Comparative Study of Seed from Northern and Southern Hatcheries
Fisheries Resource Grant #FRG-99-37
(Joshua Merritt)

Results Summary

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Nursery Phase

Seed from Northern and Southern (hereafter called local) hatcheries was procured in May 2000. Oysters delivered by the Northern hatchery were on time and of the desired size (~3 mm). Seed from the local hatchery, however, arrived several days later and were too small to go into field nursery containers and were subsequently held in upwellers and then transferred to the field nursery gear. Figure 1 shows growth as measured by mean shell height (mm) for both strains. Note that the local seed took ~20 days longer to reach grow-out size (indicated by first sieve).

Using standard aquaculture protocols, seed of each stock was sieved 3 times over the course of the summer and early fall of 2000, resulting in grades referred to as large, medium, small and runt (Figure 2). Oysters were stocked into the grow-out gear from these grades with the exception of runts, as there were too few oysters of this grade from both strains to complete the experimental design. Because seed from the 2 hatcheries progressed at different rates, it is important to note that the comparison in Figure 2 is not so much an effect of growth of different stocks as it is an effect of the timing of sieving. For example, due to logistics, holding off on sieving one stock for 3-4 days can result in a higher proportion of oysters in a given grade.

Grow-out Phase

Stocking - Oysters were stocked to grow-out using a standard industry volumetric approach consisting of counting the number of oysters in a known small volume and then using larger measured volumes to stock gear. Although not a part of this study, a by-product of the project is an informal evaluation of this technique. Target stocking densities were 400 oysters per bag. Densities achieved ranged from 333-534 oysters/bag and averaged 433 oysters/bag (Table 1).

This indicates a slight overstocking with a fairly wide range. However, although it is probably quite variable between individuals, given its speed, it is likely an appropriate commercial field technique.

Harvest – The amount of oysters harvested by the end of this study (November 16, 2001) from the various experimental categories ranged from 0.0-95.2 % (Table 1). None of the oysters stocked in bags and placed directly on the bottom were harvested due to extremely high mortality and poor growth. Due to the nature of the data, harvest percentages cannot be compared statistically, however, practical differences and trends were evident. Generally, more large grade oysters were harvested than other grades for both strains in most grow-out techniques. Additionally, a higher percentage of the Northern stock was harvested than the local stock (~32% and ~ 21% overall, respectively). Harvest estimates are a function of both growth rates and mortality and will be addressed next.

Mortality – Mortality estimates used for this study are from 6/8/01, the last sample period before harvesting began at large. Because different strains and grades of oysters had been in the grow-out phase for varying amounts of time, percentage mortality was standardized and calculated as % mortality/year. Mortality was variable and ranged from 2.2-75.1% (Table 2). Mortality was generally less for the Northern strain versus the local strain and, for both strains grown out in floats and off-bottom trays, is comparable to those seen anecdotally in other studies and experiences. However, bags placed directly on the bottom had substantially high mortality and all oysters were dead (mainly from sedimentation) by the end of the study.

Growth – Once again, growth estimates used for this study are from 6/8/01, the last sample period before harvesting began at large. Once significant numbers of oysters were removed from a given gear, the mean size was reduced. Oysters were not unilaterally harvested from different treatments, therefore, there is no way to standardize and compare mean growth data after 6/8/01. However, size frequency distributions from 11/16/01 that include oysters harvested, combined with fore mentioned harvest estimates complete growth comparisons for the study.

Generally, the Northern stock out grew the local stock in most techniques (Figures 3-5). Additionally, with the exception of the local mediums, oysters grown on the bottom grew significantly less than those grown in floats and off-bottom trays. As would be expected, comparative growth of various grades showed that the larges ("first sieve") were the "fast growers" and outperformed the other grades (Figures 3-5).

To further elucidate the comparison of stocks and the relationship between growth, mortality and harvest, Figures 6 and 7 depict the size frequency distribution of large grade oysters grown in floats from their initial stocking through June 2001. For purposes of this study, oysters >75 mm were considered "markets". The Northern stock (Figure 6) entered grow-out larger than the local stock (Figure 7) and achieved much larger sizes by fall 2000 that translated into a much larger proportion of market sized oysters by June 2001. The non-normal distribution seen with the local stock by 6/8/01 is likely a result of higher mortality (19.5%) that may have been size specific relative to the Northern stock mortality (7.2%).

