

# 7

## Recommendations

**The health benefits of consuming fish are well documented and the Australian population should be encouraged to consume fish as part of a healthy diet. The levels of metals found in this study are generally very low and NSW fish can, and should, be promoted as a safe, nutritious commodity.**

Some very specific concerns were identified in this study and these suggest that a precautionary approach for some sub-groups of the fish-consuming population is warranted.

As this study analysed only a small number of swordfish specimens for mercury, it is recommended that a larger study take place to confirm the levels of mercury found in swordfish and to determine if a relationship between specimen size and mercury content exists. Limited data on mercury levels in swordfish sold in NSW are available. In 1976–78 a small survey reported a mean concentration of 1.98 mg/kg (Health Commission of NSW 1978), compared with the 0.98 mg/kg found in this study. Levels of this magnitude add further weight to current concerns about the growth in the swordfish market, particularly if the fish is promoted for its beneficial fatty acid profile.

There is little evidence to suggest that environmental pollution is a significant source of mercury contamination of fish, at least in NSW. As such there is no regulatory activity that will reduce the levels of mercury in fish, except perhaps imposing size restrictions for the predatory species. The commercial sale of shark in NSW had been restricted to specimens weighing less than 30 kg until 1993, when the introduction of a more liberal mercury standard removed the need for such action. As this study shows, mercury in shark does not appear to be a problem. Whether restricting the size of swordfish available for sale will assist in reducing exposure to mercury is not known.

It is recommended that women who are pregnant or may become pregnant be advised to limit their intake of predatory species such as shark and swordfish to no more than one small meal per month. How this advice should best be disseminated should be the subject of consultation between the various stakeholders.

The Australia New Zealand Food Authority (1999a) has recently reported that it will consider developing a policy statement on safe consumption of fish by pregnant women. The Authority proposes that the policy statement should then be adopted by State and Territory Health Departments and other health professional organisations. This proposal is strongly supported by NSW Health. It is recommended that the NSW toxicological data used in this report be provided to the Australia New Zealand Food Authority and that NSW Health be involved in the development of any policy proposal on safe levels of fish consumption.

Depending on ANZFAs timeframe for the development of the policy statement, NSW Health could also consider developing its own education material targeting women who are or may become pregnant.

The target group has been exposed to other educative messages about healthy and harmful exposures to lead, listeria and folate and these may provide suitable models for dissemination of information on safe consumption of predatory fish. It may be appropriate to combine information on lead, listeria, folate and mercury in one publication on healthy pregnancy. This reflects common practice in a number of countries—for example, the Public Health Commission in New Zealand issues a guidance document containing advice for healthy pregnant women, which includes among other things advice about safe levels of fish consumption (Australia New Zealand Authority 1999a).

The NSW Master Fish Merchants' Association (1997) has issued a fact sheet recommending that pregnant women restrict their intake of predatory species to no more than one meal per month. The NSW Master Fish Merchants' Association should continue its efforts to provide information to its members and the general public. Ongoing consultation between NSW Health and the Association about the content of such information is recommended.

It is recommended that both routine surveillance and periodic surveys of specific locations that may be subject to contamination, including Lake Macquarie, continue. Repeating this type of study in several years time will provide data suitable for monitoring both the levels of exposure to metals, especially by consumers of locally caught fish, and the quality of various waterways. Local consumption advice for recreational fishers is also recommended if metal levels are found to be high in specific locations. This advice could be issued by Public Health Units with dietary modelling assistance from the Food Unit if required. The dietary habits of high consumers of fish are poorly documented. This may be an area warranting further study.

