**Supplementary materials**

Table S1: Evolution of the monitoring of the different parameters (hydrological, biological and plankton) at the “Canal d’Amenée” sampling station of the Gravelines Nuclear Power Plant since 1978.

| **Parameter** | **Start date** | **End date** | **Frequency** | **Analyst** | **Method** |
| --- | --- | --- | --- | --- | --- |
| **TEMP** | 02/03/1978 | 26/11/1985 | Monthly | SMW\* | Reversing thermometer |
| 10/03/1986 | 29/12/1986 | Weekly | SMW\* | Reversing thermometer |
| 05/01/1987 | 27/12/2012 | Weekly | Eurofins | *In situ* sensor |
| 03/01/2013 | now | Weekly | Flandres Analyses | *In situ* sensor |
| **SALI** | 07/02/1978 | 27/05/1986 | Monthly | SMW\* | Conductivity sensor |
| 29/05/1990 | 09/10/1995 | 2/year | IPLLN\*\* | Conductivity sensor |
| 19/03/1996 | 27/09/2000 | 2/year | Ifremer PELAGOS | Conductivity sensor |
| 07/03/2001 | 25/09/2007 | 2/year | Ifremer LERBL | *In situ* sensor |
| 28/11/2007 | 17/12/2012 | Monthly | Ifremer LERBL | *In situ* sensor |
| 03/01/2013 | now | Weekly | Flandres Analyses | *In situ* sensor |
| **TURB** | 29/03/2016 | 03/12/2018 | Monthly | Flandres Analyses | Optical ISO 7027 |
| 08/01/2019 | now | Monthly | Flandres Analyses | *In situ* ISO 7027 |
| **OXYGENE** | 02/03/1978 | 18/06/1986 | Monthly | SMW\* | Winkler titration |
| 29/03/2016 | now | Monthly | Flandres Analyses | Luminescence sensor |
| **NH4** | 07/02/1978 | 20/09/1986 | Monthly | SMW\* | Aminot 1983 (spectro) |
| 01/07/1987 | 21/09/1988 | 2/year | IPLLN\*\* | Aminot 1983 (spectro) |
| 27/11/1989 | 22/05/1991 | Weekly | IPLLN\*\* | Aminot 1983 (spectro) |
| 29/12/1997 | 27/12/2012 | Weekly | Eurofins | NF T90-015-2 (spectro) |
| 03/01/2013 | 19/12/2018 | Weekly | Flandres Analyses | NF T90-015-2 (spectro) |
| 01/01/2019 | now | Weekly | Eurofins | Aminot 2007 (spectro) |
| **NO3** | 07/02/1978 | 20/09/1986 | Monthly | SMW\* | Tréguer 1975 (spectro) |
| 27/11/1989 | 22/05/1991 | Weekly | IPLLN\*\* | Aminot 1983 (spectro) |
| 05/11/1999 | 27/12/2012 | Weekly | Eurofins | NF EN ISO 13395 (spectro) |
| 03/01/2013 | 19/12/2018 | Weekly | Flandres Analyses | NF EN ISO 13395 (spectro) |
| 01/01/2019 | now | Weekly | Eurofins | Aminot 2007 (spectro) |
| **NO2** | 07/02/1978 | 18/06/1986 | Monthly | SMW\* | Tréguer 1975 (spectro) |
| 27/11/1989 | 22/05/1991 | Weekly | IPLLN\*\* | Tréguer 1975 (spectro) |
| 03/11/2000 | 17/09/2001 | Weekly | IPL\*\*\* | Tréguer 1975 (spectro) |
| 29/10/2001 | 21/10/2003 | Weekly | IPLLN\*\* | Tréguer 1975 (spectro) |
| 02/07/2012 | 27/12/2012 | Weekly | Eurofins | NF EN ISO 13395 (spectro) |
| 03/01/2013 | 19/12/2018 | Weekly | Flandres Analyses | NF EN ISO 13395 (spectro) |
| 01/01/2019 | now | Weekly | Eurofins | Aminot 2007 (spectro) |
