

April, 2008

CLARION

A Publication of the Colorado Lake and Reservoir Management Association

Springtime in Colorado and still snowing! Spring snows never last long, but it would be nice to have much needed moisture in our state coming in the form of rain for a change! The picture shown above in the header for the newsletter is called "Santa Fe Spring" and although not in Colorado, is still located in and depicts a more arid, mountainous area.

CLRMA is coming into a very busy and event-full year this year, starting with the CLRMA Spring Conference at the Thornton Recreation Center on April 16th. We had a great line up of presentations and 42 participants at our first organizational event of 2008. Those of you who were unable to come missed good food, great talks and a change to catch up with fellow CLRMA members to find out what is happening (or not) in the world of lake and reservoir management.

Here is a group picture of many of the participants taken during the conference:



Kneeling from left to right: Travis Bray, Jerry Dickenson, Kelly Cline, Kipp Scott, Rick Brinkman, Mark Ritterbush, Steve Lundt, Vick Lucero, Kim Elkins, Laura Hubbard, Tracy Kosloff, Sarah Clements

Standing from left to right: Al Polonsky, Craig Wolf, Jerry Walker, Kevin Urie, Jim Shelley, Andy Cross, Eric Portner, Mary Fabisiak, Steve Ramer, Dida Osborne, Jerry Olsen, Pam Benskin, Dennis Fisher, Sarah Sauter, Michaela Taylor, Shelly Stanley, Randy Giffen, Brittany Hand, Emilie Ward, Laurie Rink, Jim Stokes, Cindy Brady, Kelly DiNatale, Chris Knud-Hansen, Jean Tollett,

Missing from the picture: Sharon Campell (taking picture), Joni Nuttle, Jim Saunders, Shonnie Cline, Ken Strzepek



Remember that we have two more events coming up this year with the “Day on the Rez” at Boulder Reservoir on July 23rd and a Fall Awards Banquet in September. We’ve found a location for the banquet at the Broomfield Lakeshore Center, 280 Lamar Street. This facility overlooks a lake and has a great view and reports from CLRMA members who have attended functions there are all good! The banquet date, just confirmed by Shelley Stanley, is September 12th from 6 – 9 pm. The CLRMA Officers and Board have been discussing some possibilities such as music, a motivational speaker or storyteller or a multimedia presentation on lakes similar to the ones shown at NALMS Fall Symposiums at their annual banquet. Let us know if you have any ideas for entertainment for the fall banquet and we’ll try to follow up on them. Remember, the concept for the banquet is to have the annual business meeting, elections, and awards presentations in a more social setting to allow CLRMA members to spend some time getting to know others and share lake management and recreational experiences. Partners and children can attend at a reduced cost (\$10) and the cost for members will be just \$25.

In this issue of the Clarion, we have the usual features such as the President’s Dock by Travis Bray, the Lakes-pert by Steve Lundt and a Limno 101 Classic feature by Chris Knud-Hansen. Our Spotlight feature this issue is on President-Elect Sarah Sauter. The Reflections segment contains an article by Bill Ruzzo and Robert McGregor entitled “***It may be oxygen bubbles to the fish, but its champagne to us.***” This article talks about Cherry Creek Reservoir’s aeration systems installation. The Ripples segment focuses on “**Nutrient Criteria for Lakes and Reservoirs – Proposed Direct Water Supply Use Category**” by Shelley Stanley and Mary Fabisiak.

Please enjoy this spring, 2008 issue of the Clarion and let us know what you’d like to see in upcoming issues by contacting the editor: Sharon Campbell, 970-226-9331, campbells @usgs.gov to provide suggestions, feedback, or to offer an article for an upcoming issue!