SUMMARY

Based on the above results, the following general trends were observed regarding stock and grade comparisons:

Nursery Growth	Northern > Local	
% Harvested	Northern > Local	Large > Medium > Small
% Mortality (Float and Tray techniques only)	Local > Northern	Large > Medium ~ Small
Grow-out Growth	Northern > Local	Large > Medium > Small

Figure1. Oyster Stock Comparison

Nursery Phase - Prior to First Sieve

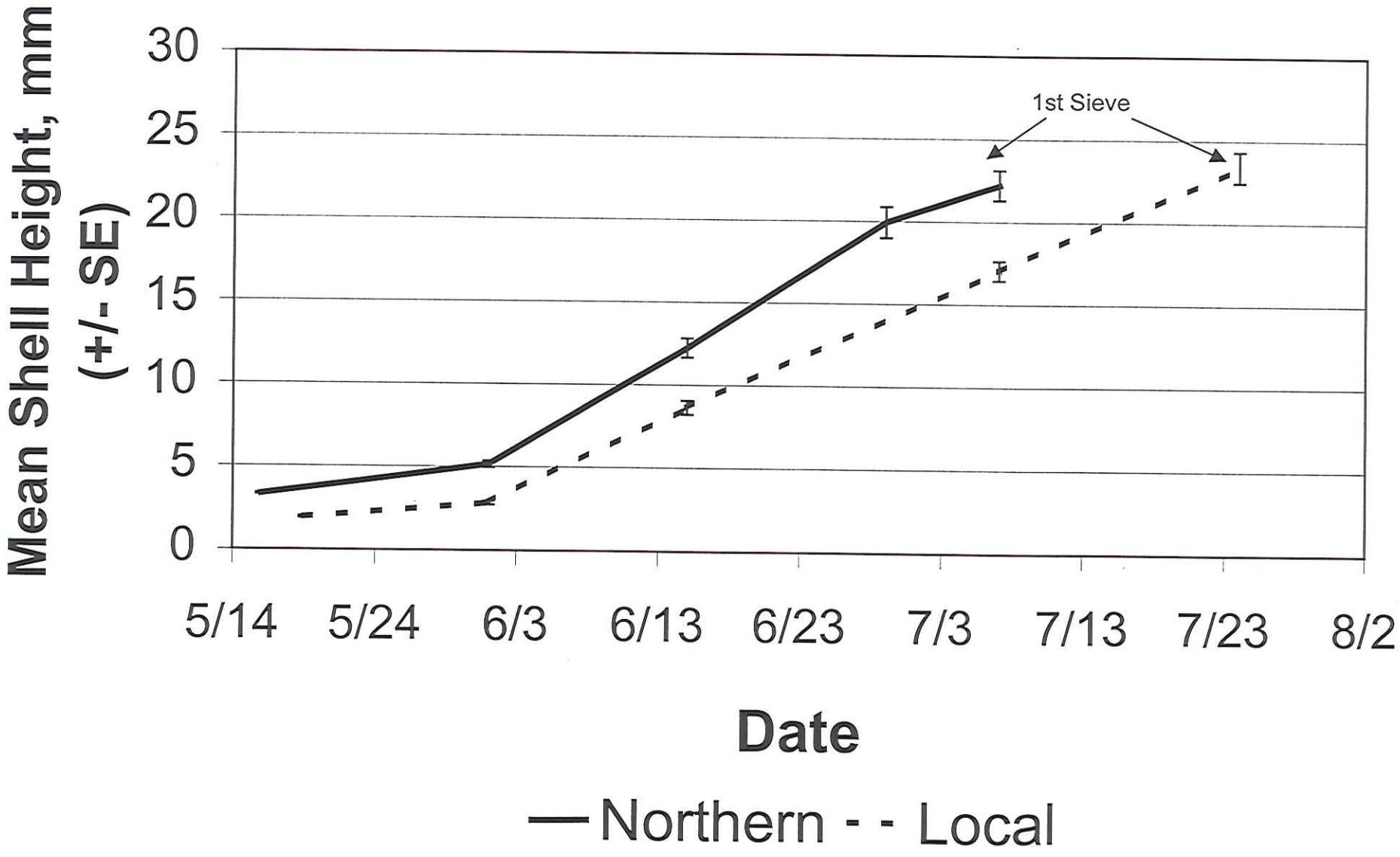
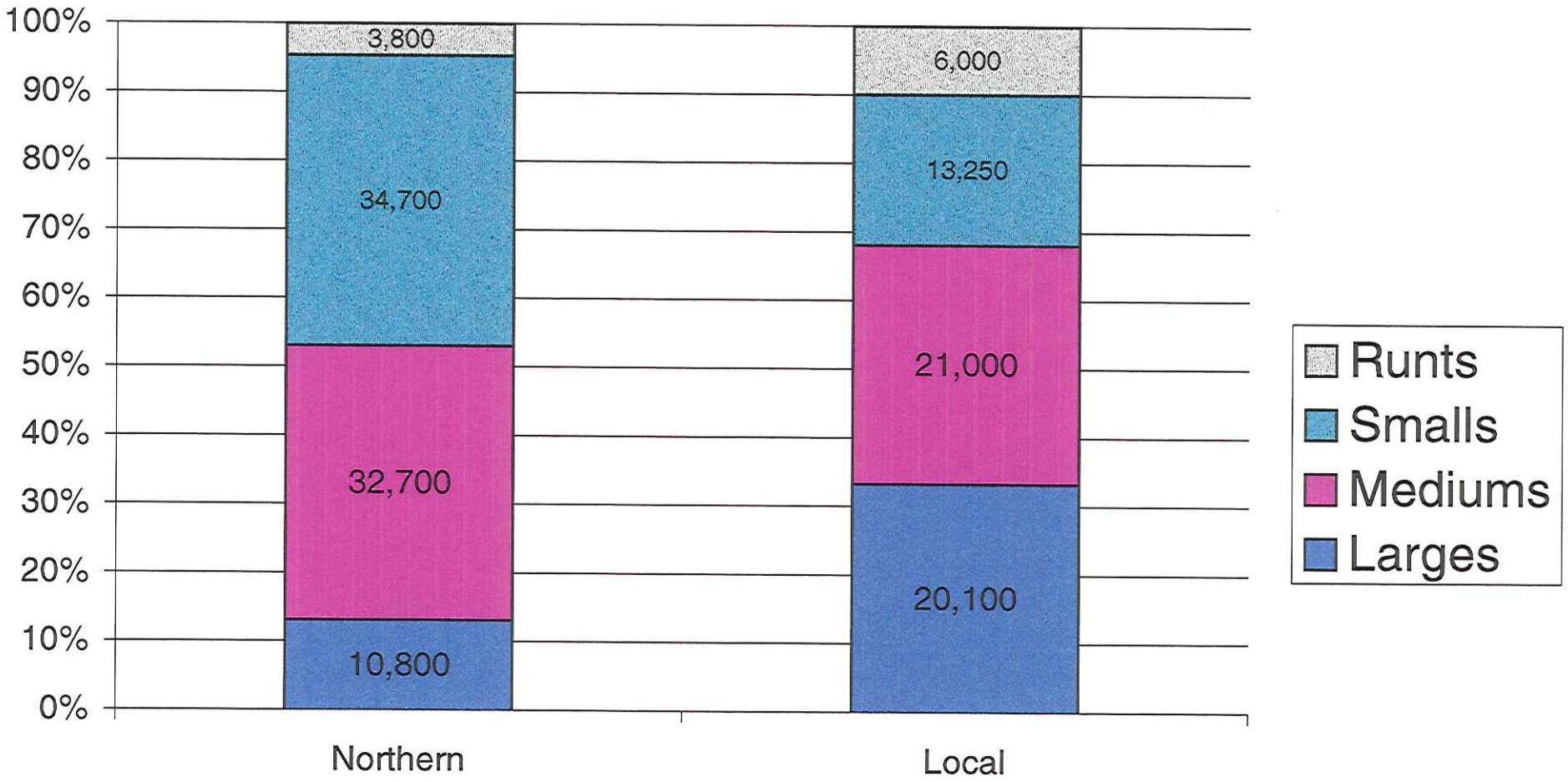


