A chemosynthesis based food chain supports commercial lobster fisheries

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Chemosynthetic symbioses are common in organic rich shallow water habitats such as seagrass beds, where they play important ecosystem functions. Lucinid bivalves are the primary chemo-symbiotic species, often dominating the infaunal biomass, but there is little information on the fate of this chemosynthetic biomass in the food web. We used bulk stable isotope analysis (carbon, nitrogen and sulfur) to examine the diet of a foraging predator in seagrass ecosystems, the Caribbean spiny lobster (Panulirus argus). Stable isotope mixing models indicate that a significant portion of spiny lobster diet is obtained from chemosynthetic primary production in the form of lucinid clams. This nutritional pathway was previously unrecognized in the spiny lobster's diet and is the first conclusive evidence that chemosynthetic primary production supports commercially important fisheries. We also present evidence of additional pathways for chemosynthetic energy transfer through shallow water food webs.