

Figure 1. Towed Underwater Benthic Sled (TUBS) version IV with side-facing camera and strobe used during the 1974 red crab survey. TUBS IV was 2.7 m long, 1.9 m high and weighed 1,225 kg.



Figure 2. Example of an image from the 1974 red crab survey showing a red crab, silt disturbed by the sled, the watch, the card reading the station number and the depth indicator. The illuminated area of the image is the portion of the image within the pool of light from the strobe. The watch, the station number and the fathometer readout that are captured next to each image were inside the camera housing. It is impossible to say exactly what the setup was, but the method of including information from other instruments with each exposure was widely employed at that time (Tom Kleindinst, WHOI Graphics, pers. comm.). The camera was programmed to expose the film through the main lens looking out onto the ocean floor every ten seconds, and then wind the film a certain distance, which left a space in between the exposed areas. As the film wound away from the main camera aperture, it was exposed to the watch, card and meter which were in their own independently lit chamber and separated from the film by glass and a piece of black material with cutouts for each. The film was exposed to the watch, card and meter in the space between the exposures of the ocean floor. Since the film was exposed first to the main camera lens which took the big picture and then had to wind some distance before being exposed again to the inside chamber, the information next to each image is offset by one or more exposures.

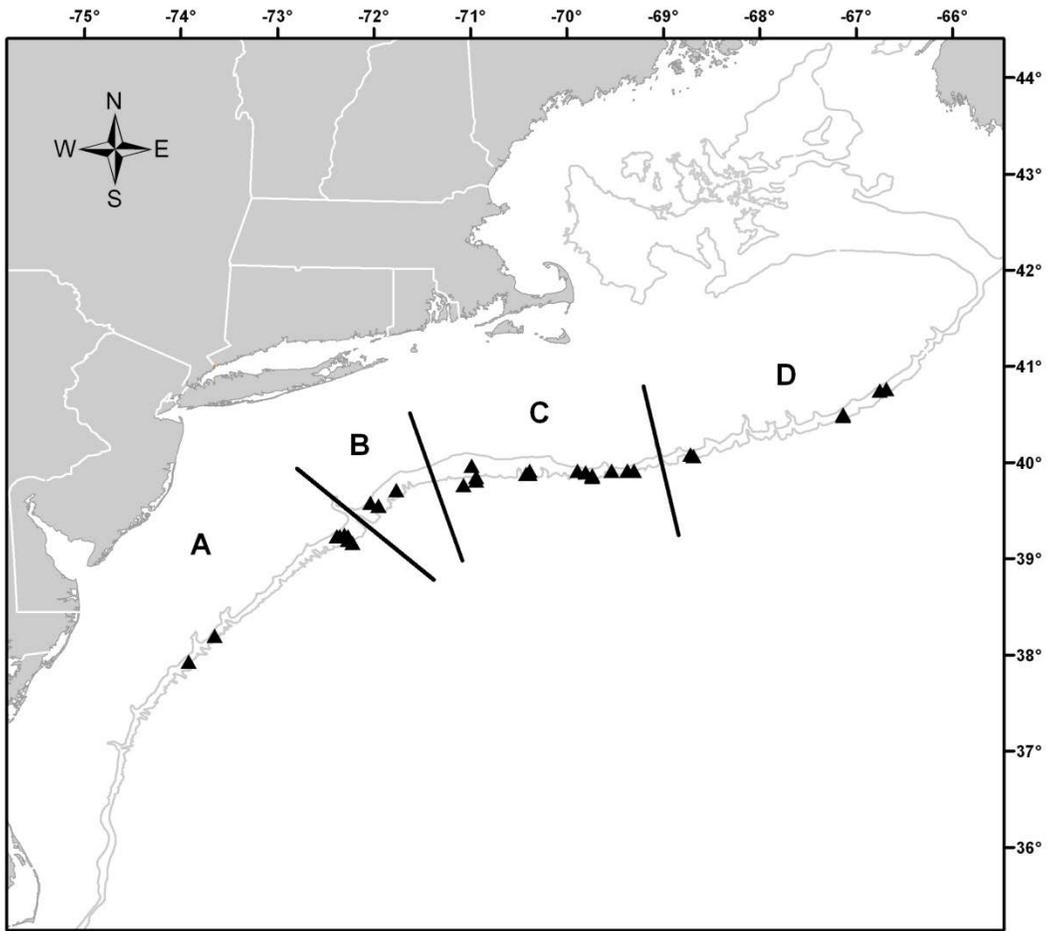


Figure 3. Locations of all the camera tows from the 1974 red crab survey, divided into the four geographic zones.