Figure 2. Oyster Stock Comparison*

% Oysters to Grades for Grow-Out

(# Embedded in Bar)



* These are results from the end of th nursery phase and mark the "beginning" of this grow-out project and reflect more the timing of seiving than performance of stocks. See "Results" section for details.

Table 1.

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Summary Stocking and Harvest Data

Strain*	Gear	Grade	Mean # Oysters/Bag	Initial Total #	Total # Harvested**	Estimated % Harvested
Northern	Float	Large	368	2206	2100	95.2
		Medium	475	2848	1250	43.9
		Small	353	2118	920	43.4
	Off-Bottom Tray	Large	529	3174	1050	33.1
		Medium	407	2440	1000	41.0
		Small	333	2000	700	35.0
	Bottom	Large	433	2598	0	0.0
		Medium	450	2700	0	0.0
		Small	404	2424	0	0.0
		AVERAGE	**417**	**2501**	**780**	**32.4**
		TOTAL	**-**	**22508**	**7020**	**31.2**
Local	Float	Large	351	2106	900	42.7
		Medium	534	3202	950	29.7
		Small	447	2680	400	14.9
	Off-Bottom Tray	Large	472	2834	1200	42.3
		Medium	473	2838	950	33.5
		Small	432	2594	600	23.1
	Bottom	Large	441	2646	0	0.0
		Medium	397	2380	0	0.0
		Small	499	2994	0	0.0
		AVERAGE	**450**	**2697**	**556**	**20.7**
		TOTAL	**-**	**24274**	**5000**	**20.6**
OVERALL		***AVERAGE***	***433***	***2599***	***668***	***26.5***
		TOTAL	***-***	***46782***	***12020***	***25.7***

* Northern Strain from Blue Points Hatchery and Local Strain from Ken Kurkowski Hatchery.

