Scientist Shares Research on Restoration

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Dr. W. Judson Kenworthy shared his knowledge of techniques designed to restore seagrass habitats damaged by boat propellers and hulls during a recent workshop held in the Florida Keys. Kenworthy, a research scientist from NOAA's Coastal Center for Fisheries and Habitat Research in Beaufort, N.C., has been developing, researching, and assessing seagrass restoration techniques in the Florida Keys for nearly two decades and has published extensively on this topic. The workshop was hosted by the Florida Park Service and sponsored by the Florida Keys National Marine Sanctuary.

On a field trip to view experimental restoration sites, workshop participants examined the new growth of shoal grass around one of the bird stakes.

Resource managers, scientists, educators, and interested citizens listened attentively as Kenworthy described the most common seagrass in the Florida Keys, turtle grass, *Thalassia testudinum*, as the "redwood" of seagrasses. In contrast, Cuban shoal grass, *Halodule wrightii,* and manatee grass, *Syringodium filiforme* are "ground covers and shrubs" because of their relatively fast-growing, colonizing nature. When the slow-growing turtle grass dominates an area, it is considered to be a mature seagrass community that can exist indefinitely under the right conditions.

"When a boat impacts a turtle grass bed, it damages a habitat that does not repair itself readily," commented Kenworthy. Often, propellers cut deeply into the underground stems called rhizomes, cutting off the growing tips, halting growth in the affected rhizomes. In addition, rhizomes are not genetically programmed to grow downward into the prop scar or blow-hole, a crater formed when a boater tries to "power off" the flat. Instead, rhizomes grow outward and upward. Recolonization of the damaged area is hindered further because the loose, coarse sediments that often fill the holes are not suitable for new seagrass colonization. Currents move these sediments around readily, further preventing colonization. Tropical storms and hurricanes have been known to cause significant erosion to already damaged banktops, which took several hundred years to form, building up from the bottom, layer by layer over time.

Understanding the natural succession toward a mature turtle grass community is necessary to fully appreciate the "modified compressed succession" restoration technique described by Kenworthy at the workshop. The goal of restoration of a seagrass site is to return the area to the original community, which in many cases is turtle grass. With this method, resource managers "jump start" the succession process, attempting to bring the site back to the original community sooner than would occur in nature. Kenworthy is careful to point out that a mature turtle grass community takes years to develop and supports a diverse assortment of invertebrate and vertebrate life that can not be easily replaced.

Various tools are used when implementing this technique, depending upon the extent of damage and other factors. In water about 3 feet deep or less, stakes that are attractive roosting posts for cormorants and terns, are driven into the sediment. Using the feces of the birds as fertilizer, shoal grass quickly grows, forming a halo at the base of each post. This process of new growth usually takes 1-2 years, then the stakes are removed. The new growth of shoal grass serves to hold the sediments in place and allows for the colonization of the turtle grass over time. In deeper areas and/or larger damaged areas, fertilizer is added and new shoots of shoal grass are planted to jump start the colonization. When needed, sediment tubes, biodegradable bags of limestone sediments, are placed into the scar or hole to provide stability to the sediments and bring the sediment level up to its original point. The sediment tubes, which can be made in different shapes, may contain plant fertilizers known to promote seagrass growth.

The restoration techniques described by Kenworthy are only one facet of the collaborative restoration program in place at the Florida Keys National Marine Sanctuary. This program uses sophisticated damage assessment methods to measure injuries to the natural resources caused by vessel groundings and conduct long-term monitoring of the restoration site.

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