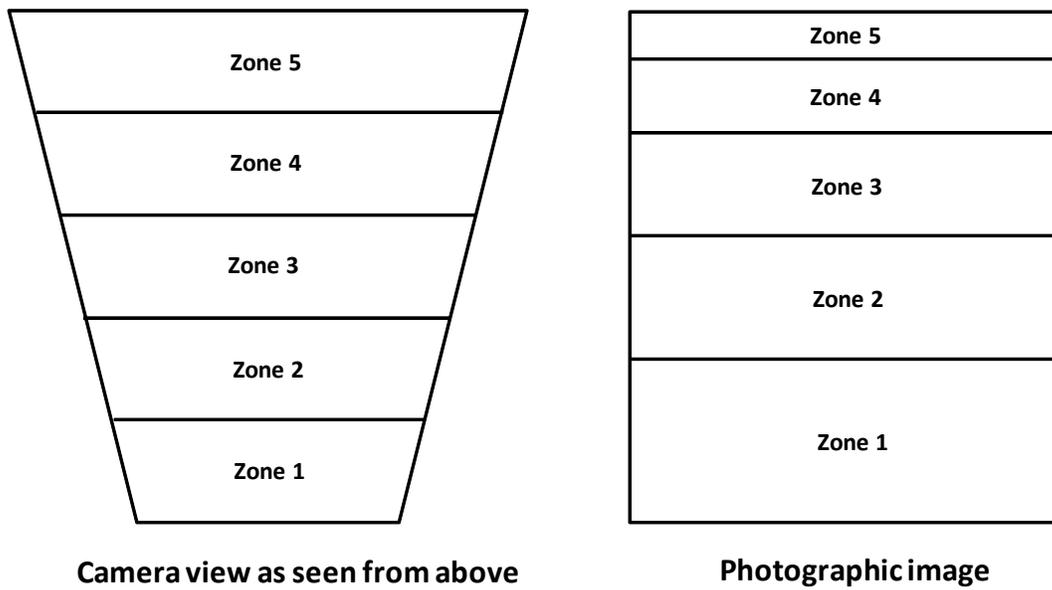


Figure 4. After Patil, et al. (1979). Diagrams of the camera view (left) and its photographic image (right), showing zones of equal height as they would look in both views. These zones are much like those used to subdivide the 1974 images.