** from Josh's data after July 2001 AND info related to me after June sampling.

Table 2.

Merritt Sea Grant Project

Summary Mortality Data

Strain*	Gear	Grade	Date To Grow Out	% Mortality 6/8/2001	# Days from Grow-out to June Mort. Measurement	% Mortality/Year
Northern	Float	Large	07/31/2000	6.2	312	7.2
		Medium	09/12/2000	2.6	269	3.5
		Small	10/11/2000	1.4	240	2.2
	Off-Bottom Tray	Large	07/31/2000	6.9	312	8.0
		Medium	09/12/2000	2.4	269	3.2
		Small	10/11/2000	2.7	240	4.1
	Bottom	Large	07/31/2000	20.7	312	24.2
		Medium	09/12/2000	31.6	269	42.8
		Small	10/11/2000	11.5	240	17.4
		AVERAGE		**9.5**	**-**	**12.5**
Local	Float	Large	08/17/2000	15.8	295	19.5
		Medium	09/27/2000	5.5	254	7.9
		Small	11/09/2000	6.0	211	10.5
	Off-Bottom Tray					
		Large	08/17/2000	9.7	295	12.0
		Medium	09/27/2000	5.5	254	7.9
		Small	11/09/2000	5.3	211	9.2
	Bottom	Large	08/17/2000	14.1	295	17.5
		Medium	09/27/2000	30.3	254	43.5
		Small	11/09/2000	43.4	211	75.1
		AVERAGE		**15.1**	**-**	**22.6**
OVERALL		*AVERAGE*		*12.3*	*-*	*17.5*

* Northern Strain from Blue Points Hatchery and Local Strain from Ken Kurkowski Hatchery.

Figure 3.