| **NO3+NO2** | 01/07/1987 | 21/09/1988 | 2/year | IPLLN\*\* | Tréguer 1975 (spectro) |
| 29/12/1997 | 27/10/1999 | Weekly | Eurofins | NF EN ISO 13395 (spectro) |
| 06/11/2002 | 21/10/2003 | Weekly | IPLLN\*\* | Tréguer 1975 (spectro) |
| 04/11/2008 | 27/10/2010 | Weekly | Eurofins | NF EN ISO 13395 (spectro) |
| **PO4** | 07/02/1978 | 18/06/1986 | Monthly | SMW\* | Tréguer 1975 (spectro) |
| 27/11/1989 | 22/05/1991 | Weekly | IPLLN\*\* | Tréguer 1975 (spectro) |
| 06/11/2002 | 21/10/2003 | Weekly | IPLLN\*\* | Tréguer 1975 (spectro) |
| 29/03/2016 | 26/12/2018 | Monthly | Flandres Analyses | NF EN ISO 6878 (spectro) |
| 08/01/2019 | now | Monthly | Eurofins | Aminot 2007 (spectro) |
| **SIOH** | 07/02/1978 | 18/06/1986 | Monthly | SMW\* | Tréguer 1975 (spectro) |
| 27/11/1989 | 22/05/1991 | Weekly | IPLLN\*\* | Tréguer 1975 (spectro) |
| 29/03/2016 | 03/12/2018 | Monthly | Flandres Analyses | NF T90-007 (spectro) |
| 08/01/2019 | now | Monthly | Eurofins | Aminot 2007 (spectro) |
| **CHLOROA** | 07/02/1978 | 20/09/1986 | Monthly | SMW\* | UNESCO 1966 (tri) |
| 16/04/1987 | 23/09/1987 | 3/year | IPLLN\*\* | Lorenzen 1967 (mono) |
| 06/05/1988 | 21/09/1988 | 3/year | Ifremer LERBL | Lorenzen 1967 (mono) |
| 09/01/1989 | 28/10/1997 | Weekly | Eurofins | UNESCO 1966 (tri) |
| 03/11/1997 | 26/10/1998 | Weekly | Eurofins | Lorenzen 1967 (mono) |
| 02/11/1998 | 27/12/2012 | Weekly | Eurofins | UNESCO 1966 (tri) |
| 03/01/2013 | 26/12/2018 | Weekly | Flandres Analyses | UNESCO 1966 (tri) |
| 31/12/2018 | now | Weekly | Flandres Analyses | Lorenzen 1967 (mono) |
|  |  |  |  |  |  |
| **PHEO** | 07/02/1978 | 20/09/1986 | Monthly | SMW\* | Lorenzen 1967 (mono) |
| 06/05/1988 | 21/09/1988 | 3/year | Ifremer LERBL | Lorenzen 1967 (mono) |
| 09/01/1989 | 28/10/1997 | Weekly | Eurofins | Méthode EDF (tri) |
| 03/11/1997 | 26/10/1998 | Weekly | Eurofins | Lorenzen 1967 (mono) |
| 02/11/1998 | 27/12/2012 | Weekly | Eurofins | Méthode EDF (tri) |
| 03/01/2013 | 26/12/2018 | Weekly | Flandres Analyses | Méthode EDF (tri) |
| 31/12/2018 | now | Weekly | Flandres Analyses | Lorenzen 1967 (mono) |
| **FLORTOT** | 07/02/1978 | 20/09/1986 | Monthly | Ifremer LERBL | Microscope (Utermöhl, 1958) |
| 06/05/1988 | 06/05/1988 | 1/year | Ifremer LERBL | Microscope (Utermöhl, 1958) |
| 09/01/1989 | now | Weekly | Ifremer LERBL | Microscope (Utermöhl, 1958) |
| **AINDVSNP** | 17/08/1978 | 24/09/1985 | Monthly | Ifremer PELAGOS | Binocular microscope |
|  | 13/04/1986 | 21/09/1988 | Seasonal | Ifremer PELAGOS | Binocular microscope |
|  | 09/05/1989 | 11/10/2005 | Monthly | Ifremer PELAGOS | Binocular microscope |
|  | 23/11/2005 | 04/10/2006 | Monthly | SMW\* | Binocular microscope |
|  | 15/11/2006 | now | Monthly | Ifremer LERBL | Binocular microscope |

