



**Colorado Volunteer Lake Monitoring**

# Program Plan

**Sponsored by:** Colorado Division of Wildlife (CDOW)  
Colorado Lake & Reservoir Management Association (CLRMA)



The point of this document is to explain the goals, purposes, and methods for the statewide, volunteer lake and reservoir monitoring program for Colorado.

Colorado Division of Wildlife (CDOW) and Colorado Lake & Reservoir Management Association (CLRMA) have teaming up to implement a statewide volunteer lake monitoring program. This plan follows the Environmental Protection Agency (EPA) guidance in establishing a new volunteer water monitoring program.

**April 2009**

# CVLM Program Plan

## Purpose

The purpose of the Colorado Volunteer Lake Monitoring (CVLM) program is to seek to improve the understanding of lake and reservoir conditions in Colorado and to help protect and improve lake and reservoir water quality conditions. The information generated from this program will help educate people and supplement the State-collected water quality data with credible, volunteer-collected data.

There are three goals to the CVLM program:

1. **Stewardship** - Educate the public about lake and watershed issues
2. **Quality** - Provide creditable data and information to State and local agencies
3. **Awareness** - Develop more public appreciation for Colorado's lakes & reservoirs

## Objectives

There are many reasons why it is important to collect data. The CVLM program can help answer many questions and be an important resource for water managers. The objective is to help answer these five questions about Colorado's lakes and reservoirs.

1. **What is the water quality condition?** – Because of unavailable staff and resource, only 45% of Colorado's lake or reservoir's surface area has been monitored in the last six years (CDPHE 305(b) report, April 2004). The volunteer monitoring would help establish baseline data for water bodies that have no data, resulting in a more thorough understanding of Colorado's lakes and reservoirs.
2. **Is the water quality improving or declining?** – Water quality trends can be charted with multiple years of reliable and consistent volunteer data.
3. **Is it economical to monitor lakes?** – With many federal, state, and local government budget cuts, a volunteer lake monitoring program can provide inexpensive water quality data that is useable.
4. **When did the water quality start changing?** – First line of defense. Volunteers can document early water quality changes, pinpoint source problems, and help prevent expensive, long-term chronic problems from occurring.
5. **How is one lake compared to another?** – It is important to be able to compare lakes and reservoir across the state, as well as across valleys.

## Data Uses

The main data use is to supplement the State monitoring efforts with volunteer lake monitoring data. With only 45% of Colorado's lake and reservoir's surface area being monitored in six years, it would significantly help shed some light on many more of Colorado's lakes and reservoirs. Therefore, the data must be of good quality and reliable enough for State and Federal standards. The data can also help local volunteer groups, watershed councils, and local agencies in properly managing lakes and reservoirs. Also, the data will be given back to the volunteers so they can see the results.

## **The Plan**

CLRMA has developed this Plan to present specific information on volunteer lake water quality monitoring for Colorado. This Plan is intended for the actual volunteer. Its emphasis is on answering the, “who, what, when, why, and how” and setting out specific steps for each monitoring water clarity (transparency). Careful quality assurance/quality control procedures are advocated throughout this document to ensure that the data collected by volunteers are useful to the state and other agencies.

### **WHAT WILL BE MONITORED?**

For now, water transparency will be the main parameter measured. To measure transparency, a black and white, 8-inch Secchi disk will be used. The disk will be attached to a plastic measuring tape and the transparency will be record in tenths of feet. A Secchi disk w/tape measure will be issued to each volunteer. The Secchi depth will be measured during each monitoring event. CLRMA will be responsible for building, maintaining, and supplying these disks.

Observational information will also be recorded on the day of monitoring. Weather, water color, presents of algae blooms, recreational potential, and time of day will be documented on a data log.

### **WHEN TO MONITOR?**

The official monitoring season will be June–September. Volunteers will be encouraged to monitor at other times as they see fit. During the monitoring season, volunteers will be encouraged to monitor their lake/reservoir at least twice per month, between 10:00 am and 4:00 pm. Volunteers may monitor as frequently as they like.

### **WHERE TO MONITOR?**

In order to fill in important data gaps, lakes and reservoirs with no data will be a high priority. Ideally, the CVLM program will include a volunteer from every major watershed in Colorado. Ultimately, it will depend on the volunteer’s location.