Merritt Sea Grant Project

"Large" Grade Oysters

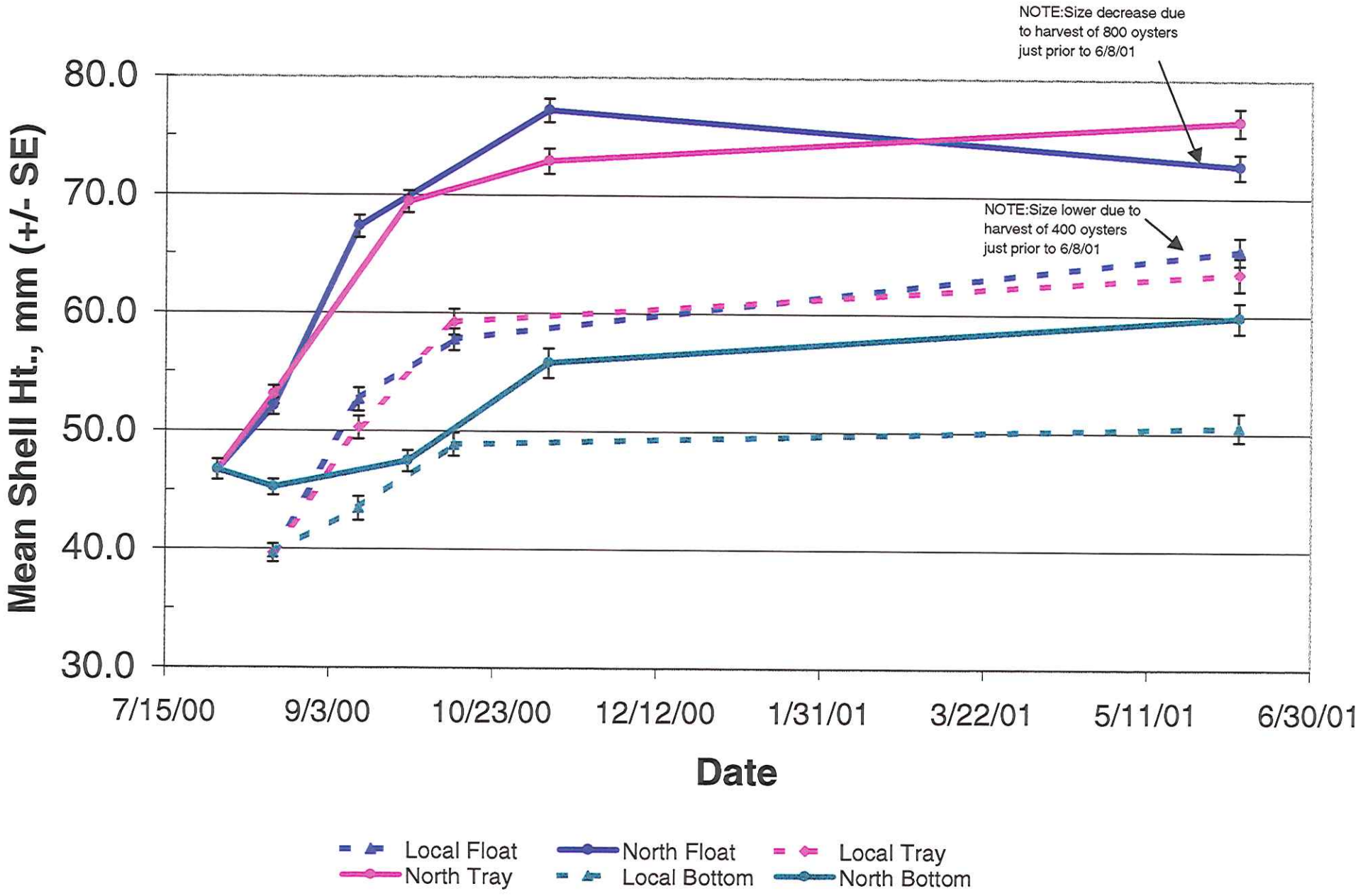


Figure 4.