Presidents Dock by Travis Bray

The third annual Colorado Watershed Conference is beginning to take shape. This year the theme will be “Sustaining Colorado Watersheds: Striking a Balance for the Future”. The presentations will include everything from the Army Corps of Engineers wetlands policy to Zebra Mussels in lakes and reservoirs. The conference will take place from October 1 through October 3, 2008 in Vail Colorado, and is jointly sponsored by the Colorado Lakes and Reservoir Management Association, Colorado Watershed Assembly, Colorado Watershed Network, AWARE Colorado, and the Colorado Riparian Association.

In other news, CLRMA has a number of events coming up this spring and summer. Later this month, April 16, we will be hosting a Spring Conference at the City of Thornton Margaret Carpenter Recreation Center from 8 am to 3 pm. This year we will be having a “Day on the Rez” at Boulder Reservoir. This annual event will take place during lakes appreciation month on July 23. For more information on either of these events, please check out our web page at www.clrma.org.

Lastly, we are once again struggling with finding students who want money. We have offered a scholarship or internship for the last three years and have had to plead and beg for students to apply for \$500 to \$1,000. If you know of a student (undergraduate or graduate) who might be interested in some extra money, please have them check out our web site at www.clrma.org and click on the “CLRMA Scholarship” link.





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REFLECTIONS: *“It may be oxygen bubbles to the fish, but its champagne to us.”* By William P. Ruzzo¹, and Robert McGregor²

According to Ed Dentry, Sports writer for the Rocky Mountain News in an article about the pending project in Cherry Creek Reservoir³, fish will get *“high on oxygenated water and munch a tossed seafood salad.”* This fisherman’s dream may become a reality because of the recently installed destratification system at Cherry Creek Reservoir. To the Cherry Creek Basin Water Quality Authority (authority), seeing the bubbles for the first time in October 2007 may as well have been champagne flowing, as the event was a milestone in a 25 year effort to control algae in Cherry Creek Reservoir.

Nutrient enrichment study – the start of a solution. In 2003, the authority and the Water Quality Control Division co-sponsored a nutrient enrichment study of Cherry Creek Reservoir which was conducted by Dr. Bill Lewis, et. al., with the University of Colorado. The results of the study showed that algal growth was limited by nitrogen, not phosphorus. Dr. Lewis also noted⁴ that *“reduction in phosphorus concentrations sufficient to induce phosphorus deficiency in the phytoplankton of year 2003 would involve decreases in upper water column concentrations of at least 50%, or about 30 $\mu\text{g/L}$ ”*. What this means is that controlling algal growth by reducing nutrients in the Cherry Creek watershed alone is very difficult and that algae must also be controlled *“...based on non-nutrient factors”*, according to Dr. Lewis. Even though the authority and others have implemented watershed controls with some success, watershed controls alone are not sufficient nor are the phosphorus reductions timely enough to control algae growth in the near future. Therefore, the need for supplemental strategies to control algae growth, such as in-lake management, became more apparent.

¹ William P. Ruzzo, PE, LLC, Consultant to the Cherry Creek Basin Water Quality Authority

² AMEC Earth and Environmental

³ Ed Dentry, Rocky Mountain News November 23, 2006. *Tiny bubbles to zap algae, aid fish at Cherry Creek*

⁴ Lewis, William M. Jr; Saunders, James F III; and McCutchan, James H. Jr. January 22, 2004. *Studies of Phytoplankton Response to Nutrient Enrichment in Cherry Creek Reservoir, Colorado*





Dr. Lewis found that during periods when the reservoir was not being naturally mixed by wind activity, then algal growth activity was at its highest. He determined that the most practical approach to controlling this growth would be to artificially mix the reservoir. Since the reservoir is relatively shallow, it can usually be mixed by normal wind activity. Several times throughout the year, however, extended periods of hot, dry and windless weather cause the lake to stop mixing and to stratify. This stratification not only causes anoxic (lack of oxygen) conditions at the bottom of the reservoir, but also allows blue-green algae to bask in the sunlight on the surface of the reservoir, fixing all the nitrogen they need from the air. And, with plenty of phosphorus in the water, they can reproduce explosively. Thus, an algae bloom is created.

