Relationship between chloride and phosphorus concentrations at IOWATER sites. Median chloride is shown.
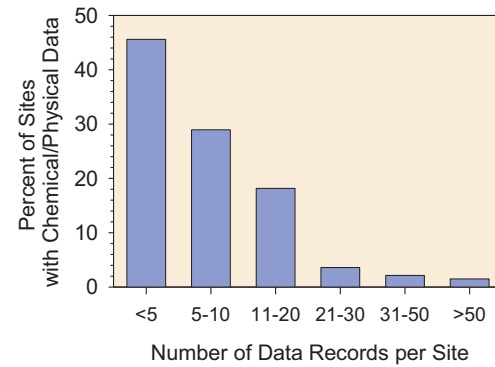
Number of chemical/physical data records submitted per IOWATER site.

Phosphorus, an essential nutrient for plants and animals, was present at relatively low concentrations. Eighty-five percent of the samples were at or below 0.2 mg/L. As phosphate levels increased from 0 to 1 mg/L, so did chloride. For phosphate concentrations from 1 to 10 mg/L, chloride levels were generally high. The sites with elevated phosphate and chloride may be affected by inputs from human or animal waste or may be sites located downstream of a wastewater treatment facility.

Nitrate and nitrite nitrogen, also nutrients, were variable. Nitrate-N was 0 mg/L for 17% of the data and 2 or 5 mg/L for 63% of the results. Nitrite-N was low, as 70% of the data reported 0 mg/L and 25% were 0.15 mg/L.

For 70% of the IOWATER data reported, dissolved oxygen concentrations were 8 mg/L or greater, while only 4% were <5 mg/L. For sites with dissolved oxygen of <5 mg/L, low dissolved oxygen tended to be a rare occurrence. Low dissolved oxygen (<5 mg/L) occurred most frequently from July through October when stream flow was low and water temperatures were at their highest.

To see the full Biological, Bacteria, Chemical/Physical, and Standing Waters Reports which include more in-depth data analysis and figures please visit: www.iowater.net/Publications/StatusReports.htm

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IOWA'S WATER
Ambient Monitoring Program

IOWATER Program: Summary of Recent Reports

IOWATER staff recently released reports on various aspects of the IOWATER program. These reports are intended to provide feedback to volunteers, analyze what has been successful for the program, point out areas for improvement, supply a scientific analysis of volunteer water quality data, and assist in program development and restructuring. Currently four reports have been released: Biological Assessments, Bacteria Assessments, Standing Waters Assessments, and Chemical/Physical Assessments. Below are brief summaries of some of the information that you can find in them.
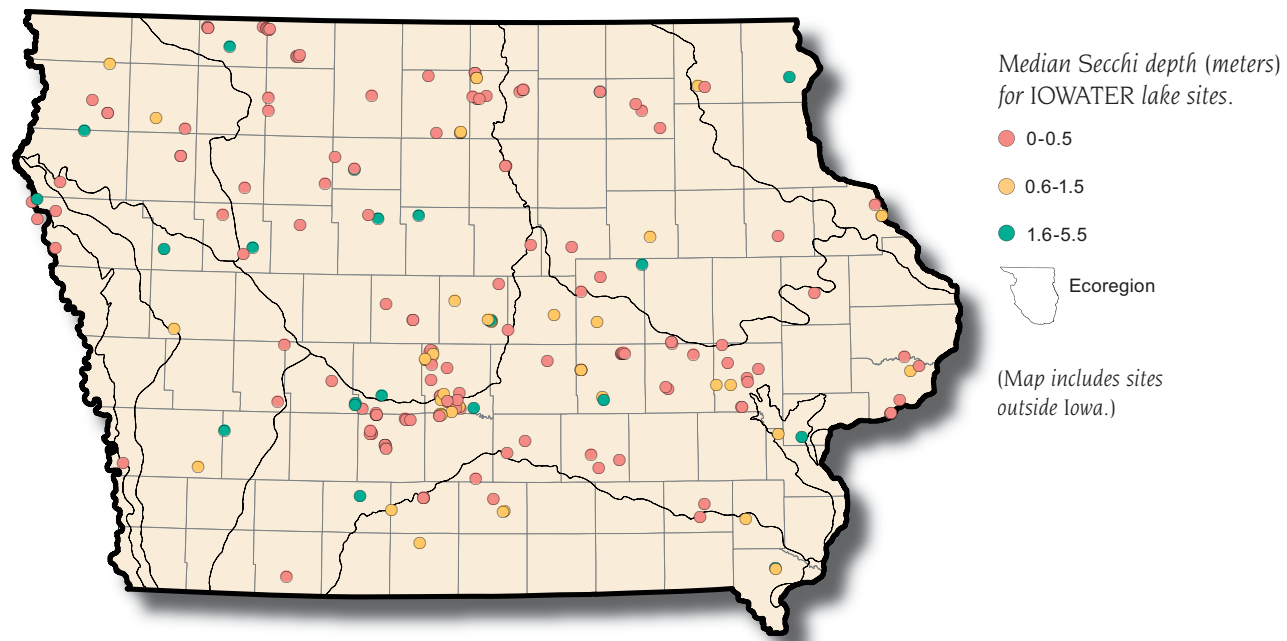

