

Summer spatial distributions of lake whitefish in the Apostle Islands, 2007-2009

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Introduction

- Lake whitefish have become one of the top commercially fished species, contributing close to 40% of U.S. output in the late 1990s.
- Whitefish abundance appears to have steadily increased lakewide since the early 1970s and especially since the early 1990s in the Apostle Islands despite increasing fishing pressure (Fig. 1).
- Previous studies, conducted during a period of low abundance, determined lake whitefish spatial distribution to be primarily contained within the Apostle Islands, with a tendency to move toward northern regions.
- An examination of current movement patterns will provide insight as to how movement has changed with increased abundance.

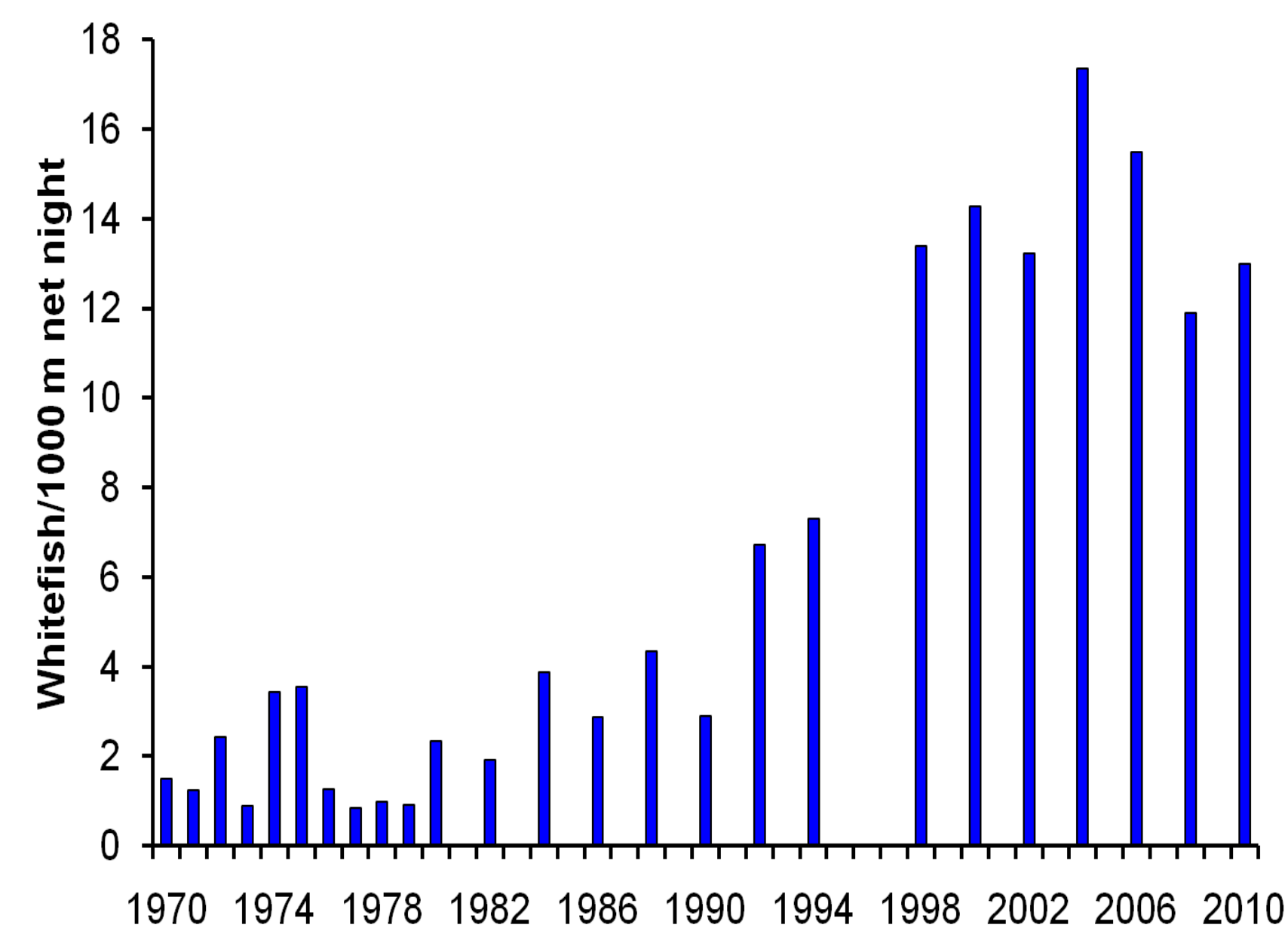


Figure 1. Lake whitefish CPEs from WiDNR summer assessment, 1970-2010.

