



CLARION

A Publication of the Colorado Lake and Reservoir Management Association
October 2004

www.CLRMA.org

CLRMA 8TH ANNUAL FALL MEETING

LUNCHEON DETAILS:

Where: Westminster City Park Recreation Center, 10455 Sheridan Blvd.

When: October 13th, 2004 from noon to 3:00pm

Cost: \$20.00

Speakers: Kay Zillich and Mike Japhet – *“Forest and Fish Habitat Restoration at Vallecito Reservoir Following the Mission Ridge Wildfire”*

Please join your favorite CLRMA officers, directors and members at our 8th Annual CLRMA meeting. You can listen to interesting speakers, vote for new officers and directors, watch the award ceremonies, and hear some big plans for CLRMA in 2005.

The guest speakers will be Kay Zillich (hydrologist with the U.S. Forest Service) and Mike Japhet (fish biologist with the Colorado Division of Wildlife), both from Durango. Kay will speak about the emergency stabilization and long-term rehabilitation of the Missionary Ridge Fire area and how post-fire debris and sedimentation were controlled near Vallecito Reservoir. Mike will provide a status report on the fisheries of the Reservoir, in particular the Kokanee salmon, and possible effects from the fire.

Please complete the registration form and mail or fax it to: CLRMA, P.O. Box 350144, Westminster, CO 80035-0144, FAX: 303-466-1522 by Friday, October 1st, 2004.

Agenda:

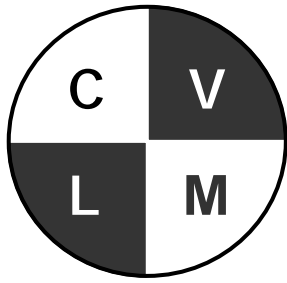
12:00 – 12:30 pm **Opening Remarks from the President**

12:30 – 2:00 pm **Eat and Listen to the Guest Speakers**

2:00 – 2:15 pm **Count Votes & Welcome New Directors**

2:15 – 2:30 pm **Awards**

2:30 – 3:00 pm **Closing Remarks**



Colorado Volunteer Lake Monitoring Program

Colorado Volunteer Lake Monitoring Program (CVLM) by: Steve Lundt

That's right! Colorado will be joining 13 other states by forming a statewide volunteer lake monitoring program, focusing on taking water clarity measurements.

Only 45% of Colorado's lakes (that's surface area) get monitored over a 5-year period. That equates to about a dozen or so large lakes/reservoirs that get visited in a given year. How can we honestly know the status and health of all our lakes with these low numbers? This is where CLRMA and you come in to play.

CLRMA will manage the day-to-day activities of keeping volunteers informed and properly trained, while the data will be managed by the Colorado Department of Wildlife (DOW) and incorporated into their database, similar to the Riverwatch program.

Volunteers will be asked to measure Secchi depth for a lake or reservoir at least twice a month between June and September. Other observations such as water color, aesthetics, and weather will be recorded. Ideally, volunteers need to have access to a boat in order to sample the open water. Each sampling event should take about 30 minutes on the water. As this program grows, more parameters will be added (e.g. chl-a, collect water samples to analyze for nutrients, temp/dissolved oxygen profiles, and more).

All the data will be sent to the appropriate state agencies and be available for anyone. Report cards will be sent back to each volunteer during

the winter. Over time, we will begin to document trends in water clarity and make comparisons between different areas of the state.

Benefits: You will feel good that you are volunteering your time to help your favorite lake. You will be the "eyes" of the lake and stop water quality problems before they get out of hand. You will also help the state assess Colorado's water quality conditions. You will be able to compare your lake to others in the state and around the country. Finally, you will have an excuse to go boating during the summer.

If you are interested in volunteering, please contact Steve Lundt at slundt@mwr.dst.co.us or call 303-286-3272 to sign up.



1 page = \$200 for 4 issues or \$60/issue
1/2 page = \$100 for 4 issues or \$30/issue
1/4 page = \$50 for 4 issues or \$15/issue

(For more info:
travis.bray@denverwater.org)

SPOTLIGHT ON....

JM Boyer

Age: 45 years young

Yrs with CLRMA/NALMS: 17 with NALMS, 8 with CLRMA

Yrs in CO: 19 years

What do you do: Help clients solve surface water quality problems

Family: Two daughters – Logan (14) and Madison (11), and husband, Keith

When I'm not working I am... working on how to best mother a strong-willed teenage daughter (now I know what my mother went through...)