Meanwhile, the anoxic water at the bottom of the reservoir allows previously settled particulate and organic phosphorus and nitrogen in the bottom sediments to dissolve into the water column, so that when the reservoir becomes remixed, due to renewed wind activity, all this re-dissolved phosphorus and nitrogen become available for the blue-green algae during the next round of stratification. To prevent this endless cycle, the authority began to investigate methods to keep the reservoir continuously mixed. By doing this, the blue-green algae would be circulated to the dark depths of the reservoir, preventing them from having access to nitrogen and sunlight at the surface, both of which they need to reproduce. This may also reduce phosphorus and nitrogen from dissolving from the bottom sediments and is the basis for the authority spending almost \$900,000 to install a destratification system

Feasibility, final design, and construction were the next steps. In 2005, the authority retained AMEC Earth and Environmental, an international consulting firm, to conduct a feasibility analysis⁵ of various options to mix the reservoir. The AMEC team recommended the installation of a submerged mixing system in the 330 acre portion of the reservoir which is greater than 16 feet deep. The primary objectives for the mixing system were to:

1. Destratify and strongly mix the deepest portions of the reservoir,
2. Vertically mix algae to compromise their habitat and reduce production of blue-green algae, and
3. Oxidize of the deep bottom sediments to reduce the release of nutrients from the sediments into the water column.



Inland Marine installing air lines and diffusers

After considering the various options and risks associated with such a high profile project, the authority board authorized final design of the destratification system in 2006, which was also prepared by AMEC. The destratification system selected was a fine-bubble aeration system.

⁵ AMEC Earth and Environmental, Alex Horne and Associates, and Hydrosphere Resource Consultants December 5, 2005. *Feasibility Analysis Cherry Creek Reservoir Destratification*



Separate construction contracts were awarded to supply the compressor, hoses, and fittings. Construction of the underwater work was awarded to Inland Marine of Centennial, Colorado. Construction of the compressor building and other non-underwater components was awarded to American Civil Constructors in Littleton, Colorado. After receiving approval from Colorado State Parks and the U.S. Army Corps of Engineers, construction began in early 2007.



What's involved in mixing an 850 acre water body? Lots of hose, fittings, diffusers, and a powerful compressor is the short answer. Air is pumped by a 125 hp compressor at 455 SCFM and 51 psi, which is housed in a 19 by 17 foot block building with a metal roof near the Marina. The air passes through over 40,000 feet of 1-1/4 inch hydraulic hose leading to 102 air diffusers placed at the bottom of the deepest part of the reservoir. These diffusers are expected to move about 1,000,000 gallons of water per minute (approximately 4,400 acre feet per day) which will "turn-over" the mixing zone about once per day.

So how do you get all that air to the 102 diffusers? You construct what has turned out to be the beginning of a very popular trail across much of the face of the dam. Actually, the "trail" was first conceived as an above grade platform by which to contain the 4" HDPE pipe line with separate 1-1/4 inch hydraulic hoses for each of the five diffuser zones and to provide access for maintenance. When it became apparent that this maintenance access could function as a formal park trail, Colorado State Parks agreed to fund the additional costs of constructing the trail to their standards. Even during construction, when the work was shut-down for the evening, people were waiting to access the trail for hiking, fishing, running and simply enjoying the view.



One of 102 diffusers



Actual diameter of bubble disturbance area is about 4 feet at each aerator

How will we determine if the project works? The ultimate test of whether destratification works will be the reduction of algae biomass and density as measured by chlorophyll *a* and species identification and enumeration, particularly the blue-green species *cyanobacteria*. The more immediate test will be to determine if the reservoir stays mixed throughout the algae growing season from May through October, as measured by the vertical temperature and dissolved oxygen profile of the water column.

