ASSESSMENT OF BAIT SHRIMP POPULATIONS IN SAND LAKE RELATIVE TO A COMMERCIAL FISHERY ON THIS RESOURCE

Background

Sand Lake supports a rather limited biological community. Of the species that inhabit the estuary, sand shrimp are the most abundant. For years these shrimp supported a small commercial fishery. In 1979, local residents in the area became concerned about the status of the shrimp stocks in areas accessible to recreational fishermen. Department surveys in the areas adjacent to public access points revealed the mean size of shrimp to be quite small (average 45 mm) near the Tillamook County Park. Mean size of shrimp adjacent to the USFS campground was 65 mm. Commercial shrimpers consider a mean size of 55 mm to be the minimum acceptable size for bait. Due in part to the small size of shrimp and the adoption of the statewide planning goals for natural areas, ODFW discontinued issuing permits to commercial shrimpers in Sand Lake in 1980. No commercial shrimp permits have been issued since then.

In the fall of 1986, a commercial shrimper asked to have Sand Lake reopened to commercial fishing. ODFW staff met with DLCD personnel to discuss a course of action. We decided to first develop a basic biological inventory of the present status of sand and mud shrimp populations in the estuary. The remaining portion of this report covers the survey.

Methods

Sand Lake was subdivided into four subunits for ease of identifying tideflats (Figure 1). Transects were established across each tideflat and were 100 yards apart. Transects were run perpendicular to the shoreline and samples were collected every 100 yards along the transect lines. A six-wheel drive all-terrain vehicle (ATV) was used to lay the transects and sample stations. We collected 212 samples.

At each sample station we hand-pumped a minimum of 10 shrimp to measure for size. We also counted the number of shrimp holes in five replicate one-square foot samples. Substrate type, clam, and other invertebrate species, and vegetation type were recorded.

To insure that the mean size of our hand-pumped shrimp was representative of the actual mean size of shrimp at each sample station, we collected shrimp at four different areas with a commercial mechanical jet type pump and a hand-held pump. We measured 173 hand-pumped shrimp and 219 jet-pumped shrimp.

Results

Figure 2 shows the distribution and relative abundance of sand shrimp in Sand Lake. Sand shrimp were observed at nearly every station sampled. Most stations contained shrimp holes in excess of $11/ft^2$. Concentration of shrimp was most dense in the area just south of the Tillamook County Park where densities in excess of $50/ft^2$ were recorded at 16 sample stations.

Figure 3 shows the size composition of sand shrimp. Most stations had sand shrimp that averaged less than 55 mm, the minimum size that most commercial shrimpers take for bait. Only two areas had sand shrimp of commercially acceptable size. The largest but less dense area was south of the USFS campground. The second area was west and south of the Tillamook County campground. This area although relatively small in size did have dense concentrations (in excess of 26/ft^2) of commercially desirable shrimp.

Figure 4 shows the size composition of mud shrimp in Sand Lake. Mud shrimp at most of the stations averaged less than 55 mm, and their distribution was restricted to the southern portion of Sand Lake.

Whether we were taking a representative sample of sand shrimp by hand pump was addressed by conducting a student's T test on the mean sizes of sand shrimp taken by hand pump and jet pump. Results showed no significant difference between the mean sizes of the two sampling techniques at the 95% confidence interval ($T = 0.68$). Mean size of hand harvested shrimp was 51.8 mm vs. 51.2 mm for the jet pumped shrimp. These samples were taken from areas appearing to contain commercial size shrimp. As a result, we can conclude that the mean size of shrimp collected by hand pump was representative of the size of shrimp in the area.

During the course of our surveys four different local landowners confronted us as to our activities. When we explained that we were gathering background biological information on the status of the shrimp stocks and that the possibility existed for reopening Sand Lake to commercial shrimping, all landowners expressed strong opposition to that happening.

Discussion

Our surveys of the bait shrimp resources in Sand Lake revealed extensive beds of dense concentrations of sand shrimp. Mud shrimp were also recorded in the estuary but were far less common than the sand shrimp. The large numbers of shrimp holes made surveying for clams nearly impossible. Based on our knowledge of clams and clam habitat and also the lack of clam shells on the tideflats, we are confident that few recreationally important clams occur in Sand Lake.

