INTRODUCTION

Maturity estimates are important in assessing stock reproductive potential as well as investigating spawning behavior patterns. Acoustic surveys provide a component of the pollock abundance estimates used in stock management. Female ovary development is estimated using macroscopic anatomical maturity keys during surveys targeting prespawning pollock stocks. The use of macroscopic keys allows researchers to assess maturity on a large number of fish easily and with minimal cost. However, maturity assessments are subject to error associated with interpretation of the key and when the key is applied to ovaries in transitional stages of development.

Here, we evaluated the use of a macroscopic maturity key deployed with Fisheries Monitoring and Analysis Division groundfish observers aboard commercial fishing vessels. Observers are in a unique position to collect data from broad temporal and spatial scales. In addition to macroscopic maturity assessments, observers collected ovary specimens. These collections were used to compare macroscopic maturity assignments with microscopic maturity staging seen through histological processing of tissue samples of the same fish.

Often, the most advanced oocyte stages are used to estimate ovary maturation. We believe this may overestimate the level of asynchrony developing oocytes assessed for fisheries management. We also evaluated the use of an acoustic key for determining maturity in female walleye pollock Theragra chalcogramma in Shelikof Strait, Alaska. Alaska Fishery Research Bulletin 12, 252–26

METHODS

HISTOLOGICALLY ASSESSED MICROSCOPIC MATURITY

Collecting, analyzing, and stage grouping microscopic maturity

Along with macroscopic maturity assessments in 2007 and 2008, observers collected ovary tissue from a subsample of macroscopically assessed fish for histological analysis. Each tissue sample was preserved in 10% formalin on the vessel. Once in the laboratory each specimen was prepared for microscopic observations by slicing to four microns, staining with a hematoxylin and eosin stain, and fixing to a slide. Approximately 500 histological specimens were collected. Oocytes were classified histologically according to Hindley (1986). Histological assessment of the ovary included describing the level of maturation using: 1) the most abundant, and 2) the most advanced oocyte stage present.

VISUAL COMPARISON BETWEEN MICROSCOPIC AND MACROSCOPIC STAGES

CONSTRUCTING GRAPHS AND MAPS

Phenology graphs were constructed using histologically assessed microscopic maturity (Figure 1) and observer-assessed macroscopic maturity stages (Figures 3 and 4). Data from all years available were combined to analyze seasonal trends. Colored lines indicate percent maturity stage per date and the gray shading indicates sample numbers. The dates are binned over five day intervals. Date intervals with less than 50 samples were not plotted. For maps each stage is represented by a unique color. Rules for Observer Program data confidentiality were addressed by insuring that fishing locations plotted were not unique for less than three vessels within a 20X20 nautical mile area.

REFERENCES