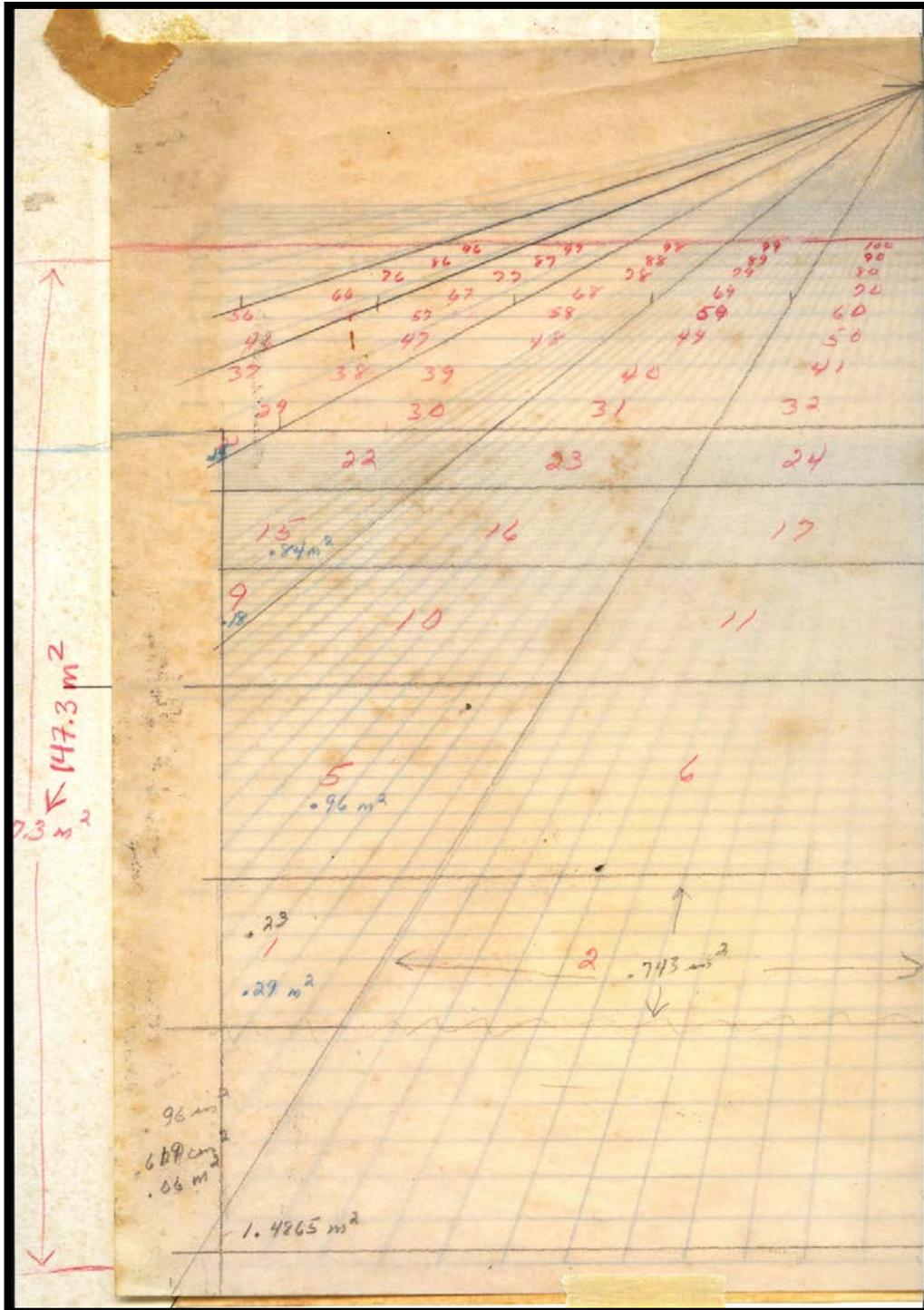


Figure 5. The left half of the grid used to determine the area of the ocean floor covered in each image. Each rectangle represents the same area but becomes more distorted as the distance from the camera increases. The areas of the rectangles only partially covered by the camera's view have been determined and written in or near the rectangle in question. The grid is 10 inches wide by 7 inches high.

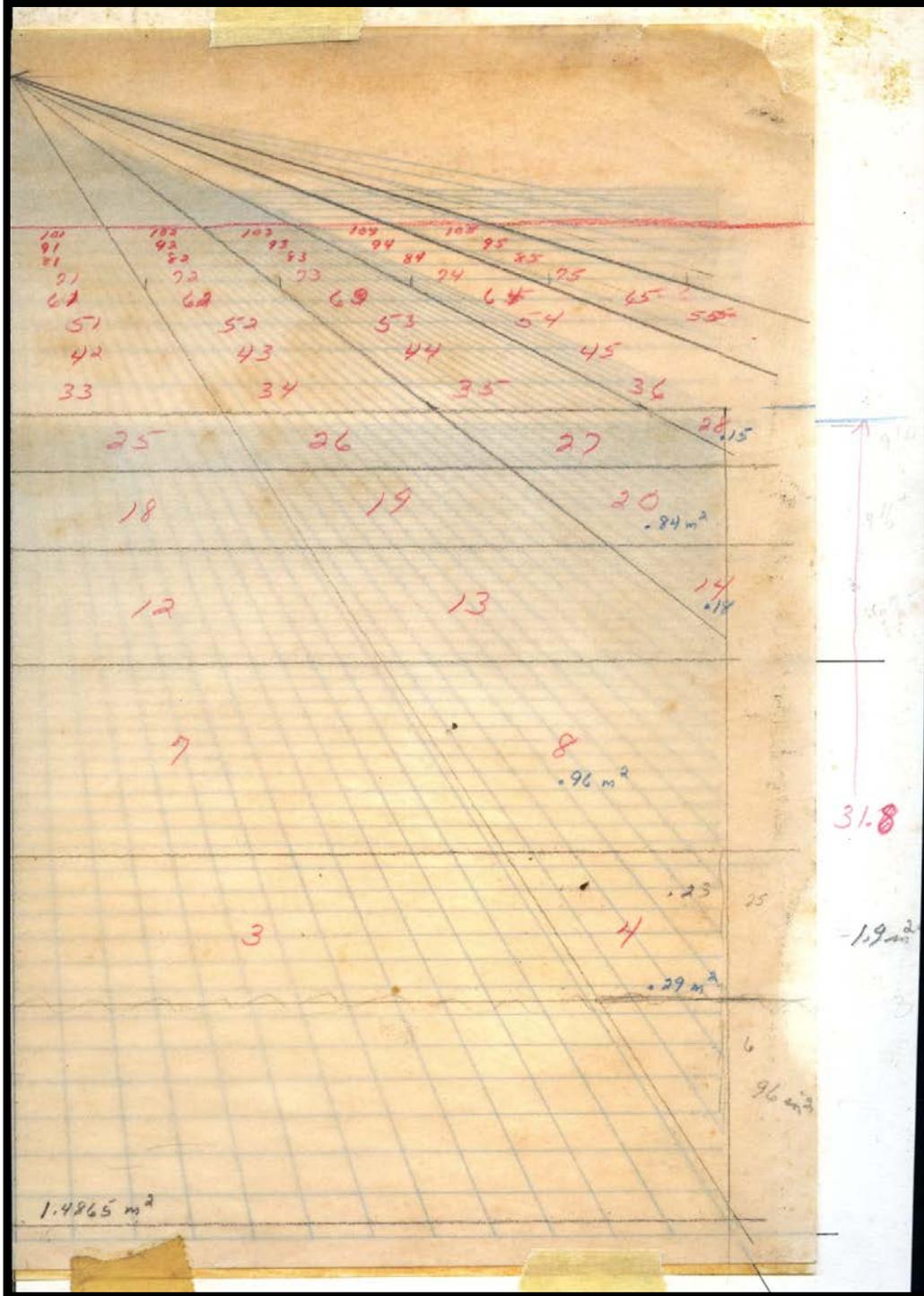


Figure 5 continued.

