Identification of cryptic species can have profound implications in fishery management, conservation and biodiversity contexts. In the North Atlantic, the genus Sebastes is currently represented by four species, although additional cryptic species have been assumed. The connectivity of the gene-pools within the genus in Greenland waters, in particular, remains largely unexplored. Using a panel of 13 microsatellite markers for 720 fish, we explored the species complex of Sebastes norvegicus in Greenland waters. Genetic analyses provided evidence for three cryptic species in samples that were morphologically identified as S. norvegicus. They were termed S. norvegicus-A, S. norvegicus-B, and S. norvegicus-giants. A few phenotypic features exist to identify adult S. norvegicus giants, but no characteristics have been identified for the two other cryptic species. The proposed cryptic species should be recognized in the management regime to ensure sustainable exploitation and conservation of Sebastes species in Greenland waters.