During the regular growing season, the authority contracts with GEI/Chadwick Division to conduct bi-monthly sampling in the reservoir at three locations. During each sampling episode on the reservoir, three main tasks were conducted, including: 1) determining water clarity; 2) collecting depth profile measurements for temperature, dissolved oxygen, pH and



conductivity; and 3) collecting water samples for chemical and biological analyses. In anticipation of construction of the destratification system, the authority had GEI install three temperature arrays consisting of Onset HOBO® Water Temp Pro data loggers in the deepest part of the reservoir. These data loggers recorded temperature measurements on 15-minute intervals for each 1 meter water layer. This monitoring program will continue in 2008 to determine how well the reservoir stays mixed and may be extended beyond 2008.

In addition to the temperature loggers at the three monitoring sites, GEI will also perform monthly Oxidation Reduction Potential (ORP) profiles along a transect through the deep water zone, including measurements near the water/sediment surface during the July to September period. The sample locations and transect will be consistent with locations previously established by AMEC during their destratification feasibility study.

In the mean time, the authority continues to implement watershed management strategies, construction of other more traditional BMPs, such as shoreline and stream stabilization, and education.

Additional information can be obtained from the authority's website at <http://www.cherrycreekbasin.org/>.

2008 Plans for Lake Appreciation Month by Steve Lundt

For the past 4 years, CLRMA has dedicated their efforts to focus on a featured lake for Lake Appreciation Month (July). Left in the wake of this great effort to enhance lake users sensitivity to our valuable lakes, there are some great lake events planned each year. This year's featured lake will be Boulder Reservoir, the heart of Boulders water recreation culture.

Boulder Reservoir – July 23rd

On Wednesday, July 23rd, CLRMA and the City of Boulder will be hosting a day of lake professional celebration. This event is designed for lake professionals and users who want to learn more about lake management and who want to try to win a canoe race. Hands on training and shoreline demonstrations will be the focus of this event. Training units will be available for this event.

Barr Lake – July 19th

In 2007, CLRMA featured Barr Lake, the "oasis" northeast of Denver. Last year, over 300 volunteers showed up to clean the 9 miles of shoreline. Again, the plan is to spend the morning cleaning up the park and the shoreline, enjoy a free barbecue lunch, and end with enjoying the water with canoes and nature walks around the wildlife preserve.

Cherry Creek Reservoir – July

Cherry Creek Reservoir's celebration had both the Governor and Lieutenant Governor show up for the event in 2006. Every year the state park plans a great event of cleaning up the shoreline, removing noxious and invasive weeds, and doing some kind of trail repair. With the marina next to the boat ramp and great beach access, this is sure to be another great Lakes Appreciation Month event.



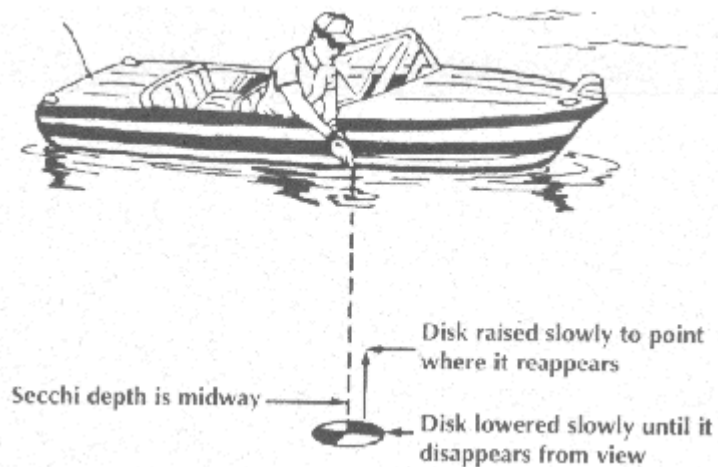
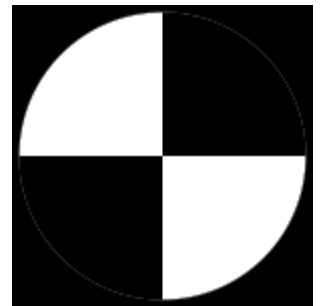
Grand Lake – July 19-20th

Grand Lake, Colorado's largest and deepest natural lake, was the first lake featured by CLRMA back in 2005. For the past 61 years, the great lake community of Grand Lake has been celebrating Lakes Appreciation Month and not even knowing it. Every July, they celebrate Western Weekend with an annual Buffalo Barbecue celebration. This great event brings in thousands of tourists to experience the natural beauty of Grand Lake. The town, classic boat parade, luxury lake homes, and the overall calmness of the residents would not exist if it wasn't for the lake. The community knows this and puts on a great weekend event every year.