● Good   ● Fair   ● Poor   ○ Not assessed
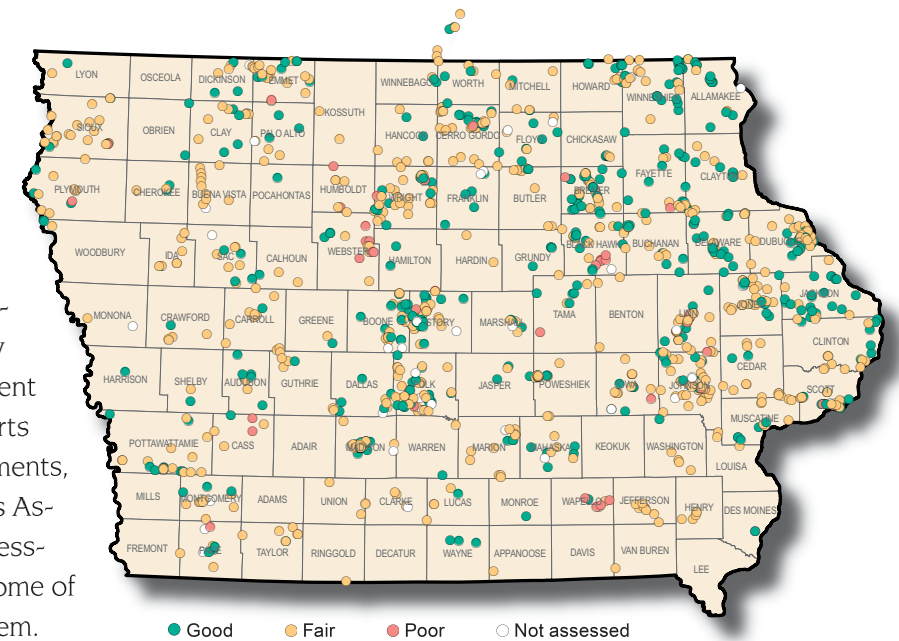
Index of Biotic Integrity for IOWATER sites.
(Map includes sites outside Iowa.)

Biological Assessments

From 2000 through 2008 there were 3,675 biological assessments completed at 1,185 different sites. The maximum number of sites and individual assessments completed was in 2001. The fewest sites and individual assessments were completed in 2008. Only 32% of the IOWATER sites registered have biological data submitted for them.

Biological data indicate that the benthic macroinvertebrate population statewide is diverse; 23% were high quality, 53% were middle quality and 24% were low quality. However, 242 of the 3,675 datasets recorded no benthic macroinvertebrates from 2000-2008.

