite serious in some areas such as Casco Bay, would be eased with a meaningful trap limit in conjunction with some form of limited entry.

Clearly, even though lobster catches are at record levels and everything appears well with the resource, it would be imprudent to embrace a "let's wait and see" approach to lobster management. Many feel current Maine lobster laws and regulations, which are more restrictive than those of several other lobster producing states, provide adequate resource protection - a view contested by most lobster scientists and even many industry members. In light of intense fishing pressure and every indication that effort will continue to escalate, it's more important than ever to effect management strategies to address the overfishing situation. If we delay further management until the stocks begin to decline from overfishing, the risk of a protracted recovery period is great. Recognizing about 5 to 7 years are required for lobster to reach the minimum legal size, any remedial action to restore the lobster resource may take up to 10 years - a long time by anyone's standards. Accordingly, now is the time to be proactive and forge ahead with more prudent management of Maine's most valuable

commercial fishery.

MAINE NEARSHORE LOBSTER CATCH DATA

1880 - 1994

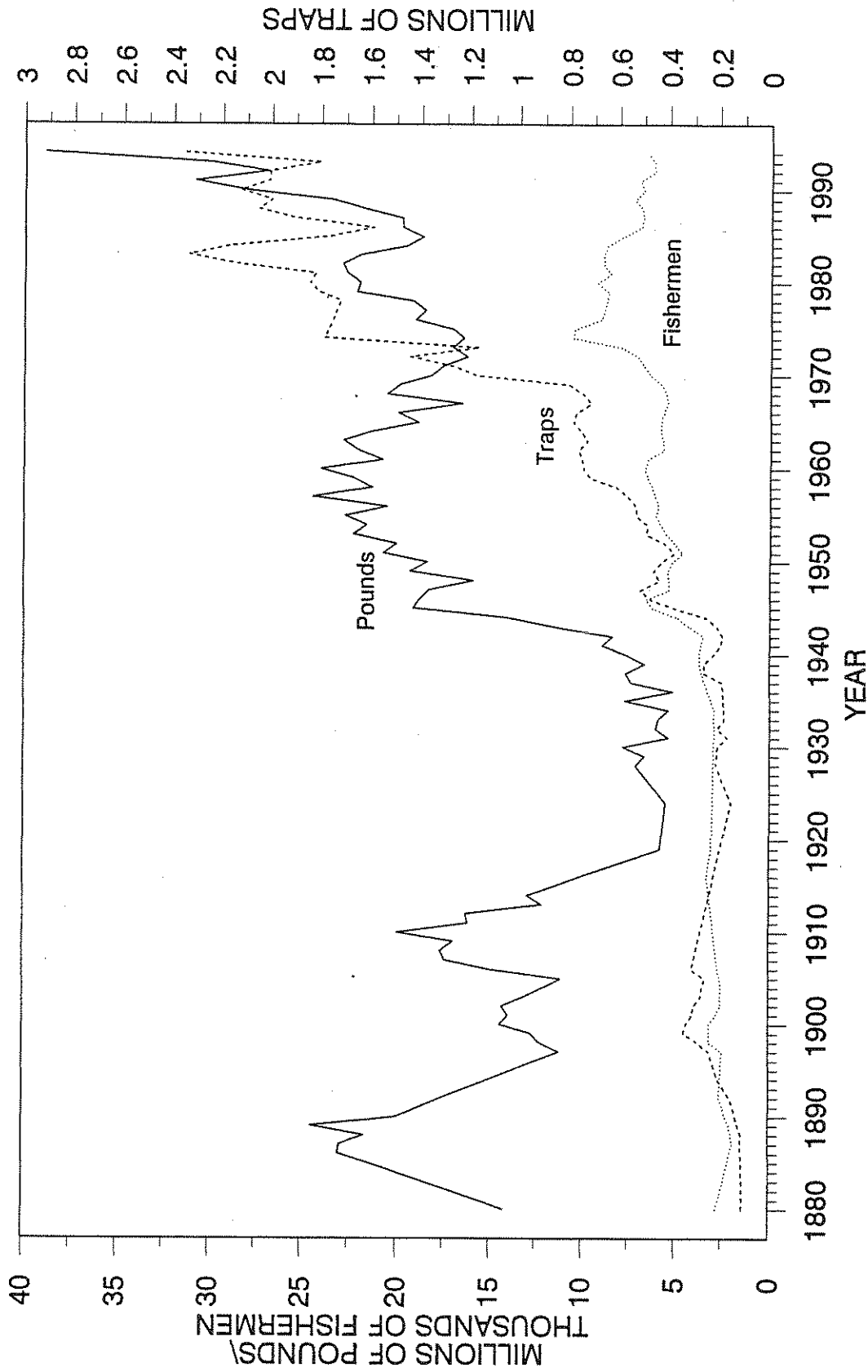


Figure 1. Annual landings of lobster caught in traps along the Maine coast, 1880-1994.