Once a lake or reservoir has been selected and the bathymetry known, the volunteer will monitor at the most representative site, center or near the deepest area of the lake or reservoir. It is crucial that the volunteer goes to the same location each time to collect the data. A map of the monitoring location will be provided by CLRMA.

### **HOW TO MONITOR?**

A boat is required for this program. For procedures and training material, refer to the CVLM Monitoring Handbook.

### **WHO WILL DO THE MONITORING?**

Volunteer citizens will do the monitoring, and anyone can volunteer. It is important that the volunteer makes a multi-year commitment to help provide long-term data. Here are several groups in Colorado that might have an interest:

- |   |                               |
|---|-------------------------------|
| 1. Boy Scouts and Girl Scouts           | 7. YMCA programs              |
| 2. Colorado State Parks Volunteers      | 8. Public Schools             |
| 3. Watershed Councils                   | 9. Lake monitoring programs   |
| 4. Volunteer for Outdoor Colorado       | 10. Nearby lake residents     |
| 5. Retired water resource professionals | 11. CLRMA members             |
| 6. Summer camps on lakes                | 12. CO Youth Corp Association |

### **WHO WILL MANAGE THE DATA?**

CDOW will incorporate the CVLM data into an appropriate volunteer database. All data will be sent to CDOW via CLRMA and managed by CDOW.

### **WHAT QA/QC MEASURES WILL BE PERFORMED?**

Given proper training and guidance, dedicated volunteers can conduct monitoring activities and collect samples that yield high quality data. To ensure this, the CVLM program will adopt effective quality assurance/quality control (QA/QC) responsibilities.

Based on the program's purpose and objectives stated earlier, here are five major areas of QA/QC that are important:

1. **Accuracy** (*degree of agreement between the sampling result and the true value of the parameter being measured*): To maximize accuracy, the equipment will be properly maintained and the sampling procedure closely followed.
2. **Precision** (*how well you are able to reproduce the data result on the same sample*): Human error is the main reason for precision problems. Proper training and implementation of the monitoring manual will help maximize precision.
3. **Representativeness** (*degree to which the collected data accurately and precisely represent the lake condition being measured*): Sample location will be properly selected and the volunteer will consistently go to the same location during each visit.
4. **Completeness** (*measure of the amount of valid data obtained versus the amount expected to be obtained as specified by the original sampling design objectives*): It is important that each volunteer, each time, collects the same data and fully records all the information on the data form, and fulfills their multiple year commitment.
5. **Comparability** (*represents how well data from one lake can be compared to data from another*): Across the state, every volunteer will follow the same procedures and collect the same information the same way. It is important to be able to compare lakes and reservoirs to others during the same period of time.

**ANNUAL PROGRAM SCHEDULE (TABLE 1)**

Between January and March, communication will occur with the existing volunteers from the previous year by e-mail and mail (e.g. one-page water quality summary, statewide, a lake report card, and upcoming information about training and changes for the next monitoring season). Between March and May, volunteers (new and existing) will have opportunities to take a one-day training session and to receive equipment, a monitoring manual, and data forms. June through September volunteers will conduct their monitoring. Data will be processed and entered into the volunteer monitoring database as it comes in. Volunteers will be welcomed to join year round.

Table 1. CVLM Program’s Annual Schedule

<b>Activity</b>	<b>Date</b>
Lake Report Cards	Winter
Train monitoring volunteers	April Luncheon/Workshop
Recruit monitoring volunteers	Year round
Obtain and check operation of instruments	Spring
Beginning of monitoring season	June 1st
Data entry	Anytime
QA/QC control sessions	April
Review data with technical advisors	Fall
End of monitoring season	September 30th

**WHO WILL DO THE TRAINING?**

CLRMA will be responsible for training all volunteers. CLRMA has a volunteer board of directors and active members that can coordinate the training process and do the actual training of volunteers.

**WHO WILL SUPPLY THE EQUIPMENT?**

CLRMA will construct the Secchi disks and supply the necessary data forms for the volunteers. CLRMA will pay for the Secchi disk equipment and keep a supply of disks on hand when older disks get lost or need replacing.

**HOW WILL THE PROGRAM BE EVALUATED?**

Close communication between organizers and volunteers is important. Annual surveys will be sent out with the data summaries to help evaluate and improve the program. Surveys will include open-ended questions to find out what the volunteers need or would like to get out of the program (e.g. how they would like to see their data). An evaluation form will be used for training sessions also.