A simplified Benthic Macroinvertebrate Index of Biotic Integrity (IBI) using the IOWATER tolerance groups of High, Middle, and Low Quality has been created. IBIs <1 would indicate a poor benthic macroinvertebrate population, IBIs ranging from 1.01 – 2 would indicate a fair benthic macroinvertebrate population, and IBIs ranging from 2.01 – 3 would indicate a good benthic macroinvertebrate population. The IBI was calculated for 1,185 sites that had at least one biological assessment (map

Median Secchi depth (meters) for IOWATER lake sites.

- 0-0.5
- 0.6-1.5
- 1.6-5.5

Ecoregion

(Map includes sites outside Iowa.)

Median transparency (cm) for IOWATER sites.

- 0-10
- 11-20
- 21-30
- 31-40
- 41-50
- 51-60

(Map includes sites outside Iowa.)

on p.1). Sites without benthic macroinvertebrates are labeled as "Not assessed." IBIs were averaged for sites with multiple biological assessments. Forty-three sites were poor (3.63 %), 677 sites were fair (57.13 %), 420 sites were good (35.44%), and 45 sites were not assessed (3.80%).

Bacteria Assessments

In 2001 IOWATER began offering bacteria monitoring training using Coliscan® Easygel. To date, 15% of IOWATER volunteers have completed the bacteria training. Of those trained, 27% (129) have submitted bacteria data to the IOWATER database for 344 sites. For 70% of the sites, less than 5 bacteria data records have been submitted. Approximately 19% of the sites have more than 10 bacteria data records. Fourteen of the 129 volunteers each submitted 30+ records, which accounts for 59% of available data.

A total of 22 IOWATER sites have 15 or more bacteria data sets. These sites have generally been monitored on a monthly basis by 10 IOWATER volunteers. These 22 sites are located in Boone County (6 sites), Cerro Gordo (1), Dubuque (3), Plymouth (5), Muscatine (2), Story (4), and Wright (1). Ten of the 22 sites are in the Squaw Creek watershed in Boone and Story counties. For these 22 sites, 55% of the samples exceeded 235 organisms per 100 milliliter (ml) (water quality standard for Class A1 and A3, primary contact and children's recreational contact, respectively) while 12% exceeded 2,880 organisms per 100 ml (Class A2 standard, secondary contact recreational contact).

