Marine Life on the Move

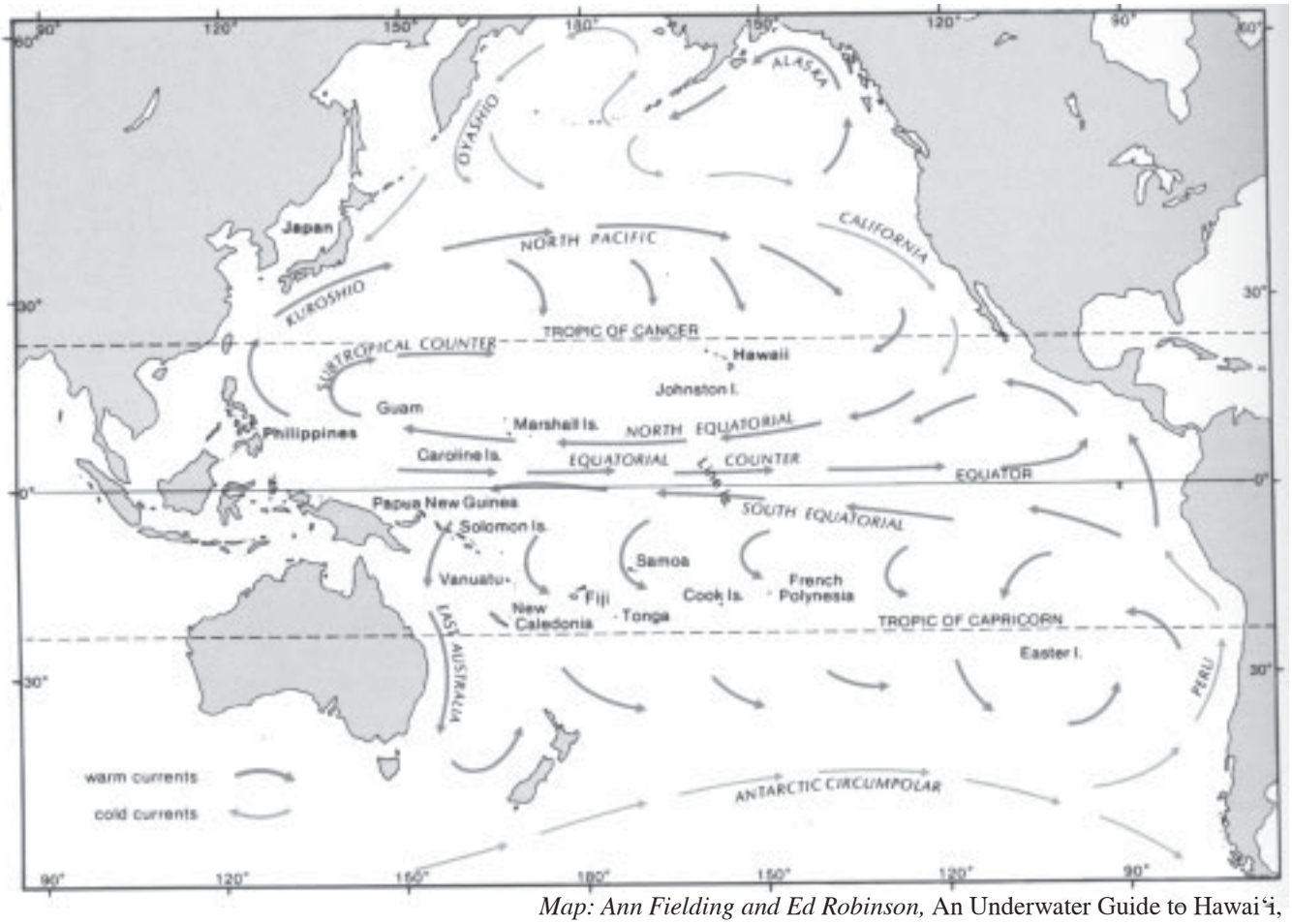
Reproduction among reef fishes is highly varied and often quite complex. The vast majority of fishes lay eggs. The birth of fully developed young is extremely rare among bony fishes and common only among cartilagenous fishes [fishes such as sharks and rays whose skeletons are largely composed of cartilage rather than bone]. Eggs of fishes are typically small (about 1 mm in diameter) and generally take about a week to hatch. The eggs hatch into larvae which bear little resemblance to the fishes familiar to most people. Larvae start out as tadpole-like creatures with large eyes, without pigment or scales, and often with an external yolk sac to nourish them until their gut develops.

Larvae are adapted to a pelagic life, drifting with the [ocean] currents and feeding on phytoplankton to progressively larger zooplankton as they grow. Some larvae actively swim, guided by environmental cues that may help them find a suitable settling site. In many species the larvae develop enlarged bony plates or spines that help protect them from predation [and make them more buoyant]. In some species larvae settle and transform into juveniles within days of hatching while in others they may go through a prolonged late larval stage that may last up to two months or more. Once they locate a suitable place to settle, larvae become bottom-oriented and rapidly acquire the pigments, scales, and full complement of fin rays characteristic of juveniles. Juveniles usually resemble adults in form but, in reef species, may often have a color pattern entirely different from that of adults.

— *Robert F. Myers,* Micronesian Reef Fishes: A Guide for Divers and Aquarists, *3rd ed., Sea Challengers, 1999, pp. 19-20.*

1) In the space below, make a drawing that represents each phase of the reproductive cycle of most marine fishes, as described in the passage above.

2) Assume that your drawing represents a species of fish native to the Philippines that dispersed to Hawai‘i. Label each part of the reproductive cycle on the map below to indicate where the organism would be at different stages of its life.
3) Formulate a hypothesis to explain the difference in the rate of endemism in Hawaiian marine



Map: Ann Fielding and Ed Robinson, An Underwater Guide to Hawai‘i, *University of Hawai‘i Press, Honolulu, 1987*

invertebrates and Hawaiian insects. Species that are “endemic” to Hawai‘i are found only in Hawai‘i and nowhere else on earth.

	Rate of endemism
Hawaiian marine invertebrates such as mollusks, sea stars, and brittle stars	Approx. 20 percent of species are endemic
Hawaiian insects	Approx. 94 percent of species are endemic

4) Do ocean currents favor the dispersal of marine life from the South Pacific to Hawai‘i? Why or why not?

5) What part of the world has the greatest concentration of marine species and has acted as the center for dispersal for marine life in the tropical Indian and Pacific oceans, from Africa to Hawai‘i?

   Name the area here, and circle it on the map of the Pacific on the previous page.

6) Name three factors that influence whether a coral species from Indonesia would be able to successfully colonize Hawaiian waters.

7) Compare the means by which Polynesian voyagers and planktonic marine organisms travel on ocean currents to reach Hawai‘i.