Merritt Sea Grant Project

"Medium" Grade Oysters

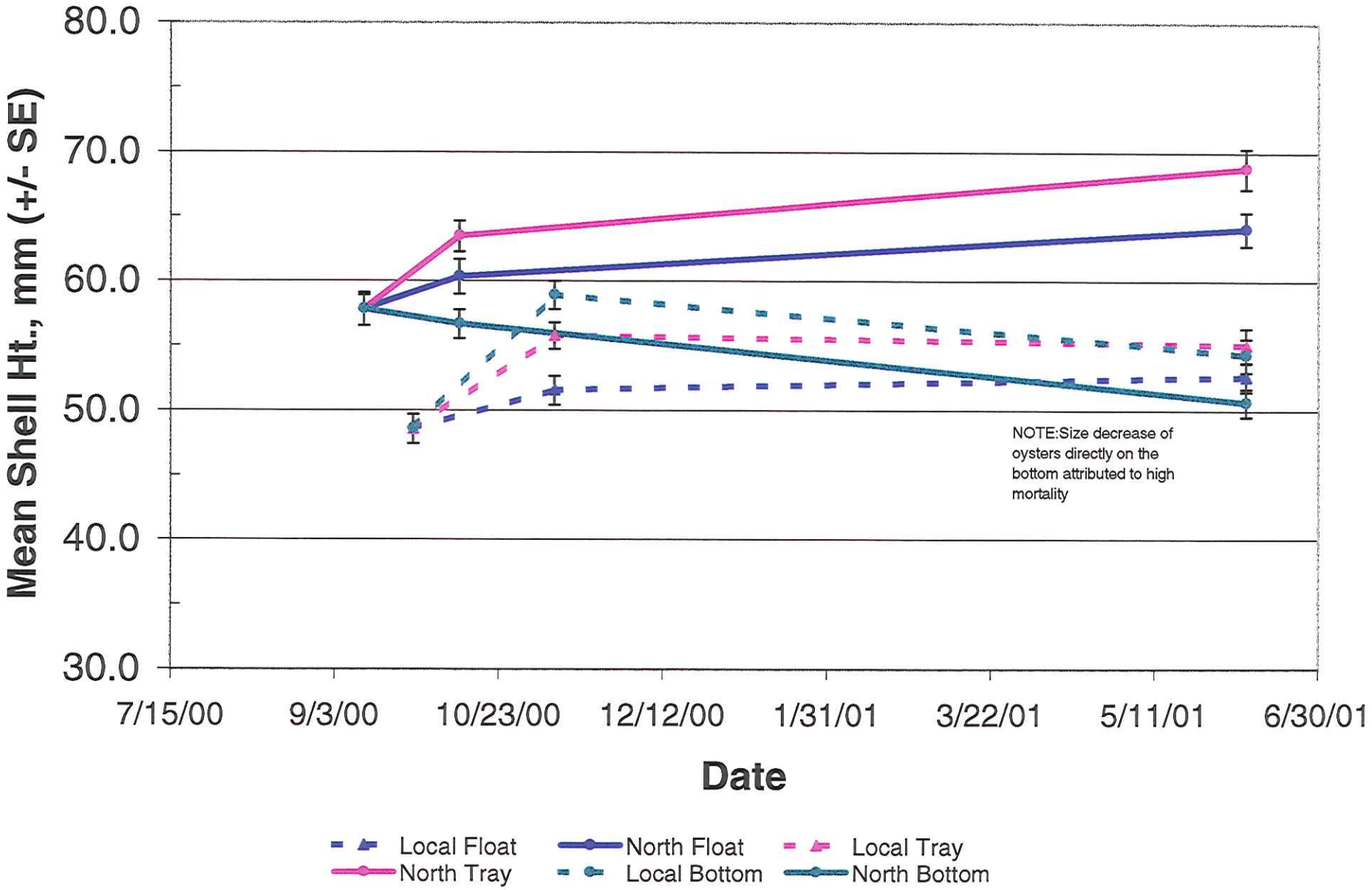


Figure 5.

