began sampling shellfish in the impacted areas during the 2005 bloom. Sampling continued in 2006 and toxicity levels above the action level were still being detected for moon snails and whelk from federal waters off the coast of Massachusetts (Table 3). In that region, the only other species that remained toxic was the sea scallop (*P. magellanicus)*, in the viscera (Table 3). Sea scallops are known to retain toxins in viscera for long periods of time compared to other co-occurring species [104]. These data demonstrate the need to monitor toxicity for these non-traditional seafood products, even after bloom conditions have dissipated.

Table 3. Shellfish collected from New England, USA, federal waters in 2006. All testing was done by H^3STX receptor binding assay. Highlighted results indicate individuals above the action level (80 µg STX eq./100g tissue). M = male, F = female; LOD = below detection limit.

Sampling Date	Common Name	Scientific Name	Number of Animals	Sampling Coordinates	STX eq. (µg/100g)
7-8-06	Ocean Quahog	*Arctica islandica*	8	41 00.183N 70 44.543W	7.2
7-8-06	Ocean Quahog	*Arctica islandica*	3	41 06.476N 70 27.150W	11.6
7-9-06	Whelk	*Busycon sp.*	3	41 25.057N 70 02.751W	234.3
7-9-06	Atlantic Surfclam	*Spisula solidissima*	3	41 25.057N 70 02.751W	15.6
7-9-06	Blue Mussels	*Mytilus edulus*	12	41 23.836N 69 53.954W	19.5
7-9-06	Blue Mussels	*Mytilus edulus*	12	41 23.836N 69 53.954W	26.3
7-9-06	Northern Moon Snail	*Lunatia heros*	3	41 26.084N 70 03.000W	265.5
7-9-06	Northern Moon Snail	*Lunatia heros*	7	41 23.836N 69 53.954W	321.0
7-10-06	Sea Scallops	*Placopecten magellanicus*	9	42 09.865N 70 18.279W	228.8
7-10-06	Sea Scallop viscera (F)	*Placopecten magellanicus*	1	42 09.865N 70 18.279W	93.6
7-10-06	Sea Scallop viscera (M)	*Placopecten magellanicus*	1	42 09.865N 70 18.279W	131.9
7-11-06	Ocean Quahog	*Arctica islandica*	11	42 12.025N 70 22.017W	<LOD
7-11-06	Sea Scallop	*Placopecten magellanicus*	6	42 11.391N 70 19.700W	50.6
7-11-06	Northern Moon Snails	*Lunatia heros*	6	42 11.391N 70 19.700W	318.9

7-11-06	Ocean Quahogs	*Arctica islandica*	12	42 12.025N 70 22.017W	<LOD
7-11-06	Blue Mussels	*Mytilus edulus*	9	42 12.025N 70 22.017W	5.0
7-11-06	Atlantic Surfclam	*Spisula solidissima*	2	42 11.391N 70 19.700W	16.1
7-11-06	Ocean Quahog	*Arctica islandica*	5	42 12.025N 70 22.017W	12.0
7-11-06	Ocean Quahog	*Arctica islandica*	4	42 11.391N 70 19.700W	0.2

* Number of whole animals homogenized to form representative sample.

** For sea scallops only combined viscera and gonad tested, unless otherwise indicated.

3.2 Crustaceans

Among non-filter feeding, non-molluscan species, STXs have been found most commonly in xanthid crabs (Table 4) [156-159]. In some cases, toxins were believed to be derived from the calcareous alga *Jania* sp., consumed by the crabs [160]. STXs have also been found in other crab species, lobsters, crayfish, penaeid shrimp, barnacles (Table 4) and a few other crustacea [85, 147].

Many macrocrustaceans, including lobsters, are able to tolerate and hence concentrate extremely high levels of STXs. Lobsters can accumulate STXs by preying on, among other species, blue mussels which can have maximum toxicities of up to 23,000 µg STX eq/100g [162]. Jiang *et al.* (2006) [175] demonstrated the transfer and metabolism of STXs from the scallop *Chlamys nobilis* to spiny lobsters *Panulirus stimpsoni*. When experimentally fed with toxic viscera of *C. nobilis*, the hepatopancreas of *P. stimpsoni* showed the same toxin profile as that of the scallop, including GTX1-3, C1+C2 and B1, and dcGTX2+3. In spiny lobsters depurated with non-toxic squid, the mildly toxic N-sulfocarbamoyl toxins tended to transform into more highly toxic carbamates. After being fed toxic *C. nobilis* for six days, spiny lobsters selectively accumulated N-sulfocarbamoyl toxins with low toxicity. The concentration of dcGTX (2+3) in *P. stimpsoni* decreased significantly and was not detectable after six days depuration, which was likely due to their initial low level of toxicity.

Xanthid crabs can harbor toxins [176] in their tissues at concentrations (Table 4) that would be fatal to other animals [177]. Maximum toxin levels of more than 16,000 µg STX eq/100g were found in the xanthid crab *Atergatis floridus* in Australia, even though the majority of samples contained less than 80 µg STX/100g [161]. In Japan, an individual *Zosimus aeneus* contained nearly 16,500 Mouse Units (MU) per g [178], which is equivalent to 300,000 µg STX eq/100g [105, 161]. Several species of xanthid crabs produce a hemolymph protein, saxiphilin, that binds with STX and which may confer some resistance to possible toxic effects [177]. This mechanism may explain why some xanthid crab species appear to tolerate exceptionally high levels of toxins [177]. When a mixture of GTX2 and GTX 3 in 3% NaCl was injected into the right chela of *A. floridus*, the rate of dissipation within the crab was fairly high and suggested that high concentrations of toxin are not accumulated in all species [179].