# 8

## References

- Anon. 1997, Seafood Consumption Survey, *Food Australia*, vol. 49, no. 2, p. 54.
- Australia New Zealand Food Authority 1995, *Cadmium in Crustaceans (A223)*, Discussion Paper, February 1995.
- Australia New Zealand Food Authority 1996, *The Australian Market Basket Survey 1994*, AusInfo, Canberra.
- Australia New Zealand Food Authority 1998a, *The Australian Market Basket Survey 1996*, AusInfo, Canberra.
- Australia New Zealand Food Authority 1998b, *The Regulation of Contaminants and Other Restricted Substances in Food. Policy Paper*, August 1998.
- Australia New Zealand Food Authority 1999a, Proposal P157, *Contaminants in Food – Metals*. Full Assessment.
- Australia New Zealand Food Authority 1999b, Proposal P157, *Contaminants in Food – Metals*, Explanatory Notes, 3 March 1999.
- Australian Bureau of Statistics 1997, *National Nutrition Survey: Selected Highlights, Australia 1995*, Catalogue No. 4802.0, AusInfo, Canberra.
- Australian Bureau of Statistics 1998, *National Nutrition Survey: Nutrient Intakes and Physical Measurements, Australia 1995*, Catalogue No. 4805.0, AusInfo, Canberra.
- Australian Bureau of Statistics 1999, *National Nutrition Survey: Foods Eaten, Australia 1995*, Catalogue No. 4804.0, AusInfo, Canberra
- Baines, J. 1999, *Australia New Zealand Food Authority* [personal communication].
- Bebbington, G.N., Mackay, N.J., Chvojka, R., Williams, R.J., Dunn, A. & Auty, E.H. 1977, *Heavy Metals, Selenium and Arsenic in Nine Species of Australian Commercial Fish*, Aust. J. Mar. Freshwater Res., vol. 28, pp. 277-86.
- Chvojka, R. & Williams, R. 1981, *Report on Mercury Levels in Fish from Four Northern Rivers of New South Wales*, NSW State Fisheries.
- Davidson, P.W., Myers, G.J., Cox, C., Axtell, C., Shamlaye, C., Sloane-Reeves, J., Cernichiari, E., Needham, L., Choi, A., Wang, Y., Berlin M. & Clarkson, T.W. 1998, *Effects of Prenatal and Postnatal Methylmercury Exposure From Fish Consumption on Neurodevelopment*, JAMA, vol. 280, no. 8, pp. 701-707.
- Dwyer, J.T. 1994, Dietary Assessment, in Shils, M.E., Olsen, J.A. and Shike, M. (Eds.), *Modern Nutrition in Health and Disease*, 8th edition, volume 1, pp. 842-860, Lea & Fabiger, Philadelphia.
- Fish Research and Development Corporation 1998, *Beating the Drum on Health Benefits*, R & D News July '98, vol. 6, no.3.
- Gordon, S. 1999, *Master Fish Merchants' Association of NSW* [personal communication].
- Health Commission of NSW 1978, *Government to Regulate the Marketing of Shark in NSW*, press release from the office of the Minister for Health, 14 April 1978.
- Hunter Public Health Unit 1997, *Selenium and the Safe Level of Fish Consumption*.
- Johnson, K. 1998, *Health Benefits of Omega Oils from Australian Seafood*, Nutrition News, issue 27, p. 7.
- Leadbitter, D. 1992, *Management of Fishing Activities in Contaminated Areas*. *Australian Fisheries*, vol. 5, no. 9, pp. 30-33.
- MAFF 1997, 1994 *Total Diet Study: Metals and Other Elements*, Food Surveillance Information Sheet No. 131, Ministry of Agriculture, Fisheries and Food, United Kingdom.
- Mahaffey, K. 1998, *Methylmercury Exposure and Neurotoxicity*, Editorial, JAMA, vol. 280, no. 8, pp. 737-738.
- Master Fish Merchants' Association of NSW 1997, *Mercury in Fish: Fact Sheet*.
- Myrvik, Q.N. 1994, *Immunology and Nutrition*, in M.E. Shils, J.A. Olsen and M. Shike (Eds.), *Modern Nutrition in Health and Disease*, 8th edition, volume 1, Lea & Febiger, Philadelphia.

- National Health and Medical Research Council 1991, *Recommended Dietary Intakes for use in Australia*, Australian Government Publishing Service, Canberra.
- Nichols, P., Virtue, P., Mooney, B. & Elliott, N. 1998a, *Seafood the Good Food: The Oil (fat) Content and Composition of Australian Commercial Fishes, Shellfishes and Crustaceans*, CSIRO Marine Research, Australia.
- Nichols, P., Mooney, B., Virtue, P. & Elliott, N. 1998b, *Nutritional Value of Australian Fish: Oil, Fatty Acid and Cholesterol Composition of Edible Species*, FRDC Final Report: Project 95/122.
- National Health and Medical Research Council 1991, *Recommended Dietary Intakes for use in Australia*, Australian Government Publishing Service, Canberra.
- NSW Health, 1989–93 *Heavy Metals in Fish Survey*, unpub.
- NSW Health Department 1997, *Lake Macquarie Study*, press release, 12 June 1997.
- Rogers, J. 1998, *Good Oil on Eating Fish*, Daily Telegraph, 21 August 1998, p. 16.
- Scribner, E.A. & Kathuria, A. 1996, *New South Wales Commercial Fisheries Statistics 1992/93*, NSW Fisheries.
- United States Environmental Protection Agency 1991, *Selenium and Compounds*, Integrated Risk Information System file CASRN-7782-49-2.
- United States Environmental Protection Agency 1995, *Methylmercury (MeHg)*, Integrated Risk Information System file CASRN 22967-92-6.
- United States Environmental Protection Agency 1996, *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories*, Volume 3: Overview of Risk Management, Office of Water, United States Environmental Protection Agency, Washington DC.
- United States Environmental Protection Agency 1997, *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories*, Volume 2: Risk Assessment and Fish Consumption Limits, Office of Water, United States Environmental Protection Agency, Washington DC.
- United States Food and Drug Administration 1993, *Guidance Documents for Trace Elements in Seafood*, Center for Food Safety and Applied Nutrition.
- United States Food and Drug Administration 1994, *Mercury in Fish: Cause for Concern?*, FDA Consumer, September 1994.
- Working Group on Mercury in Fish 1980, *Report on Mercury in Fish and Fish Products to the Co-ordinating Committee on Metals in Fish and Fish Products*, 1979, Australian Government Publishing Service, Canberra.
- World Health Organisation 1972, *Evaluation of Mercury, Lead, Cadmium and the Food Additives Amaranth, Diethylpyrocarbonate and Octyl Gallate*, 16th report of the Joint FAO/WHO Expert Committee on Food Additives, Technical Report Series 505, WHO, Geneva.
- World Health Organisation 1982, *Evaluation of Certain Food Additives and Contaminants*, 26th report of the Joint FAO/WHO Expert Committee on Food Additives, Technical Report Series 683, WHO, Geneva.
- World Health Organisation 1989, *Toxicological Evaluation of Certain Food Additives and Contaminants*, 33rd meeting of the Joint FAO/WHO Expert Committee on Food Additives, WHO, Geneva.
- Wlodarczkyk, J. & Beath, K. 1997, *Heavy Metals in Seafood in Lake Macquarie: a cross-sectional survey*. Report to the Hunter Public Health Unit.