LOBSTER LANDINGS 1980 - 1993

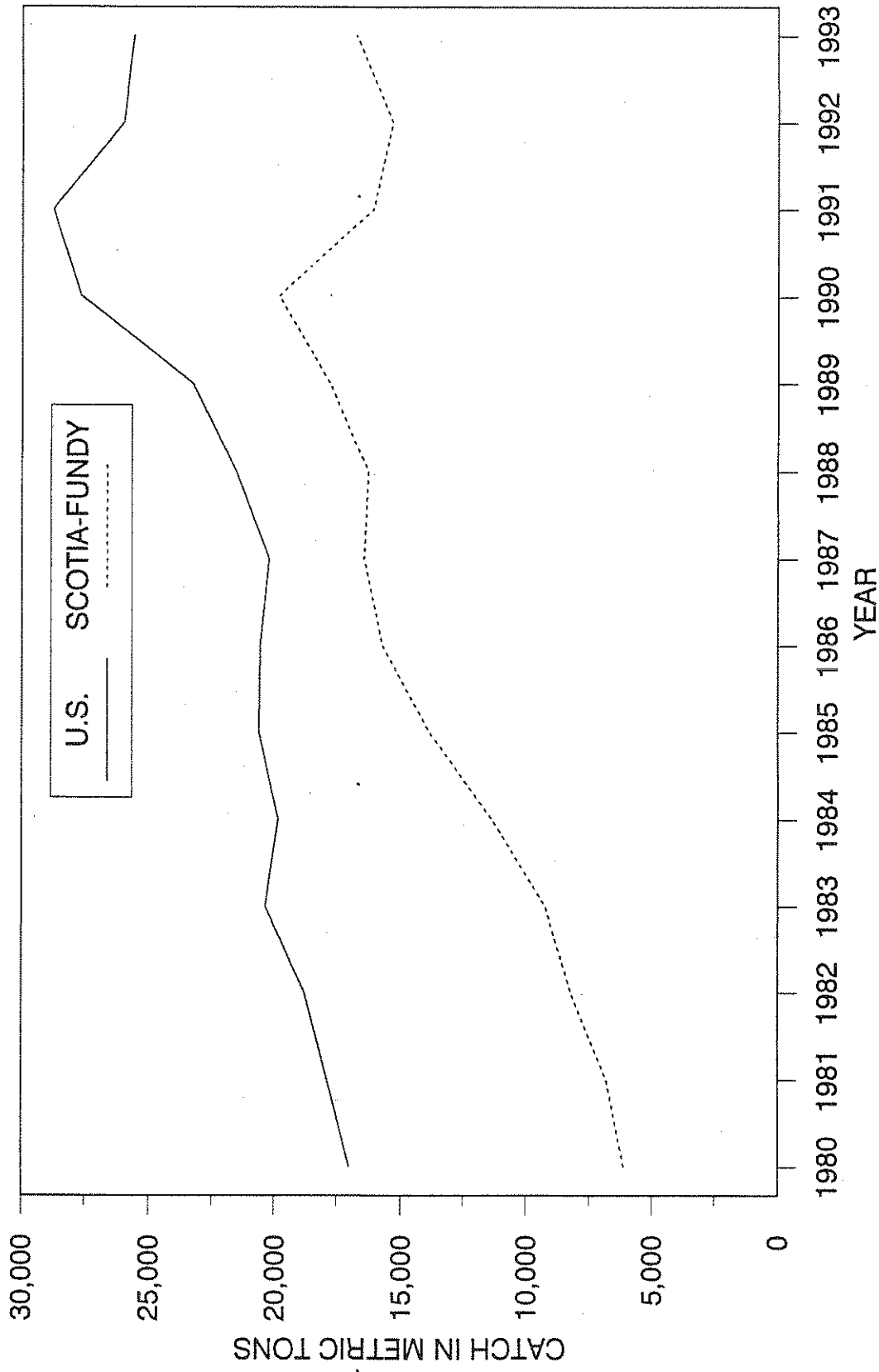


Figure 2. Annual landings of lobster caught in U.S. and Canadian waters, 1980-1993.