Your idea of happiness: Going to the theatre at least once per week

Not many people know that... I used to race in whitewater slaloms around the country

What do I like to do most: Solve problems

If I won the lottery: Take my daughters around the world and give the rest of the money to charity

Last book I read: Angels and Demons by Dan Brown

What political office: ????

Toughest aspect of my job: There's only 24 hours in the day

What famous person would you like to meet most: Albert Einstein – for his understanding of science AND his understanding of aspects of life and thinking beyond science



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West Side Story by: Sarah Clements

Labor Day has past and fall is rapidly approaching with cooler nights and the aspen leaves turning. Warm days are keeping the blue-green algae blooming in the Three Lakes (Grand Lake, Shadow Mountain, and Lake Granby). Routine phytoplankton sampling is new for the Three Lakes. In September 2003, the first known phytoplankton samples were taken in Grand Lake containing Anabaena, a cyanobacteria. Starting in July 2004, monitoring occurred monthly at one site on each lake during the summer. However, monitoring was increased to once a week for phytoplankton analysis in Shadow Mountain and Grand Lakes due to the Anabaena cell counts.

Watching the changes in the lakes as the water warmed and summer progressed has been captivating. Though connected by canals or channels, each of the Three Lakes has its own unique characteristics dictated primarily by topography, inputs, and outputs. Anabaena levels increased through August in all three lakes, but especially in Shadow Mountain and Grand Lake. In Shadow Mountain, drops in the dissolved oxygen content could be seen coinciding with a severe drop in chlorophyll levels. Large masses of aquatic weeds decaying along the sides of the lake have made the interactions between algae and aquatic weeds interesting with the additional inputs to the nutrient cycling. Aquatic weeds and algae can still be seen making their way to the Adams Tunnel and the Front Range via the channel from Shadow Mountain to Grand Lake.

Serious lake management issues are facing the stakeholders in the Three Lakes area. Shadow Mountain and Lake Granby are part of the Arapaho National Recreation Area governed by the U.S. Forest Service. Grand Lake, the state's largest natural lake, is presently under no jurisdiction. All three lakes are part of the Colorado-Big Thompson Project owned by the U.S. Bureau of Reclamation and operated by Northern Colorado Water Conservancy District. The Three Lakes watershed is an important year-round recreational region as well as a major water supply for the Front Range. Water quality issues including the aquatic weeds, cyanobacteria, and nutrient loading need to be addressed by the stakeholders. Publications, resources, and contacts through CLRMA and NALMS are vital in understanding the many water quality issues facing the Three Lakes and helping to find solutions to the multi-faceted problems.

What's Happening in NALMS

Lakeline Magazine Subscription deal!!

Only \$25/year for the popular quarterly magazine

(No membership required)

LAKES APPRECIATION MONTH, July 2005

– GRAND LAKE, COLORADO-

Every July during *Lakes Appreciation Month*, Early in July during Lake Appreciation Month CLRMA tries to increase people's awareness of the importance of clean lakes and requests the Governor to sign a proclamation. But for 2005, we are thinking big! Instead of focusing on a regional conference, CLRMA is going to organize a major event(s) on Grand Lake in honor of *Lakes Appreciation Month*.

We are looking for volunteers interested in helping with this event. CLRMA will need help with marketing, inviting the press to cover the story, coordinating the events at Grand Lake, getting the Governor to visit the Lake, and anything else that will promote CLRMA, Grand Lake, and the national *Lakes Appreciation Month* celebration.

President's Dock – Turn Over-

It's October, the aspens are changing, and the blue-greens are hopefully settling to the bottom. Another summer season has passed and our lakes are about to *turn over*.

Speaking of *turn over*, my presidency will end in a couple of months, this being my last newsletter as president. I would like to take a moment and thank Travis Bray for his great job as the CLARION editor, Sharon Campbell for leading us to a successful regional conference, Stacey Smith who is stepping aside as Treasurer, and to the other four directors that are also leaving.

As for you CLRMA members, I hope this past year was different for you. I tried to bring you more technical resources via e-mail, work with watershed groups, help promote the state parks system, and tried to give you a reason to go boating at the "CLRMA on the Water" events. With the membership back up to 125+ and a very successful regional conference, CLRMA is as strong and active as ever.

The *turn over* of 5 director positions (half the board) brings a level of newness and excitement for next year. I will continue to be very active as Past-President, leading the Colorado Volunteer Lake Monitoring program and helping to coordinate a major *Lakes Appreciation Month* event on Grand Lake.

