

表5-1 印旛沼・手賀沼及び亀山ダム貯水池における富栄養化関連項目の経年変化

| 項目                    | 水域     | 測定年度<br>測定地点 | 昭和   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 平成    |       |       |       |       |       |       |       |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------|--------|--------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|                       |        |              | 54   | 55    | 56    | 57    | 58    | 59    | 60    | 61    | 62    | 63    | 元     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 13    | 14    | 15    | 16    | 17    | 18    | 19    | 20    | 21    | 22    | 23    |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 全<br>水<br>素<br>(mg/l) | 印旛沼    | 阿宗橋          | 5.3  | 5.7   | 5.6   | 4.9   | 5.4   | 5.9   | 5.1   | 4.3   | 4.0   | 3.8   | 4.1   | 4.0   | 4.0   | 3.7   | 3.8   | 3.8   | 3.8   | 3.4   | 2.7   | 3.5   | 3.1   | 3.3   | 3.1   | 3.0   | 3.6   | 3.7   | 3.6   | 4.0   | 3.3   | 3.5   | 3.4   | 3.9   | 3.6   |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 上水道取水口下      | 2.3  | 2.5   | 2.1   | 2.5   | 2.8   | 2.3   | 2.1   | 2.1   | 2.3   | 2.5   | 2.7   | 2.3   | 3.0   | 2.7   | 2.7   | 2.1   | 2.1   | 1.7   | 1.8   | 1.9   | 1.9   | 2.2   | 2.4   | 2.2   | 3.0   | 3.1   | 2.9   | 3.0   | 2.4   | 2.6   | 2.7   | 2.9   | 2.4   |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 一本松下         | 1.8  | 2.1   | 1.5   | 2.1   | 2.4   | 1.7   | 1.6   | 1.6   | 2.0   | 2.5   | 2.4   | 1.8   | 2.6   | 2.5   | 2.4   | 1.8   | 1.9   | 1.4   | 1.7   | 1.6   | 1.6   | 1.8   | 2.0   | 1.9   | 2.3   | 2.8   | 2.3   | 2.5   | 2.0   | 2.2   | 2.3   | 2.6   | 2.1   |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 北印旛沼中央       | 1.3  | 1.3   | 1.1   | 1.4   | 1.3   | 1.1   | 1.2   | 0.91  | 0.99  | 1.4   | 1.4   | 1.2   | 1.9   | 1.9   | 1.8   | 1.7   | 1.6   | 1.1   | 1.4   | 1.5   | 1.5   | 1.4   | 1.6   | 1.4   | 1.6   | 2.3   | 1.6   | 2.0   | 1.6   | 1.7   | 1.9   | 2.3   | 1.8   |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 根戸下          | 8.1  | 7.7   | 9.0   | 8.3   | 8.1   | 8.4   | 7.3   | 6.6   | 6.8   | 6.1   | 6.1   | 6.2   | 7.2   | 6.7   | 7.5   | 8.1   | 7.9   | 6.2   | 5.8   | 5.8   | 4.5   | 3.7   | 3.5   | 3.0   | 3.2   | 3.4   | 3.2   | 3.3   | 3.0   | 3.1   | 2.7   | 2.8   | 2.7   |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 手賀沼                   | 手賀沼中央  | 6.3          | 5.5  | 6.6   | 6.1   | 5.6   | 5.3   | 5.3   | 4.6   | 4.8   | 4.5   | 4.3   | 4.3   | 4.4   | 4.4   | 4.9   | 4.9   | 5.3   | 4.5   | 4.1   | 4.0   | 3.7   | 3.2   | 3.2   | 2.8   | 2.9   | 2.9   | 2.8   | 2.9   | 2.5   | 2.6   | 2.4   | 2.5   | 2.3   |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       | 布佐下    | 4.6          | 4.7  | 5.3   | 5.4   | 4.7   | 4.1   | 3.8   | 3.2   | 3.3   | 3.8   | 3.4   | 3.4   | 3.6   | 3.5   | 3.4   | 3.2   | 3.8   | 3.4   | 