MAINE 1967 - 1994

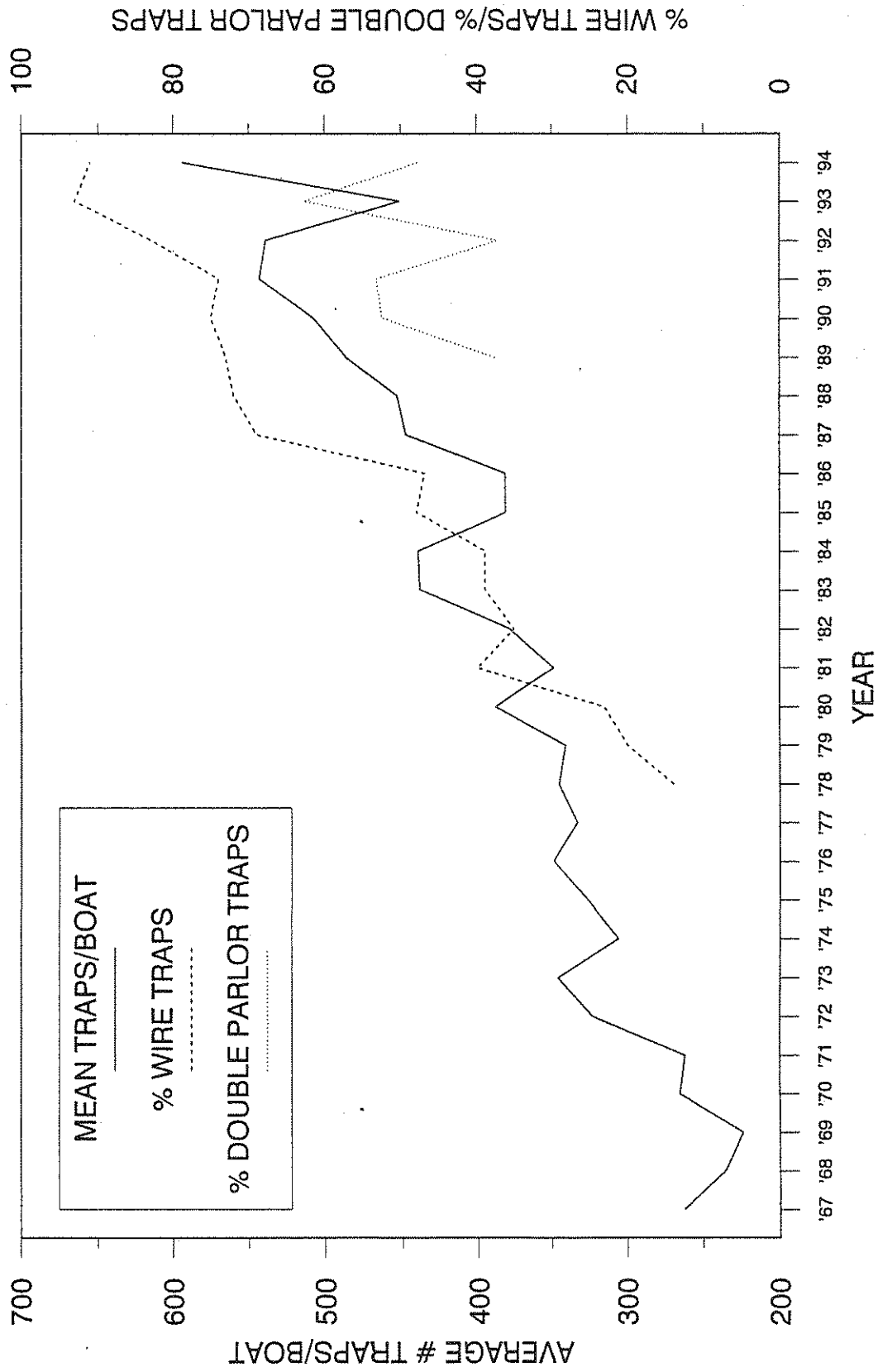


Figure 3. Changes in the number and characteristics of lobster traps used by Maine fishers from 1967 through 1994.