I will be *turning over* the presidency to Chris Knud-Hansen in January. Chris has been a member of CLRMA since the beginning and will continue my efforts to bring in new faces (e.g. lake associations and neighborhood associations), start up a volunteer lake monitoring program, and organize a major event on Grand Lake.

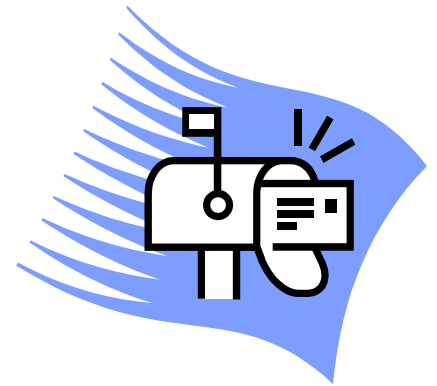
Just so I can say the phrase one more time, I will end this article and get back to my morning apple *turnover*. Thank you for being a member of CLRMA in 2004 and protecting Colorado's precious lakes and reservoirs.



Due to the popularity of the CLARION electronic version, we have decided to only send it out via e-mail. If you have problems viewing the electronic version, please let me know.

Thanks, Travis Bray

travis.bray@denverwater.org
303-628-6551



2004 CLRMA Board of Directors

Steve Lundt	President
Tom Settle	Past-President
Chris Knud-Hansen	President-Elect
Kelly Close	Secretary
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Limno 101: Chlorophyll *a*
by Chris Knud-Hansen

In the last Clarion we discussed the Secchi disk and how it is used to evaluate water clarity in lakes. The primary culprits reducing water clarity in most lakes are the billions and billions of microscopic plants (i.e., algae) suspended in the water column, collectively referred to as phytoplankton (phyto = plant, plankton = free floating). Similar to terrestrial plants, phytoplankton contain a variety of pigments used to capture light energy for photosynthesis. The two main groups of photosynthetic pigments are chlorophylls (giving algae their typical green color) and carotenoids (giving some algae an orange-red color similar to carrots, yams, and salmon). Within these two groups are a number of different pigments, including chlorophylls *a*, *b*, and *c*, carotenes, xanthophylls, phycocyanins, phycoerythrins, and phycopyrins.

Chlorophyll *a*, however, has particular ecological significance because it is the only pigment involved in the electron transfer from light energy to chemical energy through photosynthesis, and is the only pigment found in all algal species (including cyanobacteria/blue-green algae). Chlorophyll *a* reflects green light, but it absorbs light energy primarily in the red-light region (wavelengths around 660 nm) and in the blue-light region (wavelengths around 430 nm). All other algal pigments are called accessory pigments, and absorb light energy from other parts of the visible spectrum and transfer electrons to chlorophyll *a* for photosynthesis. Differences in accessory pigment composition are used to determine primary algal taxonomic classifications.

Because chlorophyll *a* is the dominant algal pigment and is found in all species, concentrations of this pigment are commonly used to indicate levels of algal biomass in lakes. Clear water lakes with Secchi depths > 8 meters may have chlorophyll *a* concentrations < 1 mg m⁻³ (= 1 ug L⁻¹ = 1 part per billion). When chlorophyll *a* concentrations exceed 20-30 mg m⁻³, Secchi depths are generally < 1 m and waters are often considered eutrophic or impaired. In fertilized, warm water aquaculture ponds,

chlorophyll *a* concentrations can exceed 400 mg m⁻³, with corresponding Secchi depths of about 10 cm or less.

Although within a given lake there can be considerable chlorophyll *a* variability both seasonally and spatially due to species-specific preferences for light, temperature and nutrients, chlorophyll *a* measurements in discrete or composite water samples are commonly used to monitor lake health. It is important, therefore, to ensure that sampling and analytical methods are consistent when examining trends over time, or making comparisons between lakes. Even with inherent analytical variability, chlorophyll *a* remains a very valuable and useful limnological indicator of algal biomass. In the next Limno 101 installment we'll discuss factors that control the rate of algal biomass production in lakes.



CLRMA WANTS YOU!

303-286-3272

EDITORIAL by: Steve Lundt

Carp (*Cyprinus*) are an exotic aquatic nuisance species introduced in 1831 from Asia. Very quickly after being stock in many east coast and Midwest waters, the species lost its popularity. Now we are stuck with them. Thanks!