Standing Waters Assessment

Standing waters assessments have provided a good start towards gathering additional information at Iowa's lakes and wetlands, especially since volunteers monitor many lakes and ponds that are not otherwise monitored through DNR programs. From 2001 through 2008 there were 1,254 Standing Waters Assessments completed at 222 different sites. Over 50% of the monitored sites had less than 5 assessments completed for them. Additional data are needed to accurately characterize lake water quality and assess trends in lakes.
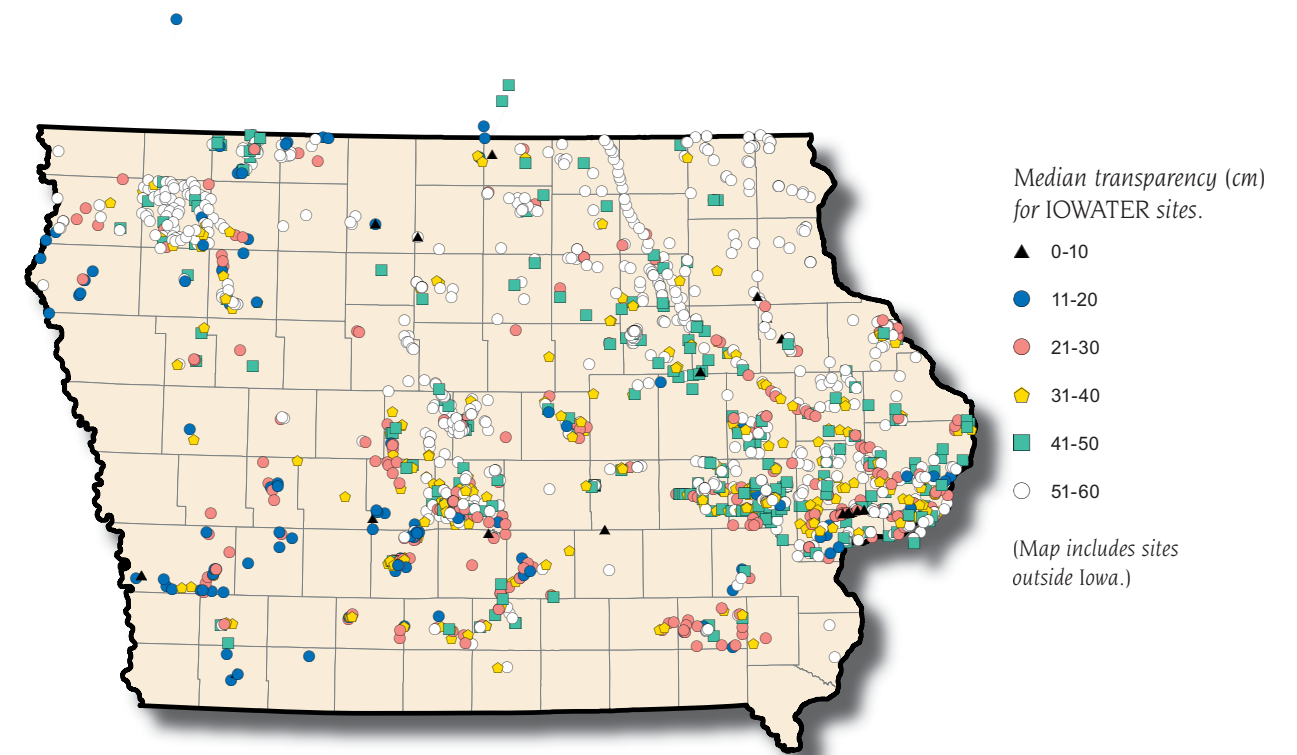
Secchi depth is one of the IOWATER tools that provides valuable information on lake water quality. In lakes and ponds, Secchi depths can be used to assess overall water quality and determine trophic state. Using the median Secchi depth for the 104 IOWATER sites with readings, 12 sites were in the *mesotrophic* category, 60 sites were in the *eutrophic* category, and 32 sites were in the *hypereutrophic* category based on Carlson's TSI values. These results suggest many lakes have poor water transparency, which according to Carlson's TSI relationships, is associated with high levels of nutrients and algae blooms. Increased Secchi depth measurements collected through the IOWATER program could provide a better characterization of lake water quality in Iowa.

Chemical/Physical Assessment

For the past 10 years, IOWATER volunteers have been monitoring streams statewide to assess the chemical and physical quality of those sites. In general, most IOWATER sites were not sampled very frequently, as 75% of the sites have 10 or less data records submitted to the IOWATER database. A total of 38% of the sites were sampled for <1 year while 45% of sites were sampled for 1-5 years.

The water color "clear" correlated to high transparency (transparency measures water clarity), as sites which had "clear" water generally had transparency of 51-60 centimeters (cm). Transparency associated with other water color categories tended to be less than 50 cm and more variable. Overall, the average transparency for all sites was 50 cm and the water color most frequently reported was clear.

Chloride is a component of salt and a measure of human or animal waste inputs to a stream. The majority of chloride concentrations were <50 milligrams per liter (mg/L) (81% of the samples). For chloride concentrations >100 mg/L, most occurred during the month of October, a low-flow time of year when point source inputs are most apparent. For nearly 25 IOWATER sites, elevated chloride concentrations were frequently reported. Many of these sites were either located in urban areas, located downstream of community wastewater facilities, or affected by the storage or application of road salt.