Objective

- To determine the movement patterns of lake whitefish in the Apostle Islands region during a current period of high whitefish abundance and compare the results to whitefish movement patterns during periods of low abundance.

Methods

- Lake whitefish captured primarily by commercial trap nets in 54 locations throughout the Apostle Islands (Fig. 3)
- 6,212 lake whitefish tagged from 2007-2009 by WiDNR technicians using Floy t-bar anchor tags
- Recaptured fish primarily from commercial nets (Fig. 3)
- Net locations grouped by proximity; mapping and trend analysis in ArcGIS
- Straight-line minimum distance calculated using Haversine Distance Formula

Results

- Of 317 recaptures, all but 2 were recaptured within the Apostle Islands region
- 69% of recaptured fish were recaptured within five miles of the original marking location (Fig. 2)
- 63% recaptured within the same summer of marking
- Appeared to be a tendency to move towards the north-central region of the islands (Fig. 4)
- Recaptured whitefish spent a mean of 191 days at large; this corresponds to one full year due to seasonal effort

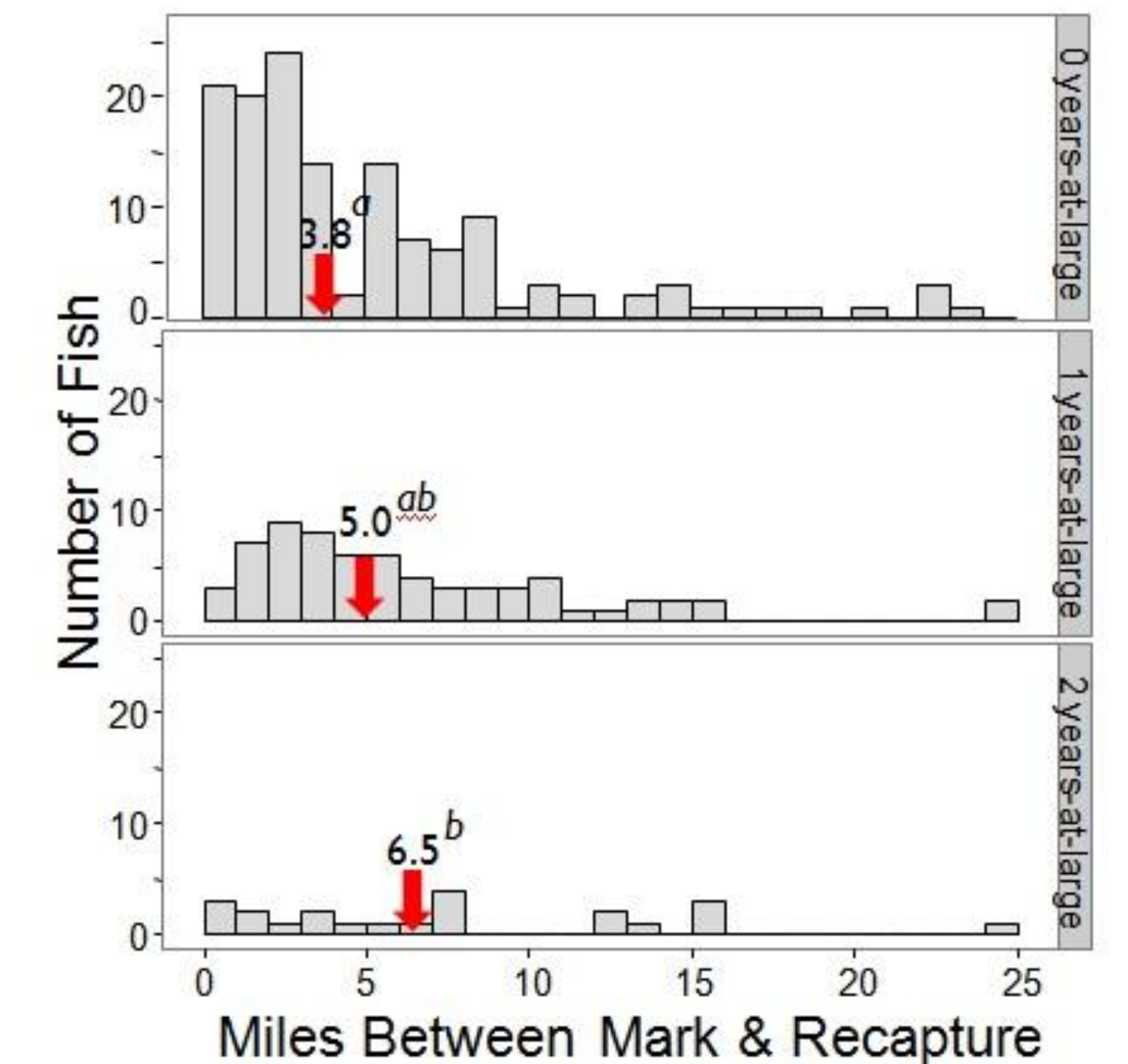


Figure 2. Distance traveled between captures for all recaptured fish for each year of recapture. Mean distances for each year are labeled and represented by the arrows.

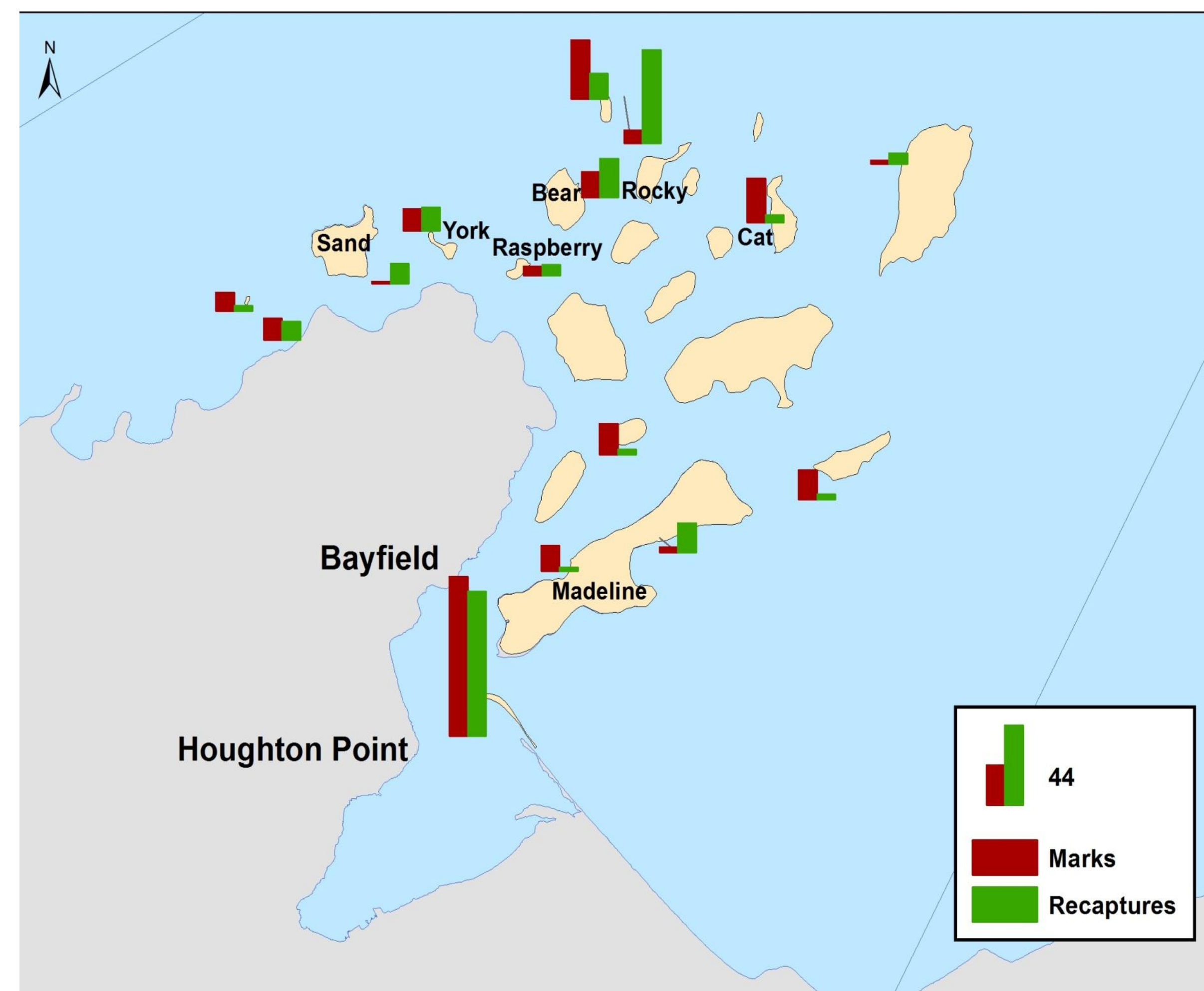


Figure 3. The number of marked and recaptured whitefish in each location of the study area. Legend shows size of bars representing 44 fish.