# Appendix I

## Fin fish – sampling plan

A total of 503 samples, made up of 400 fin fish, 64 crustaceans and 39 molluscs, was planned. Excluding fish caught outside of NSW waters, 463 samples were actually collected.

Species	Predominant source	NSW catch (kg) <sup>a</sup>	Number of samples planned	Additional sampling <sup>b</sup>	Number of samples collected
Tuna	O	4 954 593	84		22
Mullet	O & E	4 160 586	70		56
Redfish	O	1 915 421	32		20
Flathead	O & E	1 159 713	20		26
Shark	O	948 498	16		26
Australian salmon	O	824 406	14		0
Silver trevally	O	754 456	13		15
Mackerel	O	735 100	12		4
Whiting	O & E	728 849	12		22
Bream (black & yellow)	O & E	622 700	11		15
Snapper	O	609 854	10		14
Luderick	O & E	593 884	10		18
Gemfish	O	475 275	8		8
Yellowtail kingfish	O	412 976	7		4
Dory	O	408 024	7		8
Ling	O	349 560	6		6
Eel	E	305 866	5		0
Morwong	O	305 209	5		10
Yellowtail	O	297 563	5		6
Garfish (sea)	O	273 499	5		8
Perch (ocean)	O	234 281	4		6
Warehou	O	201 678	3		4
Blue-eye	O	169 275	3		6
Barracouta	O	165 331	3		0
Perch (golden)	I	159 809	3		2
Jewfish	O & E	153 897	3		3
Carp	I	153 378	3		0
Sweep	O	151 265	3		8
Bonito	O	140 881	2		1
Leatherjacket	O	137 790	2		8
Rainbow trout	A	133 700	2		2
Silver biddy	E	126 787	2		2
Ribbonfish	O	112 809	2		0
Tailor	O & E	101 899	2		2
Red gurnard	O	77 326	1		5
Swordfish, broadbill	O	16 187	0	7	8
Murray cod	I	7 663	0	3	0
Miscellaneous <sup>c</sup>					19
<b>Total</b>			<b>390</b>	<b>10</b>	<b>365</b>

## Crustaceans – sampling plan

Species	Predominant source	NSW catch (kg)	Number of samples planned	Additional sampling <sup>b</sup>	Number of samples collected
Prawn	O, E & A	2 293 686	39		33
Crab	O & E	622 143	11	6	19
Balmain bug	O	100 222	2	4	10
Eastern rock lobster	O	99 785	2		0
<b>Total</b>			<b>54</b>	<b>10</b>	<b>62</b>

## Molluscs – sampling plan

Species	Predominant source	NSW catch (kg)	Number of samples planned	Additional sampling <sup>b</sup>	Number of samples collected
Sydney rock oyster	A	388 467 <sup>d</sup>	7		7
Abalone	O	22 866 <sup>d</sup>	0	2	0 P
ipi	O	22 024 <sup>d</sup>	0	2	2
Cockle	E	6 003 <sup>d</sup>	0	2	0
Blue lip mussel	A	1 792 <sup>d</sup>	0	2	0
Squid	O	543 559	9		9
Octopus	O	455 000	8		10
Cuttlefish	O	332 214	6		7
Calamari	O	80 183	1		2
<b>Total</b>			<b>31</b>	<b>8</b>	<b>37</b>

<b>Key:</b>	O = ocean	I = inland river
	A = aquaculture	E = estuarine

<sup>a</sup> the NSW catch data were derived from the New South Wales Fisheries Commercial Statistics 1992/93 (Scribner and Kathuria 1996).

<sup>b</sup> some species were identified as having potentially high levels of heavy metals. Where the proportional sampling plan provided inadequate sample numbers, additional samples were included.

<sup>c</sup> miscellaneous included five cod, three marlin, three flounder, and one each of pigfish, sole, blue bass, coral trout, stargazer, cariora, pike and trumpeter.

<sup>d</sup> the approximate flesh weight of bivalve molluscs, calculated as 7% of total catch weight, was used.