Although sand shrimp are found fairly well scattered throughout the estuary most are quite small and relatively few are of the size (55 mm) that are considered acceptable for bait.

Local landowners expressed considerable displeasure about the possibility of Sand Lake being reopened to commercial shrimping, their main concern being the scarcity of large size bait shrimp. Several said they would outright oppose its reopening.

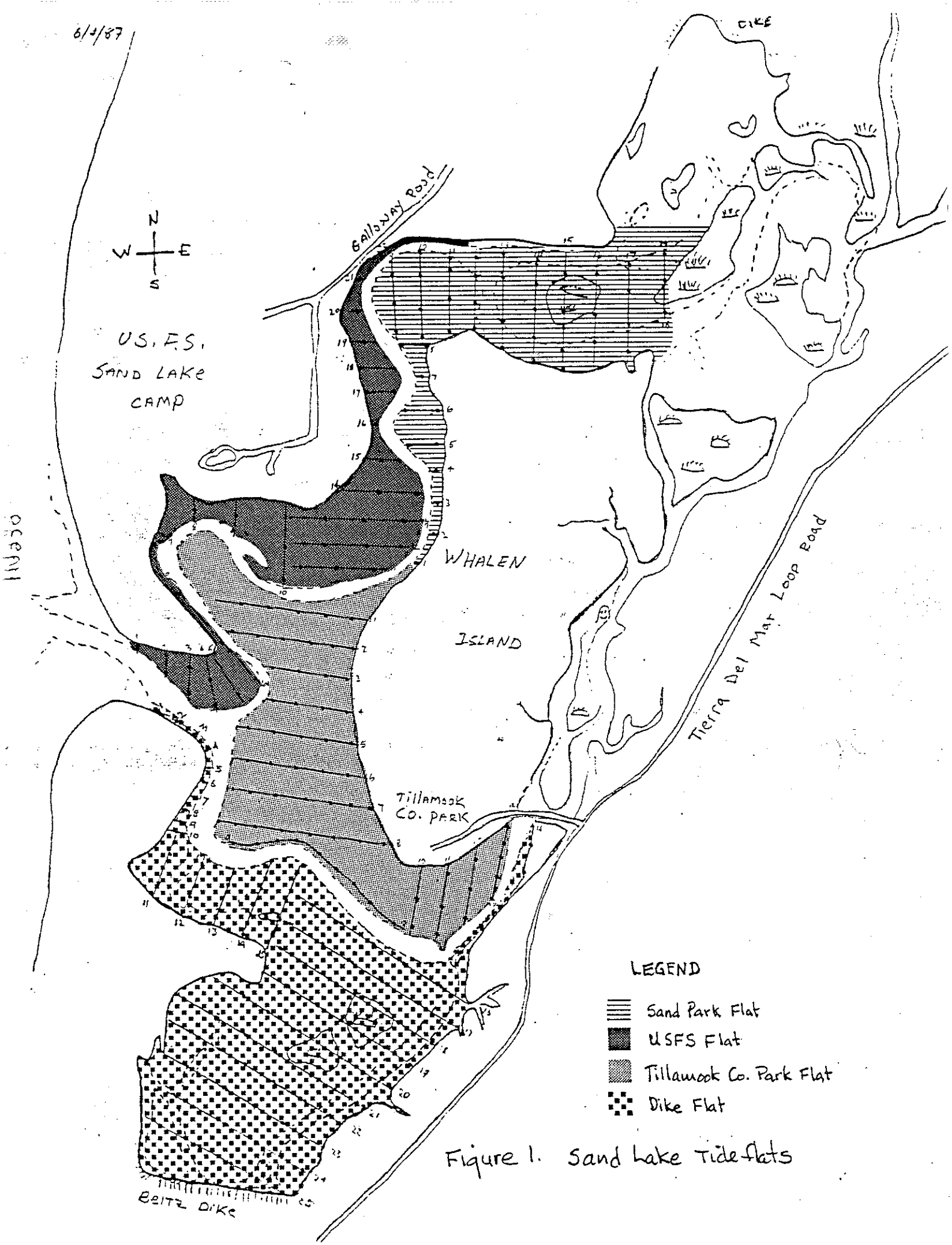

Figure 1. Sand Lake Tideflats

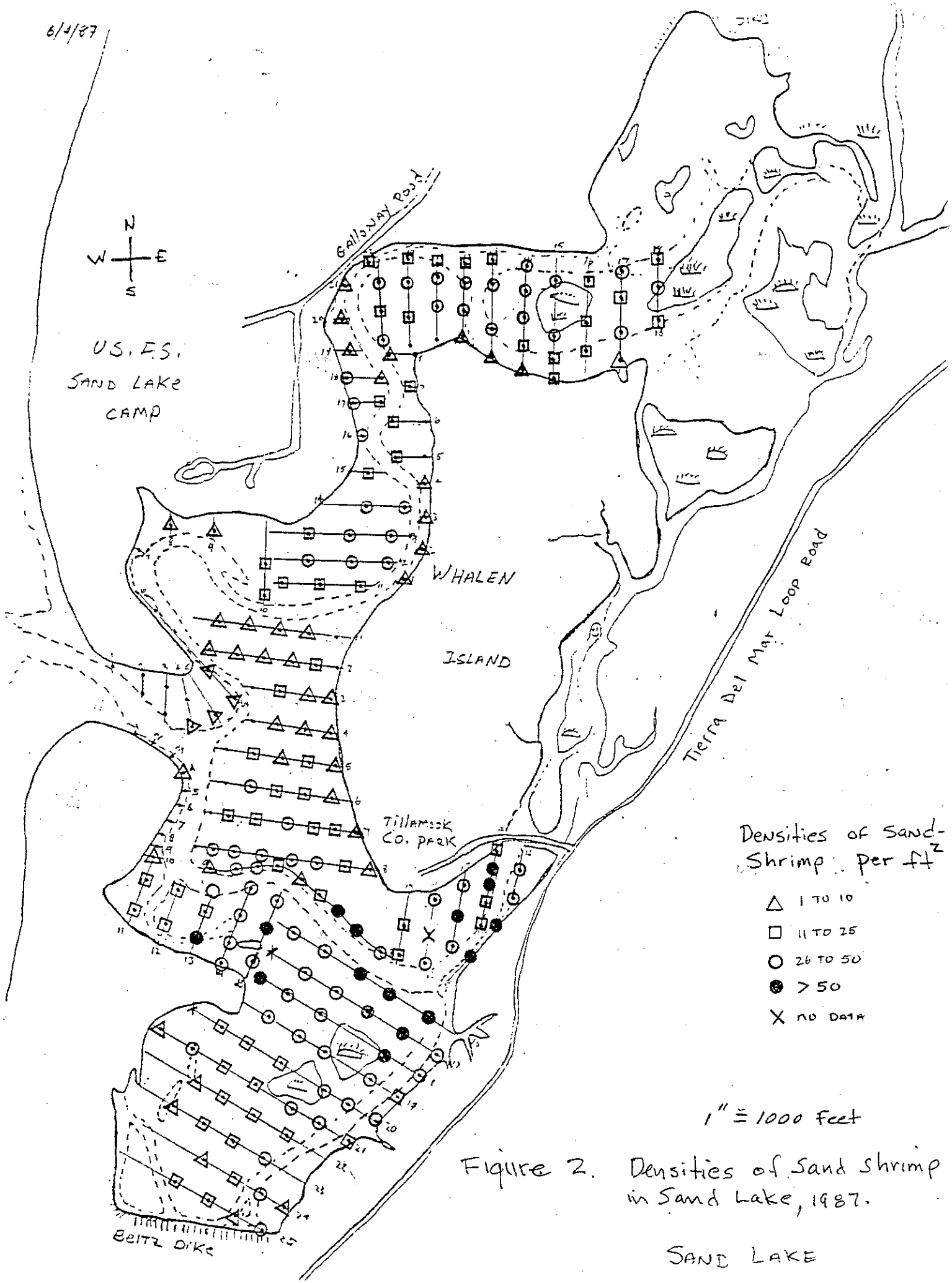

Figure 2. Densities of sand shrimp in Sand Lake, 1987.