So start planning out your July weekends now to make room for these great lake events. More information will be available on the CLRMA website as we get closer to July. Remember, give thanks to your local lake or reservoir this July.

Limno 101 Classic by: Chris Knud-Hansen – “Secchi Disk Measurement” (originally printed July, 2004 - re-printed to help kick-off the 2008 Volunteer Monitoring Program)

Limnology is the field of study that attempts to decipher the biological, chemical, and physical interrelationships within freshwater systems. A new, perhaps even regular feature of CLRMA's Clarion is a short column highlighting basic limnological concepts, we've named “Limno 101”. To coordinate with the annual *Great North American Secchi Dip-In* to be held during the first 2 weeks of July (sponsored by NALMS and the U.S. Environmental Protection Agency; see <http://dipin.kent.edu> for details), the inaugural topic for this feature is the Secchi disk.

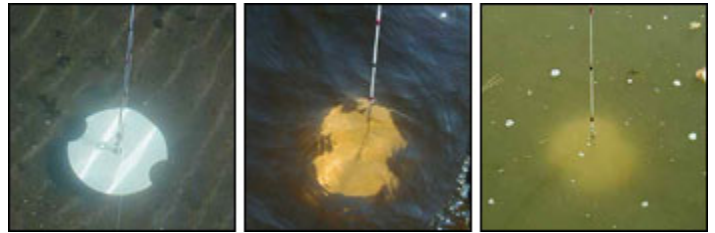


The Secchi disk is perhaps the oldest and simplest tool in the limnological toolbox, and certainly the only one with an origin linked to the Pope. In the mid 19th century, Commander Cialdi (head of the Papal Navy) asked Father Pietro Angelo Secchi (scientific advisor to the Pope) to develop a new instrument for evaluating water transparency in the Mediterranean Sea. The result of Secchi's work was a submersible disk that now bears his name. On April 20, 1865, the Secchi disk was first lowered into the Mediterranean Sea from the papal steam yacht *L'Immacolata Concezione* (*The Immaculate Conception*).

Today, Secchi disks are lowered (or “dipped”) into waters all over the world. The typical Secchi disk used in lakes is a weighted 20 cm disk with alternating black and white quadrants. The Secchi disk is lowered into the water until the observer can no longer see it, then slowly raised until it is visible again. The depth halfway between disappearance and reappearance is called the Secchi depth, and measures the transparency of the water.



Transparency decreases as the amount suspended particulate matter (e.g., algae, fine clays, etc.) increases. Secchi depths can be less than 0.5 meters in green eutrophic waters receiving algal nutrients from such sources as sewage treatment plants, septic tanks, and lawn and agricultural fertilizers, or in brown waters receiving suspended sediments from such sources as runoff from construction sites, agricultural fields, urban storm drainage, or resuspended from bottom deposits. At the other end of the spectrum, very clear, pristine lakes can have Secchi depths down to 30-40 meters.



Because of the general inverse relationship between water clarity and water quality, the Secchi depth remains a very valuable limnological measurement nearly 140 years after its invention. It has proven particularly useful for evaluating trends over time for an individual lake or for comparing many lakes at the same time – both of which are long term goals for the annual *Great North American Secchi Dip-In*. For more information about the Secchi disk, please refer to Tyler, J. (1968), "The Secchi Disc", *Limnology & Oceanography*, 13:1-6.