3.4   | 3.4   | 3.0   | 3.2   | 3.5   | 2.8   | 3.2   | 2.6   | 3.2   | 2.8   | 2.4   | 2.4   | 2.3   | 2.4   | 2.2   |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       | 下手賀沼中央 | —            | —    | —     | —     | —     | —     | 3.9   | 3.9   | 3.4   | 3.7   | 3.5   | 3.4   | 4.2   | 3.9   | 4.3   | 3.8   | 3.7   | 3.5   | 3.3   | 3.6   | 3.8   | 3.4   | 3.4   | 2.8   | 3.6   | 3.3   | 3.6   | 3.7   | 2.8   | 3.7   | 3.9   | 3.5   | 3.2   |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 亀山ダム                  | 堤体直上流部 | —            | —    | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | 0.71  | 0.63  | 1.0   | 0.93  | 0.77  | 0.76  | 0.69  | 0.71  | 0.64  | 0.61  | 0.63  | 0.58  | 0.63  | 0.61  | 0.64  | 0.65  | 0.68  | 0.63  | 0.74  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       | 小月橋    | —            | —    | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | 0.73  | 0.70  | 1.2   | 1.0   | 0.82  | 0.73  | 0.73  | 0.74  | 0.67  | 0.70  | 0.64  | 0.64  | 0.63  | 0.59  | 0.65  | 0.67  | 0.70  | 0.73  | 0.68  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       | 亀山大橋   | —            | —    | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | 0.70  | 0.73  | 1.0   | 0.84  | 0.85  | 0.76  | 0.80  | 0.81  | 0.76  | 0.69  | 0.72  | 0.76  | 0.72  | 0.62  | 0.70  | 0.71  | 0.73  | 0.76  | 0.77  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 全<br>硝<br>素<br>(mg/l) | 印旛沼    | 阿宗橋          | 0.46 | 0.52  | 0.37  | 0.25  | 0.23  | 0.25  | 0.21  | 0.16  | 0.20  | 0.15  | 0.12  | 0.15  | 0.12  | 0.11  | 0.11  | 0.14  | 0.13  | 0.12  | 0.11  | 0.12  | 0.12  | 0.10  | 0.096 | 0.10  | 0.10  | 0.11  | 0.10  | 0.095 | 0.099 | 0.091 | 0.10  | 0.12  | 0.11  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 上水道取水口下      | 0.21 | 0.17  | 0.12  | 0.13  | 0.14  | 0.14  | 0.081 | 0.085 | 0.11  | 0.070 | 0.071 | 0.10  | 0.088 | 0.097 | 0.099 | 0.11  | 0.14  | 0.15  | 0.13  | 0.13  | 0.14  | 0.12  | 0.11  | 0.11  | 0.12  | 0.13  | 0.11  | 0.12  | 0.14  | 0.11  | 0.11  | 0.14  | 0.13  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 一本松下         | 0.14 | 0.15  | 0.11  | 0.10  | 0.13  | 0.10  | 0.066 | 0.074 | 0.087 | 0.090 | 0.079 | 0.089 | 0.076 | 0.098 | 0.10  | 0.11  | 0.12  | 0.12  | 0.11  | 0.10  | 0.12  | 0.11  | 0.099 | 0.088 | 0.094 | 0.11  | 0.10  | 0.11  | 0.12  | 0.094 | 0.11  | 0.12  | 0.12  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 北印旛沼中央       | 0.10 | 0.080 | 0.070 | 0.060 | 0.080 | 0.040 | 0.051 | 0.050 | 0.045 | 0.047 | 0.053 | 0.060 | 0.069 | 0.097 | 0.086 | 0.10  | 0.10  | 0.10  | 0.099 | 0.11  | 0.11  | 0.10  | 0.086 | 0.085 | 0.091 | 0.11  | 0.095 | 0.096 | 0.12  | 0.11  | 0.10  | 0.12  | 0.12  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 根戸下          | 1.3  | 1.0   | 1.1   | 0.81  | 0.91  | 0.95  | 0.77  | 0.70  | 0.83  | 0.68  | 0.58  | 0.56  | 