\* Station Marine de Wimereux

\*\* Institut Pasteur de Lille - Laboratoire Santé, Environnement Durables Littoral Nord – Gravelines

\*\*\* Institut Pasteur de Lille – Service des Eaux

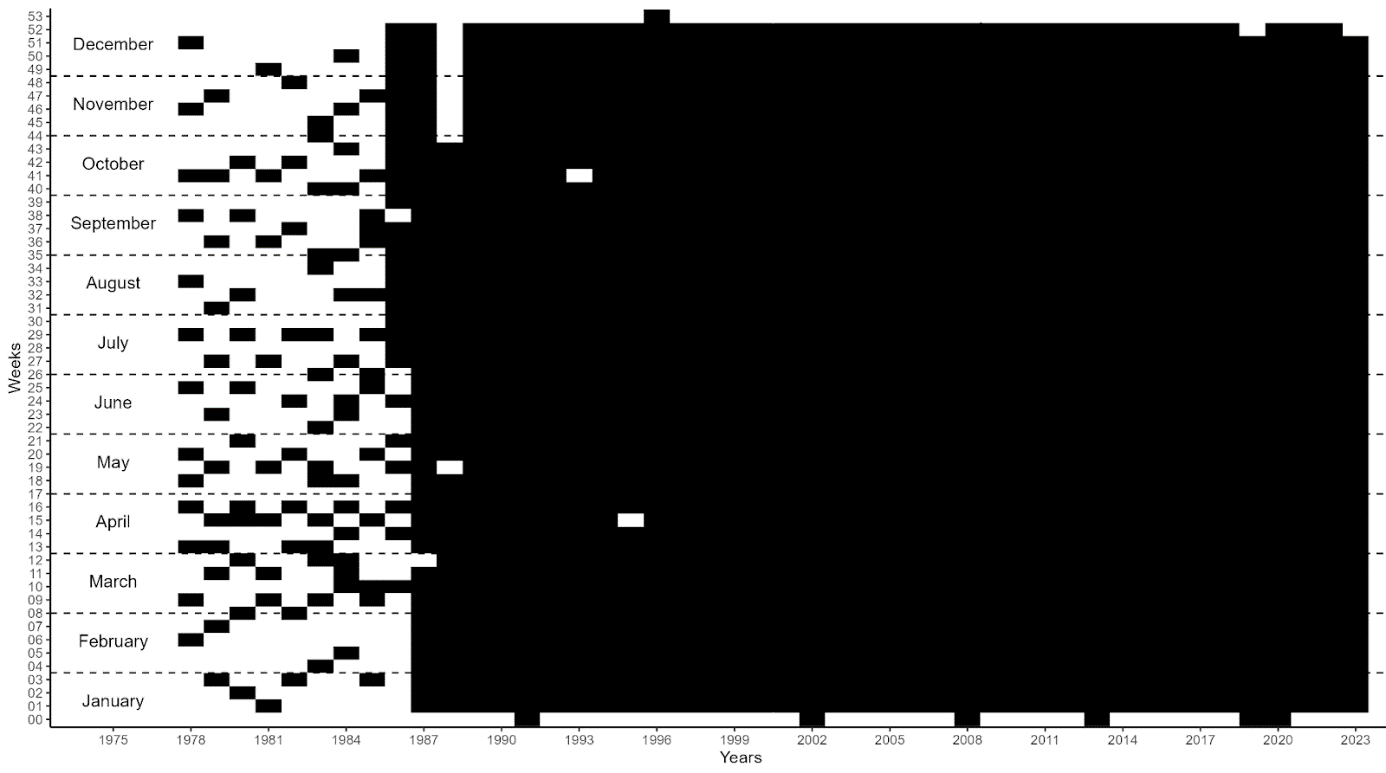


Figure S1: Distribution of physico-chemical samples (all parameters together) at the “Canal d’Amenée” station during the IGA survey. The white squares indicate months with at least one sample collected, while the black squares represent months without sampling.

