



*Nestled into the Atlantic Coast's continental shelf are a series of deep submarine canyons and soaring seamounts, resembling the canyons and mountains of the American West. These unique habitats provide critical natural refuges for a diversity of marine life, from colorful deep sea corals to giant sperm whales. Relatively undisturbed for thousands of years, these sanctuaries are now in danger of irreversible damage from advanced fishing technologies and renewed oil and gas exploration.*

### **The Atlantic Coast's Ancient Submarine Canyons and Seamounts**

Carved into the continental shelf offshore is a series of canyons stretching from Massachusetts to Virginia.<sup>1</sup> Generally believed to have been formed by strong currents flowing from rivers and earthquakes in the seafloor, they plummet down several miles, over stone cliffs filled with fish, crustaceans, and rare deep-sea corals and sponges.<sup>2</sup> At the northern end of the canyons' range, four massive underground seamounts, essentially "extinct drowned volcanoes," rise thousands of feet over the ocean floor.<sup>3</sup> With fast flowing currents carrying microscopic food into and removing waste from the seamounts and canyons, and the solid undersea walls providing a hard substrate foundation for corals and other bottom dwelling species, the seamounts and submarine canyons provide breeding and foraging habitat for an astonishing diversity and abundance of fish, mammals, and invertebrates.<sup>4</sup>

### **Our Submarine Canyons and Seamounts Are Rich Marine Habitats**

- The Atlantic canyons and seamounts provide valuable habitat for hundreds of fish and crustacean species, including monkfish, various species of flounder, hakes, and skates, American lobster and red crab, as well as such less well-known species as the cod-like grenadiers and bioluminescent lanternfish. Swordfish and tuna traverse the canyons, feasting on abundant schools of fish and squid.<sup>5</sup> Crustaceans and fish like tilefish construct large burrows into the clay canyon walls, giving them the appearance of miniature, underwater versions of the pueblo villages of the American Southwest.<sup>6</sup>
- Endangered sperm whales, beaked whales, dolphins, and other marine mammals come to the canyons and seamounts to feed on the schools of squid and fish that congregate there.<sup>7</sup> Endangered right whales (only around 300 individuals remain) pass through the canyons eating plentiful plankton as they go.<sup>8</sup>
- More than 200 species of invertebrates have been identified in the Atlantic submarine canyons and seamounts, including species of black corals, boreal red corals, sponges, and feather-like sea pens.<sup>9</sup> In a single day of dives in Hudson Canyon off New York City, scientists identified a variety of species, ranging from orange sea and brittle stars, to white sea urchins and a violet, foot-long sea cucumber.<sup>10</sup>
- The types of coral and sponge communities in the seamounts and canyons have yielded genetic, medical, and technological advances in the form of compounds used in cancer treatments, models for artificial synthesis of human bone, and elements in the construction of more durable optic cables.<sup>11</sup> Investigations of the seamounts to date have turned up more than a dozen new species and many more that are rare or unusual for the region.<sup>12</sup>

### **These Special Places Are in Danger of Irreversible Harm**

Largely sheltered from human intrusion, the Atlantic canyons and seamounts' diverse and abundant ecosystems may soon suffer irreparable damage. The use of massive weighted bottom trawling gear is ever-expanding and could invade the deep canyons – just one trawl would destroy rare and complex coral communities that grow extremely slowly.<sup>13</sup> New oil and gas exploration, including drilling and seismic surveys, would introduce significant oil, toxics, and sound pollution into these delicate marine environments. Only one canyon in the mid-Atlantic is currently protected from bottom trawling; three southern New England canyons also have protection.<sup>14</sup> None of the canyons or seamounts are protected from oil and gas exploration activities. If these activities advance into the Atlantic submarine canyons and seamounts, the unique and fragile marine oases may never fully recover.

## **Destructive Fishing Practices Would Devastate the Canyons and Seamounts**

- While the hearts of the Atlantic's submarine canyons and seamounts have generally not been commercially fished because of their steep and rocky topography, bottom trawling advances are making it increasingly possible to fish challenging seafloor landscapes as commercial fishing enterprises seek out new populations or species to catch.<sup>15</sup>
- Trawling nets stretching up to 40 meters in width and held open by pairs of seven-ton steel trawl doors crush or rip out habitat.<sup>16</sup> If bottom trawlers begin to fish the Atlantic seamounts and submarine canyons, they would leave bare, scarred sand, mud and rock where corals, abundant sponges, fish, invertebrates, and mammals now nurture each other, destroying in just a few brief acts what took centuries to build.<sup>17</sup> A study of New Zealand seamounts found that trawled seamounts had 97 to 98 percent less coral cover than those that remain un-trawled.<sup>18</sup>
- According to the National Marine Fisheries Service, "Bottom trawling is the largest potential threat to deep coral habitat for several reasons: the area of seafloor contacted per haul is relatively large, the forces on the seafloor from the trawl gear are substantial, and the spatial distribution of bottom trawling is extensive."<sup>19</sup>

## **Oil and Gas Exploration and Development Would Harm The Precious Marine Communities**

- Between 1959 and 1983 dozens of exploratory oil and gas wells were drilled in or near several major submarine canyons off the Atlantic continental shelf.<sup>20</sup> With the moratoria against oil and gas drilling in the Atlantic now lifted, a number of oil and gas companies have applied for permits to obtain new data on resources in these same areas.<sup>21</sup>
- Even small oil spills can kill marine organisms and disrupt the function of marine ecosystems. Field studies have shown that oil concentrations as low as 0.7 ppb caused developmental malformations, genetic damage, mortality, decreased size at hatching, and impaired swimming in exposed herring populations.<sup>22</sup> Marine mammals like dolphins and whales can also inhale oil when they surface to breathe which causes damage to mucous membranes and airways and can be fatal.<sup>23</sup>
- Even without the dangers of an oil spill, each drilled well also generates drilling muds, cuttings, and produced water which contain toxic metals such as lead, chromium and mercury, and potent carcinogens like toluene and benzene.<sup>24</sup>
- During the exploratory stages of offshore oil and gas development, researchers conduct seismic surveys of the resources below the ocean floor, blasting high-decibel acoustic energy pulses into the ocean from airguns on their ships.<sup>25</sup> The auditory assault from seismic surveys has been found to damage or kill fish eggs, larvae, and fry and to impair the hearing and health of fish, making them vulnerable to predators and leaving them unable to locate prey or mates or communicate with each other. These disturbances disrupt and displace important migratory patterns, pushing marine life away from suitable habitats like nurseries and foraging, mating, spawning, and migratory corridors.<sup>26</sup> In addition, seismic surveys have been implicated in whale beaching and stranding incidents.<sup>27</sup>

## **The Atlantic's Submarine Canyons and Seamounts Need Our Protection**

Submarine canyons and seamounts host vibrant ecosystems with a diversity of species crucial to human biotechnology and resource sustainability. But without swift action to protect these habitats from the dangers of bottom trawling and oil and gas exploration and development, their delicate ecosystems could disappear forever. We need to act now to protect them.

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