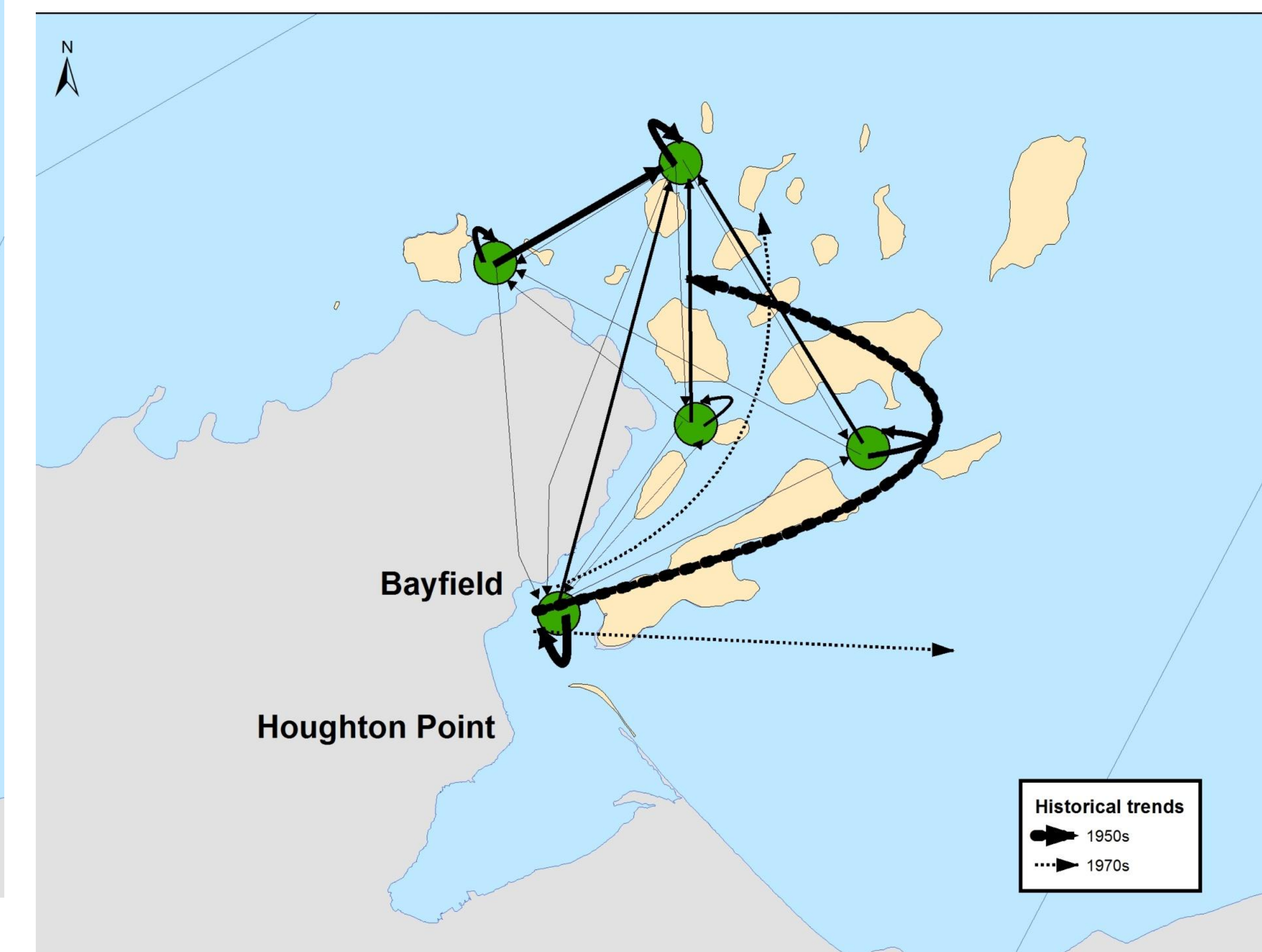


Figure 4. Trends in the movement of whitefish with historical trends superimposed.

Conclusions

- At current periods of high abundance, trends in movement do not appear substantially different from trends at periods of low abundance. (Fig. 4)
- Lake whitefish may demonstrate site fidelity.
- Movement patterns may indicate limited change in resource availability due to increased abundance.