Merritt Sea Grant Project

"Small" Grade Oysters

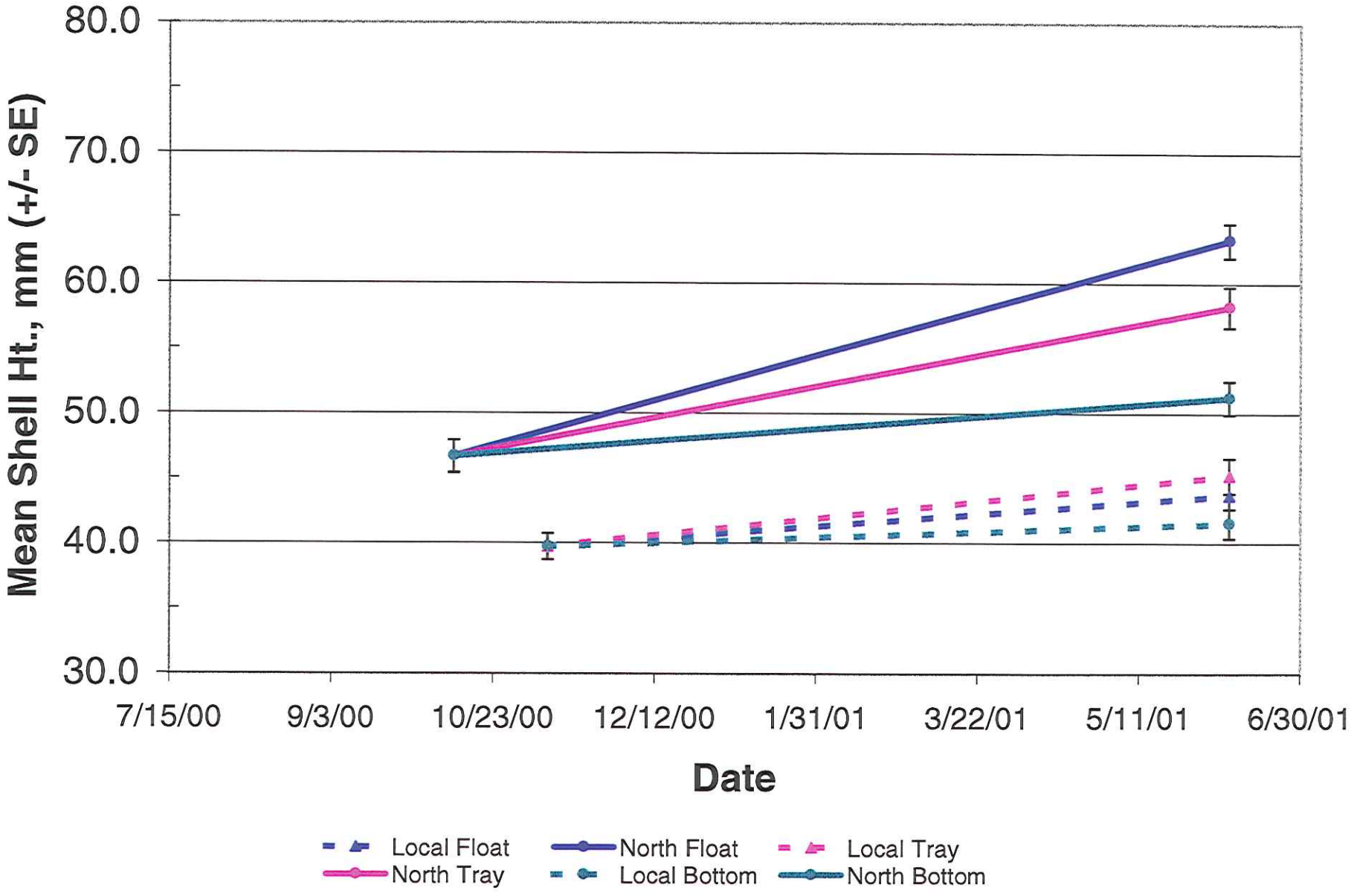


Figure 6. Merritt Sea Grant Project

Size Frequency Distribution

Northern "Larges" in Floats

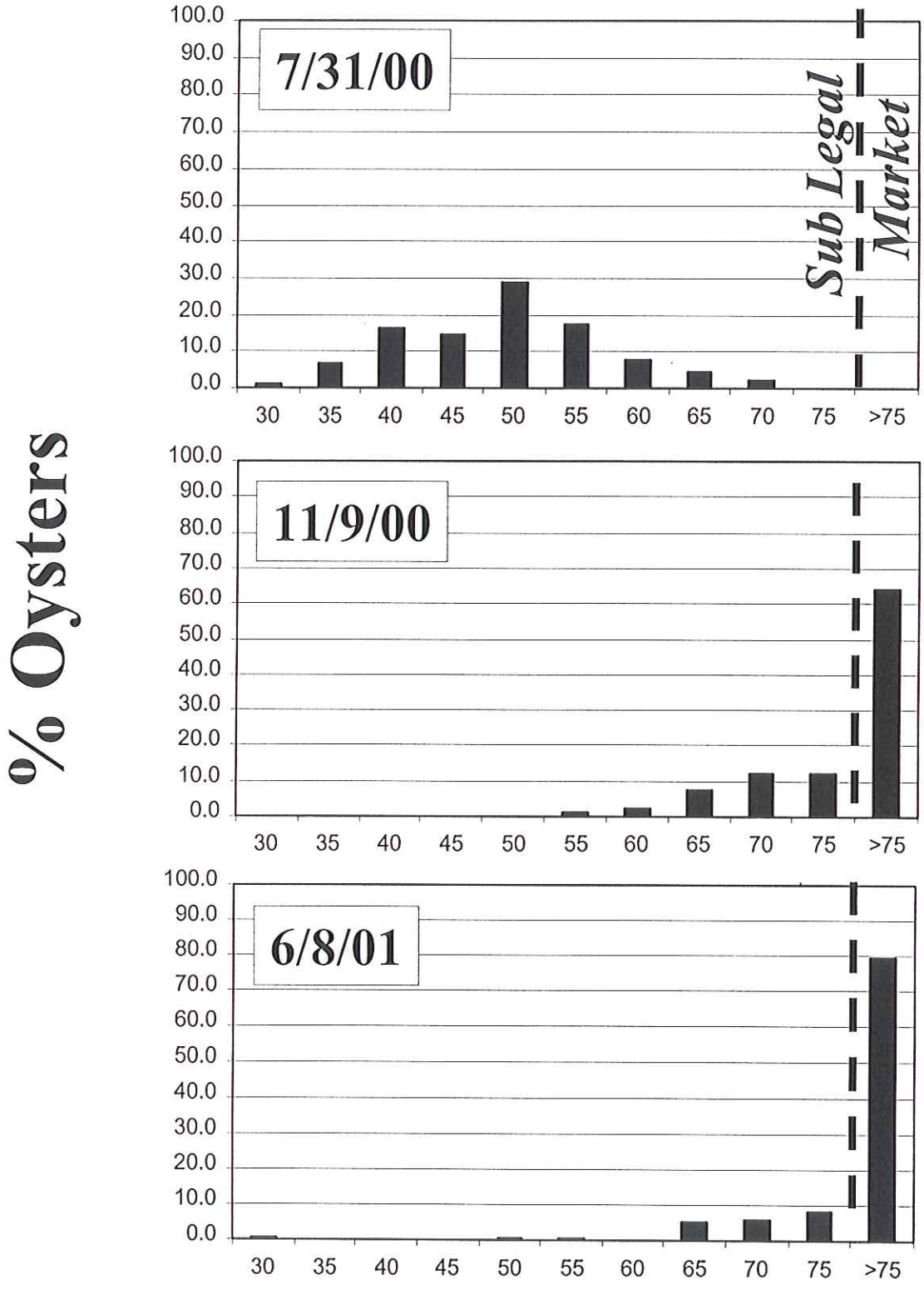
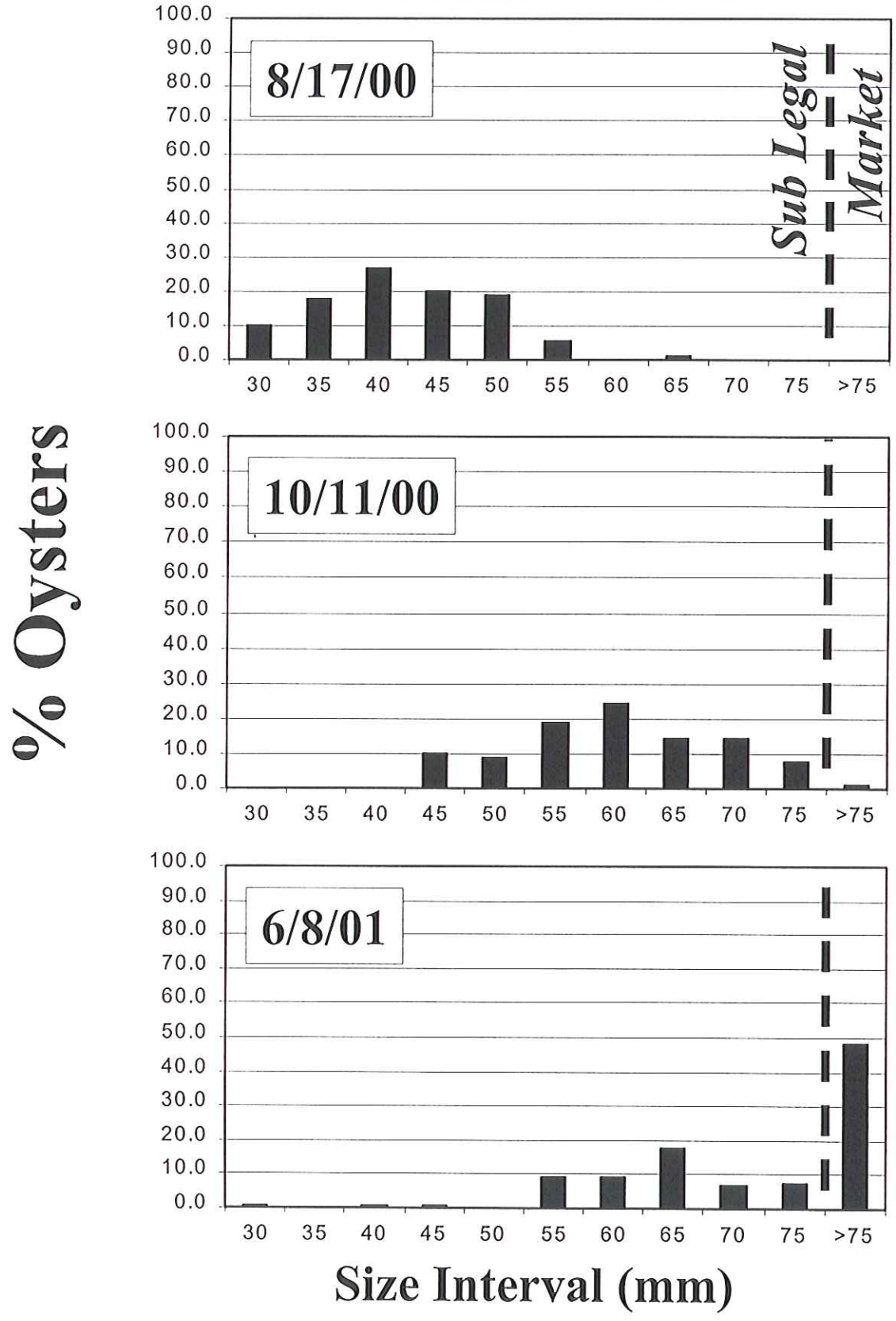