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Ask the Lakespert by Steve Lundt

Q: *How can you get Salmonellosis infection from a lake? And by the way, is it okay to lick the mixing spoon when I make chocolate chip cookies?*

Thanks, Mr. Keebler (Tiny Town , CO)

A: Thanks to the recent *Salmonella* outbreak in Alamosa and the seemingly steady headline news of *Salmonella*-contaminated food recalls, I am sure more cookie-loving lake users like you, Mr. Keebler, will be wondering about *Salmonella*.



Salmonella is a strain of bacterium that lives in the intestinal tract of animals and birds. The only way to get infected with Salmonellosis is to ingest animal feces. This is typically done by eating contaminated food such as leafy vegetables, undercooked meats, and raw eggs. *Salmonella* can survive outside the intestinal tract and live in soil and water. Ingestion of contaminated dirt or water can infect you. To answer your first question then, yes, you can get Salmonellosis (a stroke of very bad luck) by recreating on a lake and ingesting sand, water, or feces directly that has *Salmonella* bacteria. The risk of ingesting *Salmonella* at your favorite lake is unlikely, but there is that small chance that it can happen. The more polluted the lake, the higher your chances. Main sources of fecal matter to a lake include: failing septic systems, leaky municipal sewer systems, stormwater runoff, pet waste, confined animal feeding operations, and wildlife.

If you do get sick, the symptoms, after 12-72 hours of incubation, include diarrhea, abdominal pains, and fever that last 5-7 days. Every year approximately 40,000 Americans report Salmonellosis, and this number can be in the millions if you include the unreported cases.

Salmonella is not usually tested for lakes. Other fecal bacteria are tested as indicators for contamination. Testing should be done for fecal bacteria, especially when there is direct contact recreation. A good spot to monitor is at the swim beach or area where the most contact is being done. Generally, *Escherichia Coli* (60-70% identical to *Salmonella* at the DNA level) bacteria are used as a fresh water quality indicator of human health risk. If *E. Coli* are present as high numbers, then that is usually a good sign of fecal contamination and a higher risk of *Salmonella* or *Giardia* infections. EPA recommends testing for *E. Coli* instead of fecal coliform bacteria because *E. Coli* concentrations demonstrate the highest correlation to causes of human gastrointestinal illness. Colorado has no biological water quality standard for *Salmonella* but they do for *E. Coli*. For full contact recreational use, it is 126 *E. Coli*/per 100 mL and for domestic water supply it is 630 *E. Coli*/per 100 mL.

To lower your risk of Salmonellosis and any other gastrointestinal infection, it is important to avoid ingesting anything that might have been in direct contact with fecal matter (e.g., don't swim right behind a Canada goose), wash your hands often, fully cook your meat, and wash your raw vegetables thoroughly. As for your spoon-licking habit, you are ingesting a small portion of raw eggs. This might even be a higher risk than your recreational activities at the lake, depending on the freshness of your eggs. But then again, the addictive flavor of fresh, raw cookie dough should outweigh the risk of Salmonellosis from the eggs – so I say lick away!

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CLRMA Spotlight Questionnaire – 2009 President-Elect Sarah Sauter

Age: 28

Yrs w/ CLRMA/NALMS: CLRMA – 1, NALMS - 3

Yrs in CO: 2

What do you do: I'm the Community Science Coordinator for the Colorado Data Sharing Network. I am responsible for overseeing outreach materials and community based watershed projects. My major projects include the Colorado Data Sharing Network and assisting the Colorado Acequia Association in Costilla County develop a watershed management plan. I also assist with River Watch – a state wide volunteer stream monitoring program.



Family: I'm enjoying the single life. I'm the oldest of 4 children.

When I'm not working I am... Training for a triathlon or watching Law & Order re-runs

Your idea of happiness: crossing the finish line after a well run race

Not many people know that... I have a winter wardrobe for my dog

What do I like to do most: backcountry camping with friends

If I won the lottery: I would quit my job and travel for a few years (if there was any money left after paying off my college loans).