0.47  | 0.52  | 0.47  | 0.75  | 0.73  | 0.58  | 0.55  | 0.44  | 0.41  | 0.25  | 0.23  | 0.17  | 0.14  | 0.14  | 0.14  | 0.13  | 0.16  | 0.13  | 0.13  | 0.14  | 0.14  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       | 手賀沼    | 手賀沼中央        | 0.86 | 0.73  | 0.66  | 0.52  | 0.51  | 0.60  | 0.55  | 0.42  | 0.53  | 0.42  | 0.41  | 0.44  | 0.33  | 0.36  | 0.34  | 0.50  | 0.51  | 0.49  | 0.44  | 0.33  | 0.37  | 0.26  | 0.23  | 0.20  | 0.17  | 0.18  | 0.17  | 0.15  | 0.16  | 0.15  | 0.14  | 0.16  | 0.16  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 布佐下          | 0.55 | 0.43  | 0.35  | 0.39  | 0.34  | 0.46  | 0.36  | 0.24  | 0.30  | 0.28  | 0.28  | 0.26  | 0.25  | 0.25  | 0.24  | 0.30  | 0.36  | 0.27  | 0.29  | 0.21  | 0.25  | 0.23  | 0.19  | 0.19  | 0.19  | 0.18  | 0.16  | 0.16  | 0.16  | 0.15  | 0.14  | 0.16  | 0.14  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 下手賀沼中央       | —    | —     | —     | —     | —     | —     | 0.21  | 0.16  | 0.25  | 0.23  | 0.25  | 0.33  | 0.27  | 0.32  | 0.29  | 0.33  | 0.22  | 0.21  | 0.20  | 0.16  | 0.21  | 0.14  | 0.16  | 0.16  | 0.16  | 0.16  | 0.15  | 0.14  | 0.097 | 0.14  | 0.17  | 0.13  | 0.15  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 堤体直上流部       | —    | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | 0.060 | 0.050 | 0.042 | 0.043 | 0.037 | 0.045 | 0.035 | 0.035 | 0.034 | 0.036 | 0.039 | 0.042 | 0.039 | 0.050 | 0.035 | 0.034 | 0.036 | 0.044 | 0.045 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       | 亀山ダム   | 小月橋          | —    | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | 0.053 | 0.053 | 0.039 | 0.038 | 0.036 | 0.036 | 0.033 | 0.034 | 0.034 | 0.033 | 0.042 | 0.052 | 0.036 | 0.043 | 0.033 | 0.033 | 0.038 | 0.054 | 0.040 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |        | 亀山大橋         | —    | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | 0.061 | 0.10  | 0.087 | 0.070 | 0.090 | 0.097 | 0.068 | 0.076 | 0.071 | 0.067 | 0.079 | 0.097 | 0.058 | 0.073 | 0.043 | 0.054 | 0.044 | 0.085 | 0.050 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

表5-2 印旛沼・手賀沼及び亀山ダム貯水池における富栄養化関連項目の経年変化

| 項目                                        | 水域               | 測定年度<br>測定地点 | 昭和 | 平成  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-------------------------------------------|------------------|--------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                                           |                  |              | 54 | 55  | 56  | 57  | 58  | 59  | 60  | 61  | 62  | 63  | 元   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |
| 不<br>溶<br>性<br>C<br>O<br>D<br>(mg/L)      | 印<br>旛<br>沼      | 阿宗橋          | —  | 4.1 | 4.9 | 5.2 | 6.1 | 4.8 | 3.8 | 2.6 | 3.7 | 2.5 | 2.8 | 3.8 | 2.4 | 2.9 | 3.0 | 4.6 | 3.8 | 4.1 | 4.2 | 4.1 | 4.1 | 3.2 | 3.2 | 3.8 | 3.1 | 3.9 | 3.1 | 2.9 | 3.7 | 2.9 | 3.4 | 4.3 | 4.2 |     |