SAND LAKE

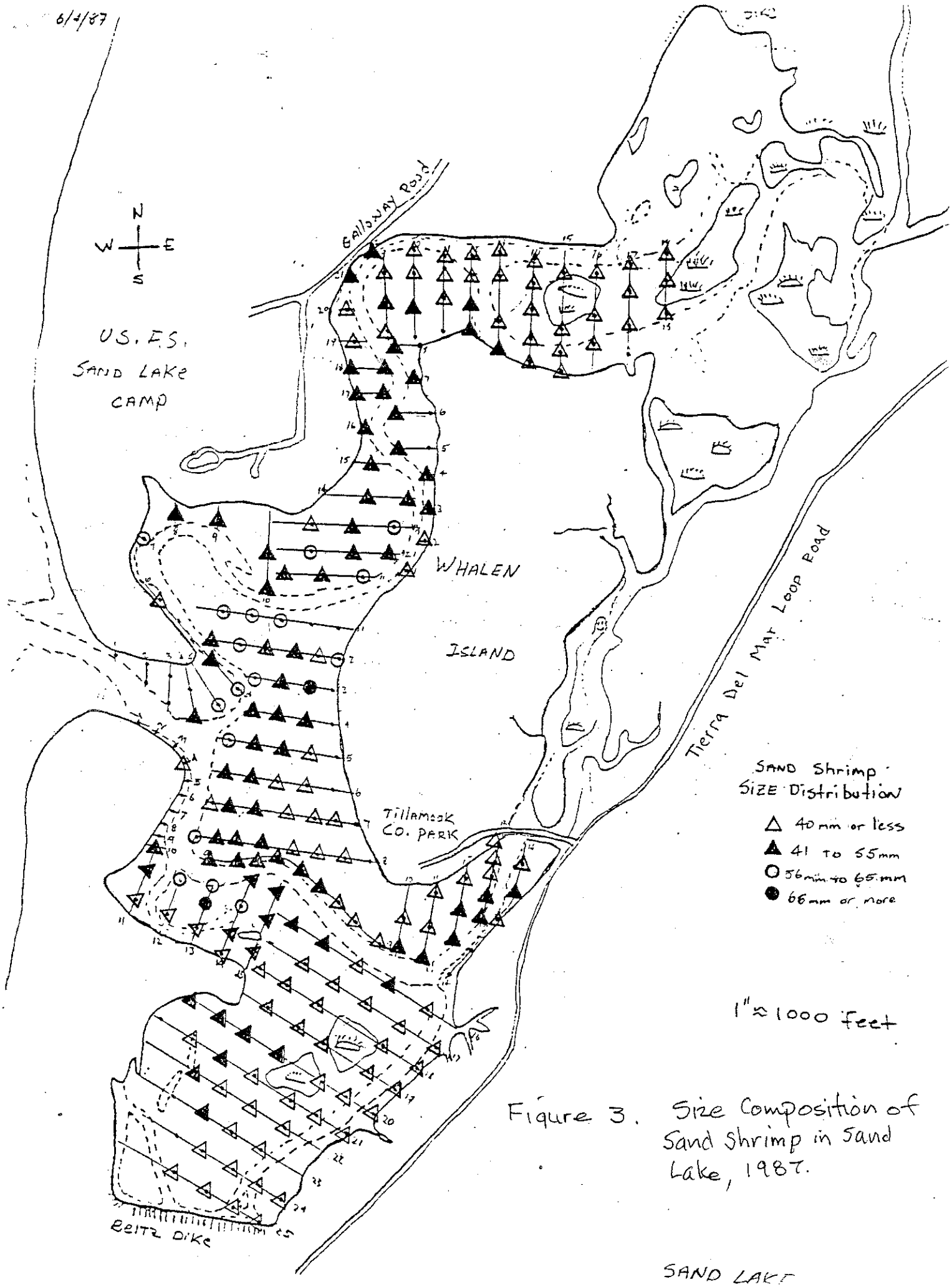

Figure 3. Size Composition of Sand Shrimp in Sand Lake, 1987.