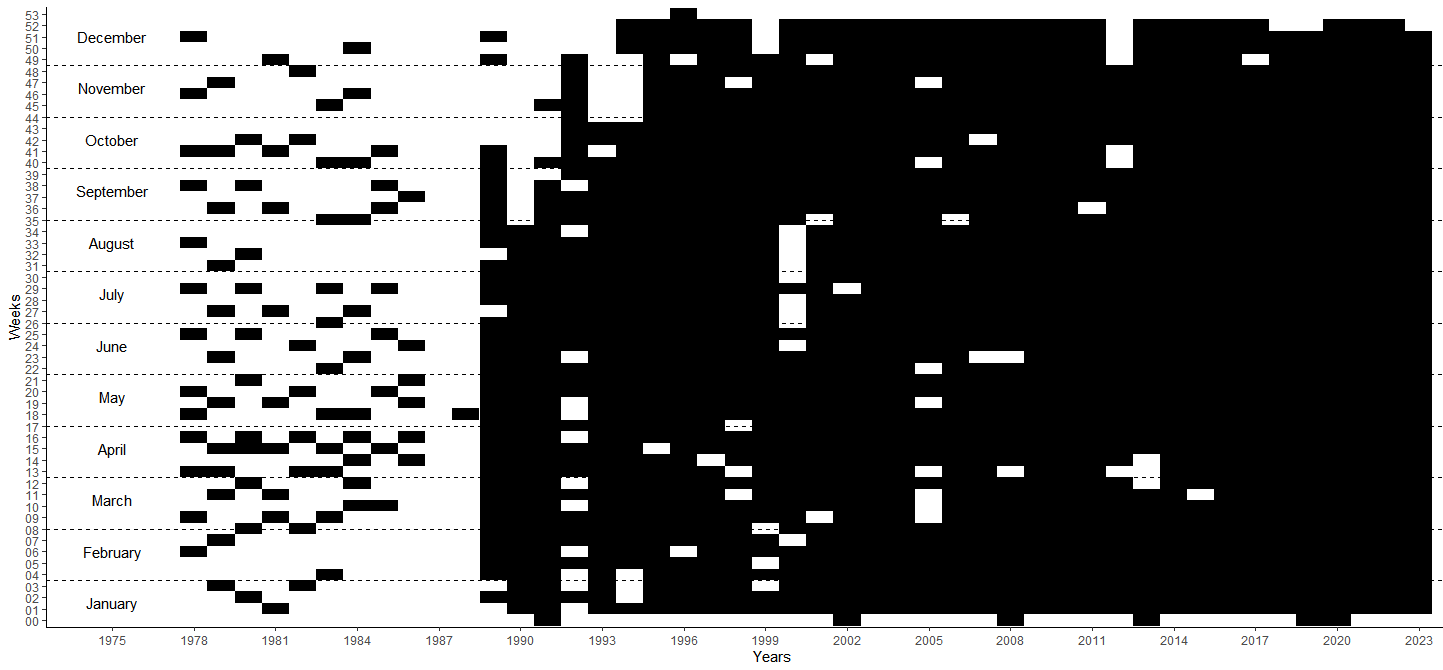


Figure S2: Distribution of phytoplankton samples at the “Canal d’Amenée” station during the IGA survey. The black squares represent months with at least one sample collected, while the white squares indicate months without sampling.

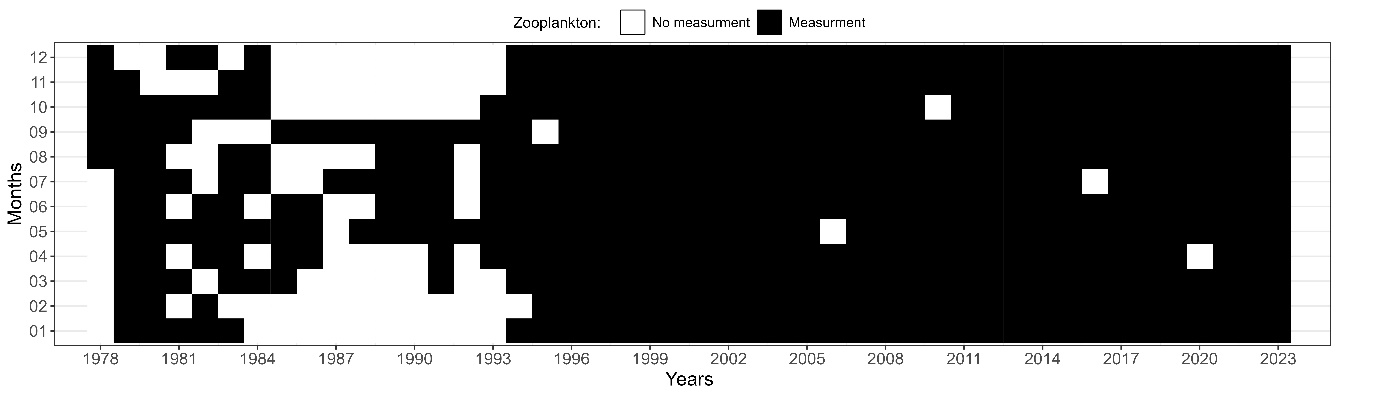


Figure S3: Distribution of zooplankton samples at the “Canal d’Amenée” station during the IGA survey. The black squares indicate months with at least one sample collected, while the white squares represent months without sampling.