|                                           |                  | 上水道取水口下      | —  | 5.1 | 4.2 | 6.3 | 6.0 | 6.8 | 5.3 | 5.1 | 5.6 | 4.3 | 3.8 | 4.5 | 3.1 | 3.9 | 4.2 | 5.6 | 6.3 | 5.6 | 5.5 | 5.1 | 6.4 | 5.1 | 4.4 | 4.0 | 4.2 | 4.7 | 3.7 | 4.1 | 5.8 | 4.1 | 4.3 | 4.3 | 6.3 |     |
|                                           |                  | 一本松下         | —  | 4.2 | 3.8 | 6.3 | 5.9 | 5.5 | 4.1 | 5.0 | 6.4 | 6.0 | 5.0 | 4.6 | 3.5 | 4.6 | 5.0 | 5.2 | 6.1 | 5.7 | 6.4 | 5.1 | 6.1 | 5.1 | 4.2 | 3.8 | 4.1 | 4.6 | 3.9 | 4.3 | 5.5 | 3.8 | 4.8 | 4.6 | 5.9 |     |
|                                           |                  | 北印旛沼中央       | —  | 2.5 | 2.4 | 3.1 | 3.4 | 3.7 | 3.1 | 2.6 | 3.0 | 3.3 | 3.3 | 2.7 | 3.2 | 4.3 | 4.8 | 6.9 | 5.2 | 4.4 | 4.4 | 5.7 | 5.1 | 4.6 | 4.0 | 3.4 | 3.9 | 4.5 | 4.2 | 4.0 | 5.1 | 4.8 | 5.0 | 4.2 | 6.5 |     |
|                                           |                  | 根戸下          | —  | 12  | 11  | 9.3 | 8.0 | 13  | 12  | 8.3 | 9.6 | 7.9 | 7.2 | 7.3 | 7.2 | 8.2 | 8.5 | 13  | 15  | 11  | 12  | 9.6 | 8.0 | 5.0 | 4.2 | 2.6 | 2.3 | 1.6 | 2.2 | 2.1 | 2.1 | 2.3 | 2.3 | 2.5 | 2.9 |     |
|                                           | 手<br>賀<br>沼      | 手賀沼中央        | —  | 14  | 13  | 12  | 12  | 15  | 15  | 9.3 | 13  | 11  | 9.1 | 9.9 | 8.9 | 9.8 | 11  | 12  | 16  | 15  | 15  | 12  | 11  | 8.3 | 6.6 | 4.1 | 5.0 | 4.7 | 4.6 | 4.1 | 4.7 | 4.6 | 4.9 | 5.0 | 5.2 |     |
|                                           |                  | 布佐下          | —  | 8.7 | 9.6 | 9.4 | 9.4 | 9.5 | 5.1 | 5.6 | 7.2 | 6.6 | 6.0 | 5.2 | 6.7 | 6.6 | 7.2 | 8.2 | 11  | 9.6 | 10  | 7.3 | 7.9 | 7.0 | 5.3 | 4.5 | 4.0 | 3.4 | 4.1 | 3.8 | 2.8 | 3.3 | 4.2 | 4.8 | 3.9 |     |
|                                           |                  | 下手賀沼中央       | —  | —   | —   | —   | —   | —   | 7.7 | 5.9 | 6.9 | 5.8 | 5.1 | 6.2 | 4.4 | 5.9 | 6.2 | 7.4 | 6.7 | 7.4 | 6.9 | 7.2 | 8.4 | 5.7 | 6.1 | 5.5 | 5.9 | 5.6 | 4.3 | 4.5 | 3.4 | 4.7 | 4.7 | 4.8 | 5.6 |     |
|                                           |                  | 堤体直上流部       | —  | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | 1.0 | 0.9 | 1.1 | 1.0 | 0.8 | 1.1 | 1.1 | 0.6 | 0.5 | 0.7 | 0.5 | 0.7 | 0.9 | 1.2 | 0.6 | 0.5 | 0.8 | 1.0 | 0.6 |
|                                           | 亀<br>山<br>ダ<br>ム | 小月橋          | —  | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | 1.0 | 1.0 | 0.8 | 0.9 | 0.8 | 1.4 | 1.1 | 0.8 | 0.8 | 0.8 | 0.5 | 0.9 | 0.8 | 0.9 | 0.6 | 0.6 | 0.8 | 1.1 | 0.8 |     |
|                                           |                  | 亀山大橋         | —  | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | 1.1 | 1.0 | 1.4 | 1.2 | 1.1 | 1.5 | 1.1 | 1.0 | 0.9 | 0.9 | 0.8 | 1.1 | 1.3 | 1.3 | 0.7 | 0.8 | 1.0 | 1.3 | 0.9 |
| 阿宗橋                                       |                  | —            | 98 | 121 | 172 | 148 | 167 | 110 | 70  | 120 | 54  | 77  | 110 | 58  | 70  | 79  | 99  | 110 | 130 | 120 | 96  | 120 | 93  | 88  | 100 | 80  | 100 | 99  | 94  | 110 | 81  | 86  | 88  | 120 |     |     |