What to do with carp? Can they be eradicated? Are they really a threat to Colorado Lakes and Reservoirs? – *eradicate them all, most likely not, and yes.* These omnivorous critters are

EDITORIAL (continued)

hardy, can out compete native fish, thrash through nutrient-rich bottom sediments for food, live for 20+ years, and they really don't taste good.

We have even tried to use them as a lake remedy for aquatic plants. We quickly discovered though, that they do more harm for water quality than good for plants. Yes, grass carp graze like cows, but they tend to eat the native first (given exotics a better chance to spread), can easily escape, and tend to scalp the littoral zone. End result; the clear, plant-dominated lake changes into a turbid, blue-green algae cesspool with no fish.

Wait, there is more. Now there is a new carp found in Colorado (Cherry Creek Reservoir) that grows to 100 pounds and can knock people out of a boat when it jumps 10 feet into the air (even Paul Harvey is talking about this one). Bighead carp is the next new aquatic exotic, introduced from China in 1972. It will be a short matter of time, thanks to no fish screens, before this lunker gets down the South Platte River.

Cool Properties of Water by: Steve Lundt

Why is water wet? How does ice float? How does a paper clip float on water? Why does the cream disappear to the bottom of your hot coffee? Why is water a liquid at stable state? Many of these questions are unanswerable, only explainable.

Water is an amazing thing that supports every form of life. Here are a few interesting properties about water. If any one of them changes, Earth will become just another Mars.

Temperature/Density Relationship

The density of water is greatest (1.0 g/ml) when its temperature is 3.98° C because of the uniqueness of the hydrogen and oxygen bonds. Cold water is heavier and sinks, just like your cream that you add to your coffee. Any temperature warmer or colder than 3.98° C is lighter and therefore floats. At 0° C (freezing), the molecules of the bonding water form a tetrahedral shape that permits both parallel and perpendicular voids between the water molecules. This void allows ice to float. But as water warms up to 3.98° C, those atomic bonds begin to dislocate and rupture, which fills in the open spaces in the ice lattice structure. After 4° C, intermolecular vibrations increase in amplitude, thereby increasing inter-atomic distances that make the molecules lighter again.

Viscosity/Density Relationship

Density of water is 775 times greater than air. This is why astronauts use underwater environments to simulate weightlessness. Viscosity decreases as water temperature increases. So colder the water, the thicker and heavier it is. Almost freezing water is twice as viscous at 25° C water. Viscosity helps organisms with floating, stabilization, and spending less energy on building woody, cellulose structures. On the other hand, the viscosity of water is 100 times the frictional resistance of air and makes it very difficult for movement. Have you tried to run in the shallow end of a pool lately? Sinking rates and spending energy on forward movement has been a defining matter in the evolution of aquatic organisms.

Surface Tension

The water-air interface is a unique environment. Water at this interface has its own set of rules. The molecular attractions in water are unbalanced and apply an inward adhesion at the liquid surface. There is actually a film on the surface forming the surface tension so that a paper clip can float. The

Cool Properties of Water (continued)

surface tension of pure water is higher than any other liquid except for mercury. Many organisms have adapted their behaviors to survive in this thin layer. Others have found their demise. Zooplankton can get trapped on the waters surface and not be able to reenter their normal submersed habitat.

Specific Heat

Water is very resistant to temperature changes. Specific heat (the amount of energy it takes to raise 1 gram of water 1° C) is very high (1.0 calorie). Compare this to terrestrial objects like rocks and it takes much less energy to heat up (0.2 calories). These heat-requiring and heat-retaining properties of water ultimately control the planets climate. Fluctuations in water temperature occur very gradually, and seasonal and diurnal extremes are small when compared to the air environment. It takes almost 80 calories to melt one gram of ice and about 680 calories to change one gram of ice directly to a vapor. To evaporate 1 gram of water, it takes 540 calories.

Information was taken out of Limnology, 2nd edition, by Wetzel (1983).

In a hurry to sample your lake? Try our new vacuum cleaner.



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- ¼ page = \$50 for 4 issues or

8th Annual Fall CLRMA Meeting

Location: Westminster City Park Recreation Center (10455 Sheridan Blvd.)

When: October 13th from noon to 3:00pm

Cost: \$20.00 for the Luncheon

Lunch Speakers: Kay Zillich and Mike Japhet

This fall it will be a casual luncheon with some interesting talks about the Missionary Ridge fire near Vallecito Reservoir. We will also be voting and welcoming in new directors and handing out awards. So come and enjoy good food with your favorite CLRMA director.

Register by going to www.clrma.org