Figure 7. Merritt Sea Grant Project

Size Frequency Distribution

Local "Larges" in Floats



Final

~~Quarterly Progress~~ Report
Fishery Resource Grants Program

Project Title:

Project Investigator:

Period Covered by this Report:

Summary of Progress / Work Accomplishments For this Quarter:

If necessary complete or continue the report on an additional sheet of paper and send by the end of the month which follows the end of the calendar quarter.

1. Describe *Work scheduled* for this quarter from proposal:

Making of New Equipement
Maintence on old Equipement.
Changing of BASS
Cleaning of All Equipement.

2. Describe *Work accomplished* this quarter:

All work is completed on time,
measurements + counting of oysters
+ All Equipment is Finished

3. Explain any *special problems* or *differences* between work scheduled and actually accomplished:

MAJOR SPONGE STRIKE THIS SUMMER. CHANGING OF BAGS ON A WEEKLY SCHEDULED THING. I LOST A NUMBER OF OYSTERS TO SPONGE STRIKE THIS YEAR. BUT THE GOOD THING WAS I LEARNED HOW TO DEAL WITH THE PROBLEM. BOTTOM CAGES ARE A GREAT IDEA.

Joshua Neal
Signature Principal Investigator

12-29-01
Date

Please send completed Progress Report to:

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