Last book I read: Three Cups of Tea by Greg Mortenson and David Oliver Relin

What political office: none – I don't plan on running for office (registered independent if that's what you're asking)

Toughest aspect of my job: sitting at my computer when I want to be outside sampling the Cache la Poudre River

What famous person would you like to meet most: Barack Obama



OUR EARLY SPRING FLOWERS



Colorado Invasive Species - Protect Your Waters!

Colorado lakes and streams already have a variety of nuisance aquatic species, most of which originated elsewhere and are formally listed as invasive species. CLRMA Secretary Elizabeth Brown and Director at Large Kelly Cline are members of an Invasive Species Work Group in Colorado that are trying to establish protective measure for preventing the spread of zebra mussels. Here are a variety of web sites where you can find out more about nuisance aquatic species, how they are spread, and how to prevent further spreading of unwanted organisms.

<http://nas.er.usgs.gov/taxgroup/mollusks/zebramusel/>
<http://www.epa.gov/Region8/water/didymosphenia/>
<http://www.protectyourwaters.net/hitchhikers/>

Ripples: Nutrient Criteria for Lakes and Reservoirs – Proposed Direct Water Supply Use Category - by Shelley Stanley, City of Northglenn and Mary Fabisiak, City of Westminster

Regulatory response to nutrient criteria:

It all started in 1996 with an EPA report that found that nutrients are a leading cause of water quality impairment. A Clean Water Action Plan ("Plan") was initiated in 1997 and development of nutrient criteria begun. The Plan assumes that by regulating nitrogen and phosphorus, algae growth will be controlled. The four primary nutrient criteria parameters suggested by EPA are: water column concentrations of total nitrogen, total phosphorus (causal parameters), algal biomass (as chlorophyll a), and turbidity or transparency (response parameters). For purposes of classifying nutrients, EPA suggested grouping water bodies with comparable characteristics (similar biological, ecological, physical and/or chemical features). This allows for data comparison and extrapolation within each water body grouping. Colorado is currently developing nutrient criteria that reflects localized conditions, protects designated uses, and uses EPA's Technical Guidance Method. Once numeric levels have been determined, these criteria will be proposed to be adopted in Colorado's Basic Standard (Regulation #31) at the 2010 Rulemaking Hearing. From problem recognition to development of a strategy plan has been a slow process.

Proposal: Adopt a new use sub-category, direct water supply (DWS), under the water supply use classification. The DWS use would apply to lakes or reservoirs that are designated waters of the State and have a direct connection to a water treatment plant. There are currently approximately 100 lakes/reservoirs in Colorado that could fall under this category. Alluvial wells are not considered DWS. No numeric standards are being advanced at this time.

An understanding of the intersection of the Clean Water Act, Safe Drinking Water Act, and Regulation 31 is important. The definition of Domestic Water Supply Use in Regulation 31 states:



Domestic Water Supply Use Classification: 31.13(1) (d):

These surface waters are suitable or intended to become suitable for potable water supplies. After receiving standard treatment (defined as coagulation, flocculation, sedimentation, filtration, and disinfection with chlorine or its equivalent) these waters will meet Colorado drinking water regulations and any revisions, amendments, or supplements thereto.