**HOW WILL VOLUNTEERS BE CONTACTED?**

CLRMA will be responsible for maintaining the volunteer membership database. All notices, updates, and communication will be sent from CLRMA to the volunteers. Data questions and request will go through CLRMA to CDOW.

**HOW WILL VOLUNTEERS BE RECRUITED, TRAINED, AND RETAINED?**

Recruitment will be done by networking with organizations mentioned above. Continuous education about the program to the public will help attract volunteers. The Great North American Secchi Dip-In event will help bring public's attention to the program, also.

Training will include face-to-face, one-day sessions during the spring, hard copy monitoring manuals, reminder cards for the field, e-mail updates through out the year, and references to EPA's training material on the Internet.

Retaining volunteers is important to help achieve the objectives of the CVLM program. Communication will be the key to holding on to volunteers. They must feel a sense of belonging to a larger group that is making a difference in the water resources field. They will be updated promptly each new season about their results from the previous year, about new changes in the program, and how their lake/reservoir compares to other lakes around the state or nation. Rewards also help and will be apart of CLRMA's annual recognition awards at the annual fall conference.

**WHAT RELATIONSHIPS WITH STATE, FEDERAL, LOCAL GOVERNMENT, SCHOOLS, COLLEGES, LOCAL BUSINESS, ORGANIZATIONS, AND WATERSHEDS?**

To have the volunteers feel like their work matters, strong relationships between the CVLM program and government agencies that use the data need to exist. Interactions at CLRMA events will help bring volunteers in contact with State officials. This will help with recruitment and retainability of volunteers.

**HOW WILL VOLUNTEERS BE REWARDED?**

Here are some examples:

- Recognition awards – CLRMA hand out awards at annual conference
- State Park fee waivers – don't need to pay to go sample a lake in a park
- Free CLRMA membership as long as you are a volunteer
- Free publications
- Reduced cost to local CLRMA conferences and events
- Recognition in newsletters around the state (e.g. Colorado Watershed Assembly)
- Free maps and information about their favorite lakes

**FUTURE EXPANDED MONITORING**

Once the CVLM program is stable with a strong group of reliable volunteers, other water quality parameters can be added to the program. Chlorophyll-a, dissolved oxygen/temperature profiles, and total and soluble phosphorus concentrations are important parameters that can be easily added to the program. Depending on resources, importance, and volunteer commitment, expanded volunteers will be hand selected. Equipment management, training, QA/QC, and data management procedures will be added to this plan when this happens.

### **MONITORING PRODUCTS AND REPORTS**

At the beginning of each year, 1-page water quality report cards will be sent to each volunteer summarizing the previous year's data. Regular five-year reports will be produced to help track water quality trends. The monitoring manual will be updated yearly to help document the training requirements for the program. Maps, data summaries, data tables, and other lake-specific material will be generated to help document the volunteers' efforts.

### **SAFETY**

It is very important that volunteers are safe. It's always a risk to be in a boat on water. Training sessions and other communications will, in great detail, cover all safety aspects of the volunteer work. The training manual will include all Colorado state safety requirements for boating and a current *Colorado Boating Statutes and Regulations* booklet. All volunteers will sign a liability release form.

### **WHAT WILL HAPPEN TO THE DATA?**

The volunteer lake monitoring data will be entered and managed in the CDOW database. This data will eventually be uploaded to the STORET (U.S. EPA's national Storage and Retrieval database) database.

The state agencies (CDPHE) can then include the volunteer data into their 305(b) report. The goal is to assist the state in assessing more of the lakes and reservoirs through out the state.

### **Final Points**

To make this a long-term, successful program, three things need to occur:

1. Volunteers need to feel like they are making a difference – Volunteers have to feel that it is worth their time. Their data needs to be used by the State, and they need to get their data back to them in a usable format. Once word gets out that it is a fun, worthwhile, volunteer program, then more volunteers will join.
2. The data collected needs to be useable – The quality of the data has to match the end use of the data. Since the volunteer data is going to be used at the state level, the data must be reliable, dependable, and representable. Training will be the most important aspect of managing this program.
3. Communication – With e-mail, newsletters, and the Internet, volunteers need to be contacted frequently to make sure everyone understands their role and to avoid monitoring errors. Good communication makes recruitment and retainment of volunteers easier and assures good QA/QC procedures.