| ク<br>ロ<br>ロ<br>フ<br>ィ<br>ル<br>a<br>(μg/L) | 印<br>旛<br>沼      | 上水道取水口下      | —  | 159 | 109 | 138 | 150 | 178 | 100 | 150 | 170 | 97  | 95  | 97  | 58  | 79  | 95  | 110 | 140 | 140 | 110 | 97  | 140 | 110 | 86  | 100 | 90  | 100 | 85  | 110 | 140 | 85  | 100 | 89  | 130 |     |
|                                           |                  | 一本松下         | —  | 121 | 80  | 121 | 134 | 127 | 80  | 120 | 160 | 130 | 120 | 97  | 66  | 88  | 86  | 97  | 130 | 110 | 120 | 83  | 120 | 96  | 78  | 81  | 82  | 93  | 87  | 99  | 120 | 76  | 110 | 88  | 120 |     |
|                                           |                  | 北印旛沼中央       | —  | 48  | 42  | 55  | 50  | 71  | 54  | 32  | 61  | 57  | 68  | 54  | 50  | 75  | 93  | 100 | 120 | 84  | 93  | 89  | 94  | 92  | 77  | 70  | 74  | 89  | 91  | 89  | 100 | 85  | 98  | 86  | 110 |     |
|                                           |                  | 根戸下          | —  | 334 | 274 | 236 | 206 | 367 | 290 | 290 | 270 | 290 | 310 | 223 | 230 | 260 | 290 | 340 | 370 | 390 | 300 | 340 | 240 | 180 | 130 | 76  | 57  | 56  | 53  | 65  | 73  | 53  | 64  | 56  | 79  |     |
|                                           |                  | 手賀沼中央        | —  | 354 | 342 | 333 | 374 | 348 | 290 | 270 | 370 | 370 | 330 | 262 | 260 | 300 | 370 | 340 | 400 | 460 | 380 | 350 | 290 | 290 | 190 | 100 | 140 | 140 | 130 | 150 | 110 | 120 | 110 | 130 | 130 |     |
|                                           | 手<br>賀<br>沼      | 布佐下          | —  | 244 | 263 | 264 | 277 | 270 | 230 | 190 | 240 | 220 | 180 | 184 | 160 | 190 | 220 | —   | 350 | 210 | 250 | 190 | 230 | 150 | 120 | 120 | 110 | 120 | 82  | 110 | 110 | 92  | 110 | 100 |     |     |
| 亀<br>山<br>ダ<br>ム                          | 手<br>賀<br>沼      | 下手賀沼中央       | —  | —   | —   | —   | —   | —   | 220 | 170 | 220 | 160 | 180 | 193 | 160 | 200 | 200 | 170 | 200 | 180 | 180 | 180 | 260 | 150 | 160 | 150 | 160 | 130 | 79  | 100 | 79  | 100 | 94  | 81  | 91  |     |
|                                           |                  | 堤体直上流部       | —  | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | 5.3 | 1.2 | 2.2 | 8.1 | 8.2 | 19  | 12  | 7.5 | 7   | 7   | 9   | 11  | 14  | 8   | 6   | 7   | 13  | 7   | 11  |
|                                           |                  | 小月橋          | —  | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | 4.4 | 1.5 | 2.5 | 12  | 11  | 25  | 23  | 10  | 10  | 11  | 9   | 14  | 10  | 10  | 7   | 9   | 14  | 8   | 11  |
|                                           |                  | 亀山大橋         | —  | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | —   | 7.3 | 1.6 | 3.6 | 14  | 11  | 26  | 17  | 13  | 12  | 14  | 11  | 18  | 17  | 13  | 6   | 8   | 16  | 13  | 11  |