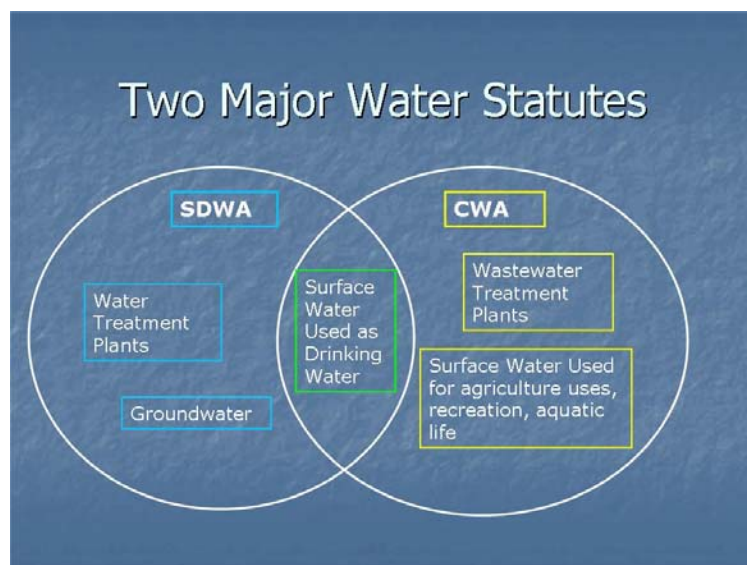
- (i) The provisions of this section do not apply to “all water withdrawn for use until use and treatment have been completed.” (31.5)
- (ii) Proposed language Class DWS – Direct Water Supply. These lakes and reservoirs provide raw water directly to a water treatment facility. This does not include “waters withdrawn for use until use and treatment have been completed.”

31.6(1) (e): Classifications should be for the highest water quality attainable.

Note that the waters are currently or potentially (future use) suitable for potable water supplies and that standard treatment, not advanced treatment, is the litmus test.

The need for a Direct Water Supply Use Category:

Extensive changes in drinking water regulations have occurred over the past 20 years. These changes make Safe Drinking Water Act (SDWA) compliance more difficult. Protection of source water quality is becoming increasingly critical to avoid increased treatment costs, prevent aesthetic water quality problems such as taste and odor events, and to meet new regulatory standards. It is well documented that excess nutrient load results in excess algae biomass. This increase in biomass (natural organic material) may in turn increase carcinogenic disinfection byproducts in the finished drinking water.



Increases in algal growth can also create taste and odor compounds that are not readily treated or controlled with conventional water treatment. Taste and odor events are the most apparent to the general public and cause them to question the quality and safety of their drinking water.

Drinking water suppliers believe that treatment is not a substitute for good source water. Protection of water quality in reservoirs that are used directly as a source for drinking water should be a priority. Clean and dependable water supplies are critical to providing safe, clean drinking water. If you want to receive email notifications of meeting times and locations please contact Mary Fabisiak at: mfabisiak@ci.westminster.co.us.



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CLRMA 2008 Events and Activities

Spring Conference- Colorado Lake and Reservoir Management – Twelve Years and Growing!

Date: April 16, 2008 (includes continental breakfast and catered lunch)

Location: Thornton Margaret Carpenter Recreation Center, 11151 Colorado Blvd., Thornton, CO

Time: 8 am – 3 pm (Volunteer Monitoring Training from 3 – 4 pm)

Agenda: Posted on the CLRMA website

Cost: \$75 per person (Training Units will be available)

Day on the Rez – A repeat of a full day of training in lake sampling, lake sampling equipment demonstrations, food and fun!

Date: July 23, 2008

Location: Boulder Reservoir

Time: 8 am to 3 pm (will include continental breakfast and barbeque catered lunch)

Agenda: Posted on the CLRMA web site, but will be updated as we get closer to the event.

Cost: \$75 per person (Training Units will be available)

CLRMA Fall Awards Banquet – Our annual membership and awards meeting in a social setting.

Date: September 12th (Friday evening)

Location: Broomfield Lakeshore Center, 280 Lamar Street

Time: 6 pm – 9 pm

Cost: \$25 per person, spouses and kids \$10 each.

Activities: Good food, good beer, good company, and a chance to meet and greet fellow CLRMA members in a scenic, social setting!

Fall Conference – Sustaining Colorado Watersheds 3rd Joint Conference: “Striking a Balance for the Future”

Date: October 1-3, 2008

Location: Vail Cascade Hotel, Vail, Colorado

Agenda: In progress, please check the CLRMA website in June

Cost: \$125 per person (early member registration)

