

# Preliminary Age & Growth of Skates (*Raja* and *Bathyraja* species) in the Southern Alaska Peninsula Using Vertebrae:

## Big Skate (*Raja binoculata*), Longnose Skate (*Raja rhina*), Aleutian Skate (*Bathyraja aleutica*) & Bering Skate (*Bathyraja interrupta*)

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### ABSTRACT

In this preliminary study, we investigate ageing thoracic vertebrae from four skate species, big skate (*Raja binoculata*), longnose skate (*Raja rhina*), Bering skate (*Bathyraja interrupta*) and Aleutian skate (*Bathyraja aleutica*). Samples were collected from the waters surrounding Kodiak Island and the Alaska Peninsula, from February to June and September of 2003, by scientists from the Alaska Department of Fish and Game (ADFG) and the Alaska Fisheries Science Center (AFSC). Vertebra preparation techniques were investigated to determine the “best method” of optimizing the readability of the ageing surface. Both whole vertebrae and vertebral thin sections were prepared and aged. Interpretation of opaque and translucent zones (vertebral bands) varied between preparation techniques and species. Older ages for all the species were evident with an increase in total length.

The sex ratio for all of the aged skates was 3:1 females to males. The clearest vertebral bands from whole vertebrae were from the big skate followed by the Aleutian, longnose and Bering skates. Big skates also had the clearest thin sections followed by longnose skates. The oldest ages were from Aleutian and Bering skates; however, the Bering skates sample size was small.

### METHODS

#### Whole Vertebrae Preparation and Ageing

Whole vertebrae were initially prepared by removing tissue with the use of Dermestid beetles. Bleach is also being investigated as an alternative method to remove tissue from the vertebrae prior to ageing (See image g).

#### Whole Vertebrae Ageing

Whole dried vertebrae were aged using a dissecting microscope with reflected light on a dark surface. Mineral oil was applied to the centrum to enhance the opaque and translucent zones.

#### Thin section Preparation

Thin sections were removed from whole vertebrae using two blades on an Isomet low speed diamond blade saw at a thin section thickness of approximately .35 mm. Sections were then mounted on a slide with Flo-Texx (liquid cover slip).

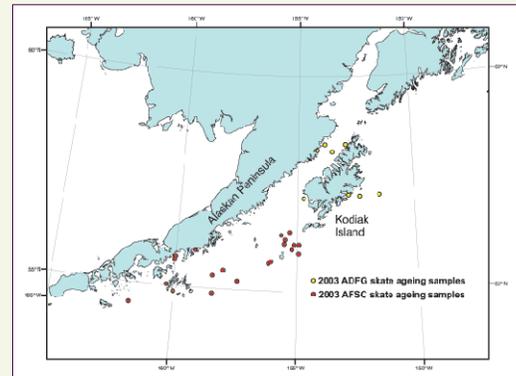
#### Thin section Ageing

Thin sections were aged with a compound microscope using transmitted light.

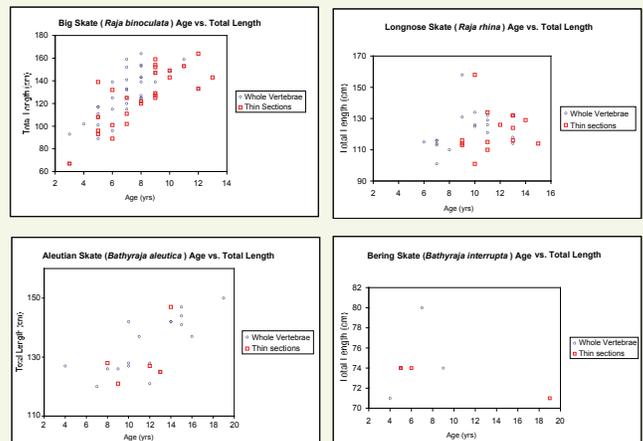
- Ages have been estimated.
- Images are from separate specimens.



### COLLECTION AREA



### RESULTS



### FUTURE RESEARCH

Investigate enhancing the reading surface of both whole vertebrae and vertebral thin sections with clearing and staining techniques including histopathology dyes and cobalt/silver nitrate.

### CONCLUSIONS

- Σ The vertebrae from these four skates are readable from both preparations. Clarity varied among specimens both within and between species. Clearing and staining may enhance the ageing surface affecting age estimation.
- Σ Deposition of alternating opaque and translucent bands was found in both preparations leading to the presumption of annual growth.
- Σ Determination of the first year and edge was estimated and future analysis is necessary.



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