SAND LAKE

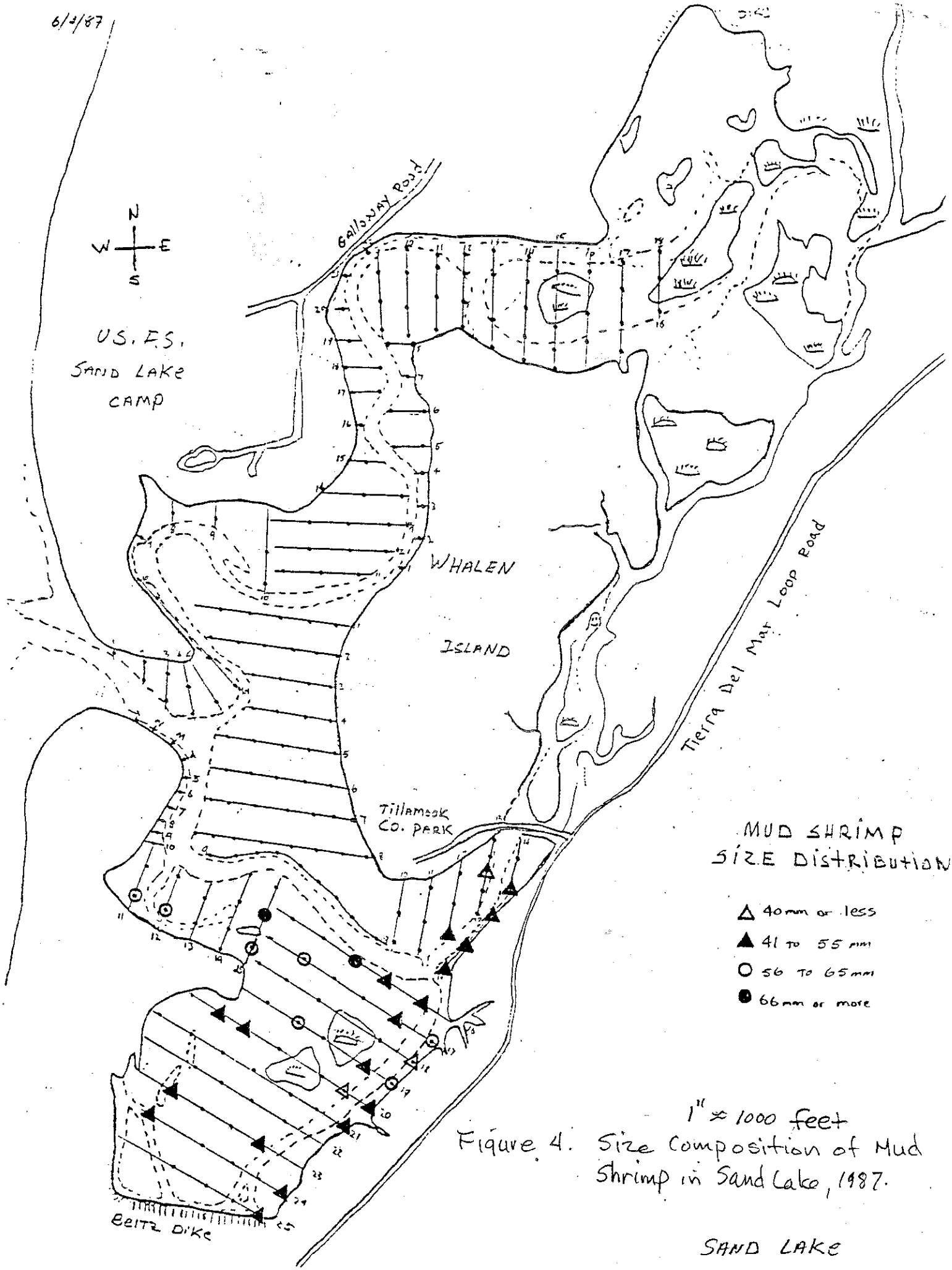

Figure 4. Size Composition of Mud Shrimp in Sand Lake, 1987.