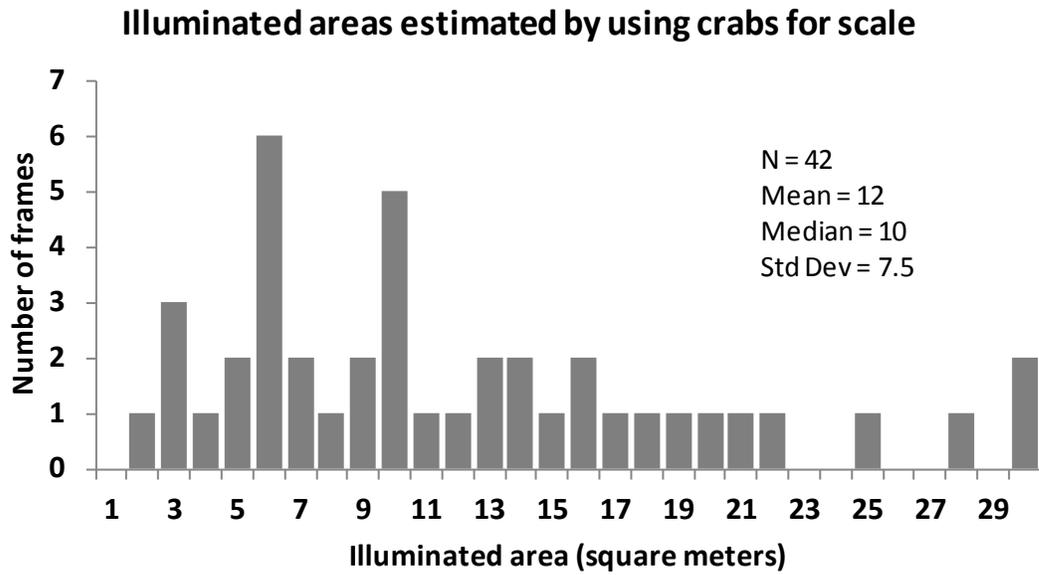


Figure 6. Estimated illuminated area of 42 bottom photographs from 1974. Each photo featured a red crab near the front of the image which was used for scale.

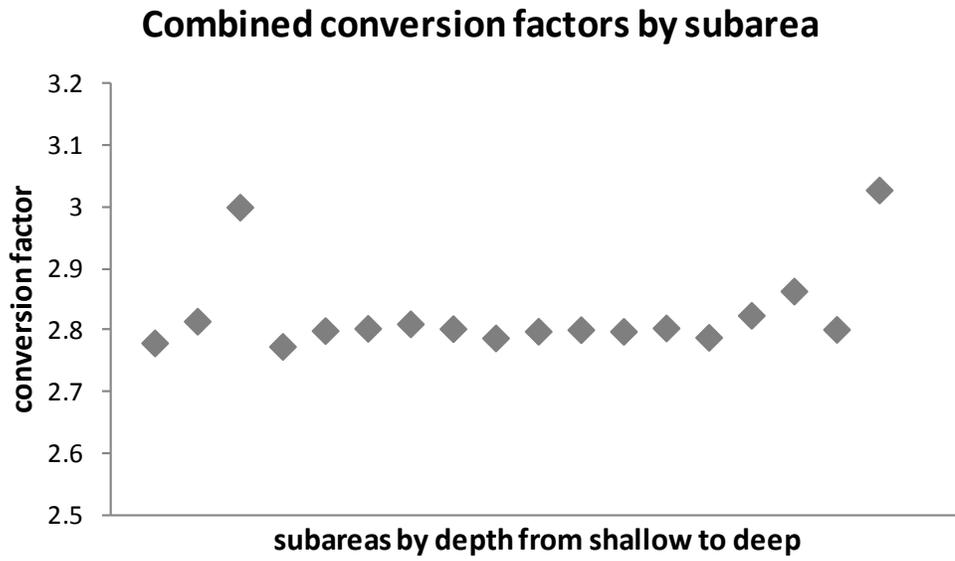


Figure 7. The conversion factors applied to the total number of crabs (zones not differentiated) seen in the illuminated area to extrapolate from the illuminated area to the camera view.