Boundaries of regulatory science: Eco/toxicology and aquatic hazards of chemicals
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Chronologies

United States
1937 Fisheries Service performs aquatic toxicity experiments
1948 Water Pollution Control Act
1962 Rachel Carson publishes *Silent Spring*; ‘laboratory micro-ecosystem’ at University of Texas
1963 California water quality criteria updated by CalTech
1965 Smog concerns in the Netherlands; Water Quality Act
1966 National Water Quality Laboratory in Duluth, Mn., operational
1968 national water quality criteria (‘Green Book’)
1969 Cuyahoga River fire
1970 First Earth Day; start of Friends of the Earth ; EPA installed by Nixon; Cairns sets up his research centre at Virginia Tech
1971 Cairns joins Committee on Ecology in Water Pollution Control Federation; preparation of TSCA starts; Metcalf and Kapoor multispecies test; Ecological Society sets up lobby office in Washington, DC; EPA sets up methods committee for aquatic toxicity testing
1972 Federal Water Pollution Control Act; DDT registration cancelled
1975 FIFRA amendments expand environmental mandate; first EPA aquatic toxicity test manual
1976 Consent decree: NRDC forces EPA to issue water quality standards; Toxic Substances Control Act
1977 Clean Water Act redefines targets for water pollution policy; Cairns begins to argue for multispecies tests
1979 Society for Environmental Toxicology and Chemistry founded
1980 ASTM develops and endorses EPA aquatic toxicity tests
1981 Reagan installed as president; Odum coins term mesocosm
1983 NRC report *Risk Assessment in the Federal Government* promotes risk assessment/risk management separation; Gieryn suggests boundary work; political crisis at EPA ends with resignation of administrator
1986 Pesticis Office investigates mesocosm
1987 Water Quality Act; draft microcosm protocols in *Federal Register*
1988 Pesticis Office publishes mesocosm protocol, first results come if for evaluation
1991 SETAC workshop on aquatic microcosms
1992 Mesocosms no longer required in pesticide registration; microcosm protocol finalised
England
1863 aquatic toxicity tests on River Leven with concepts such as mean mortality
1880 artificial streams to study effects of sewage
1951 1st report on pesticides by the Zuckerman Working Party
1957 start of Pesticide Safety Precaution Scheme
1964 Moriarty begins to work at Monks Wood
1967 Torrey Canyon disaster
1969 Irish sea bird disaster; Royal Commission on Environmental Pollution
1970 Harold Wilson’s white paper on the environment; Department of the Environment installed by Heath.
1973 Water Act creates 10 Water Authorities
1974 Control of Pollution Act requires consents for all water discharges
1977 Health and Safety Commission proposes industrial chemicals notification scheme
1982 Notification of New Substances Regulation
1983 Moriarty publishes Handbook of Ecotoxicology
1985 Pesticide regulations become statutory, under MAFF
1986 Control of Pesticide Regulations specify data requirements
1987 start of Her Majesty’s Inspectorate of Pollution; DoE announces red list
1988 DoE starts working on a red list for substances in water; Thatcher acknowledges global environmental threats in speech to Royal Society; first public evaluation documents on pesticides
1989 red list published; Water Act creates National Rivers Authority
1990 water quality objectives in effect; Environmental Protection Act initiates Integrated Pollution Control under HMIP
1992 process standards for Integrated Pollution Control under HMIP
1993 first NGO representation in an advisory committee to the Advisory Committee on Pesticides
1995 Environment Agency (England and Wales) operational
2001 Department of Environment becomes Department of Environment, Food and Rural Affairs (DEFRA)

The Netherlands
1952 Hinderwet
1962 Pesticide Act (Bestrijdingsmiddelenwet)
1967 Start of Progill protests; restriction of drins on basis of wildlife hazards
1969 endosulfan spill in the Rhine; Pollution of Surface Waters Act (Wet Verontreinaniging Oppervlakewateren)
1970 start of Biological Research Council (BION)
1971 Ministry of Public Health and Environmental Hygiene (VoMil)
1972 Working group aquatic ecology in BION; first environmental white paper (Urgentienota); Koeman moves to Wageningen
1973 ‘ecologie’ vs. ‘oecologie’ discussion
1975 Pesticide Act modified to expand environmental mandate; water quality evaluation group leaves BION
1979 Lekkerkerk soil pollution scandal
1981 Hazardous Substances Act first introduced (Wet Milieugevaarlijke Stoffen); Koeman argues for more ‘ecological’ parameters in pollution control
1982 VOMIL becomes Ministry of Environment and Regional Planning (VROM)
1984 National Institute of Environment and Public Health (RIVM) formed out of existing governmental research facilities; best available technology for limited set of chemicals discharged to water
1986 Hazardous Substances Act accepted (Wet Milieugevaarlijke Stoffen)
1988 RIVM “Care for Tomorrow” (Zorgen voor Morgen) warns for drastic environmental degradation
1989 First National Environmental Policy Plan (NMP)
1990 Multi-Year Crop Protection Plan (MJP-G); NMP+
1991 Environmental Quality Objectives soil and water (MilBoWa)
1993 NMP2
1994 Universal System for Evaluation of Substances (USES 1.0); Dutch environmental movement steps up legal action on surface water discharges
1995 Development of European version of USES starts (EUSES); environmental movement challenges pesticide registration with legal means
1996 Centre for Substances and Risk Assessment in RIVM
1997 EUSES delivered
1998 NMP3

International
1969 Truhaut coins ‘ecotoxicology’
1970 Environment Committee in OECD
1971 Limits to Growth published (Club of Rome)
1972 UN Stockholm conference, start of UNEP
1973 first EEC environment Action Plan; France plans chemical substances regulations
1974 first meeting of ministers OECD to initiate harmonisation; OECD Chemicals Programme
1977 OECD Chemicals group launches testing programme; 2nd EEC environmental Action Plan
1978 Freshwater fish Directive (quality criteria, 78/659/EEC); ICSU report presents ‘ecotoxicology’; EEC ecotoxicology advisory committee installed
1982 first daughter Directive of Dangerous Substances Directive (mercury first substance actually regulated); first OECD protocols for environmental toxicity tests, GLP
1983 Society for Ecotoxicology and Environmental Safety
1984 first North Sea Conference
1986 Chernobyl, Bhopal, Sandoz pesticide spill in the Rhine; Standard Articles Directive to speed up daughter Directives of Dangerous Substances Directive
1987 2nd North Sea Conference; Single European Act (environmental policy in EC on basis of subsidiarity)
1990 3rd North Sea Conference
1991 SETAC-Europe set up, mesocosm workshop in UK; first attempts to harmonise EC pesticide registration
1992 7th amendment introduces existing chemicals (i.e. pre-1981) programme
1993 Maastricht Treaty
1994 implementation of 7th amendment begins
1995 4th North Sea Conference