

JANUARY 2008

CLARION

A Publication of the Colorado Lake and Reservoir Management Association



Daniel Tawosy

It's January and it's cold! Nothing new there, but the past 2 months have been filled with snow, wind, and bitter cold in Colorado. What happens to lakes and reservoirs in the winter? Many of us have performed lake sampling through the ice in winter and have found that plant and animal life can do very well under the ice, particularly if the ice is clear. Some of the highest productivity can occur under the ice when plants and animals can take advantage of the thin layer just under the ice where nutrients from atmospheric deposition or inflow waters that run across the ice and freeze can provide microhabitats that allow them to thrive! Isolated from wind action and predators, algae and zooplankton can exhibit phenomenal growth rates and high populations during winter months under clear ice conditions. On the other hand, if the ice is covered by a thick layer of snow and light penetration is limited, winter kill conditions may occur. Winter kills of fish happen when dissolved oxygen is depleted by respiration of aquatic organisms and light can't penetrate the underlying water below the ice to stimulate plant growth. There are many lakes and reservoirs throughout the Northern Hemisphere, particularly at high altitude, where winter kill conditions occur annually. Fish populations in these lakes are of the "put and take" variety, stocked at ice off and if not caught by anglers during the short summer season, then often doomed to die when snow covers the ice in winter.

In this issue our 2007 President Vic Lucero passes the President's Dock feature to the 2008 CLRMA President, Travis Bray. Chris Knud-Hansen, another CLRMA past President, pens the Limno 101 feature for the Clarion and the topic for this issue is "Fish Ecology". Steve Lundt, yet another past CLRMA President and Secretary, writes the Lakes-Pert feature and discusses "Fetch" as it applies to lakes and reservoirs. In our Reflections article, Jim Shelley, another past President, has prepared an article titled "Boulder Reservoir: A Retrospective Look". CLRMA's Ripples feature focuses on the development of nutrient criteria for lakes currently in progress with a planned hearing date of June, 2010. Members will also find information on upcoming CLRMA events and contact information for our new Officers and Board members.

If you want to stay up to date on water issues in the Rocky Mountain Region, check out the Brown and Caldwell Rocky Mountain Water News weekly e-newsletter at <http://www.bcwaternews.com/RMWaterNews/>.



Presidents Dock by Vic Lucero

It was a true pleasure to serve as President in 2007. It was not only fulfilling, it was simply fun. CLRMA completed many successful projects due to the dedication of the all voluntary Board of Directors, active members and numerous sponsoring organizations. I officially pass the gavel to the 2008 President, Travis Bray of Denver Water. Travis is a long standing active member and Director, and served as the Clarion Editor for several years. He expressed a clear vision of his direction for CLRMA at the Annual Meeting this past November. I am confident that CLRMA is in competent hands and will continue to prosper. Thanks to everyone for your help and support. If you would like to get more involved in this great organization, contact Travis Bray at travis.bray@denverwater.org.

Presidents Dock (Continued) by Travis Bray

The New Year is well under way and we have just started recovering from the holidays. 2008 brings us two new faces to the CLRMA Board: Sarah Sauter is the president-elect and Elizabeth Brown is the secretary. Both are excited to continue CLRMA's objectives of promoting the understanding and comprehensive management of lakes, reservoirs, and watersheds in Colorado.

2008 promises to be another great year for CLRMA. We are planning our annual Spring Luncheon and Colorado Volunteers Lake Monitoring program (CVLM) training. This year we will have eight to ten speakers and the event is scheduled to take place on April 16 at the Thornton Recreation Center. This summer we will once again promote a lake or reservoir for Lakes Appreciation Month. This will be the fourth year we have done this. Three years ago (2005), we teamed up with the annual Western Weekend and Barbeque event to promote Grand Lake. In 2006, we held the event at Cherry Creek Reservoir with the help of Colorado State Parks. Last year the event was held at Barr Lake and with the help of several other groups we removed approximately three tons of trash from the shoreline. This year we are working with Jim Shelly and the event is scheduled to take place at Boulder Reservoir in July. This fall we will once again partner with four other groups and hold a joint conference. Last year the event was held in Breckenridge and this year the venue will be Vail and will take place from October 1 to October 3. Lastly, we are planning to try something new this year. Since we are co-sponsoring a joint conference, we are planning to have our annual fall meeting and awards presentations in the evening this year. We are still in the planning phase so stay tuned for more information.

It should be another great year for CLRMA as the organization turns 12 years old. If any of you are interested in becoming more involved with CLRMA, please contact me or any of the other Board members. New ideas and enthusiasm are always welcome.



REFLECTIONS: “Boulder Reservoir; a Retrospective Look”, by Jim Shelley City of Boulder, Source Water Quality Program Manager

Boulder Reservoir is a place near the city, yet peaceful to visit. There are times when the water is like glass and times when the reservoir is a roaring monster, with waves four feet high. Most of the time the water in Boulder Reservoir has a greenish-tan appearance caused by light reflecting off suspended inorganic fine silt/clay and dissolved solids rather than off of organic matter or phytoplankton.



Boulder Reservoir – calm (2/3/05)

Boulder Reservoir was constructed in 1955 for irrigation and drinking water purposes as part of the Colorado Big Thompson River Project. It's owned by the City of Boulder and operated by Northern Colorado Water Conservancy District. Boulder Reservoir is a class one warm water fishery. It's a low volume shallow (depth normally ranges from nineteen to twenty-eight feet deep) reservoir with a surface area of 640 acres and a capacity of 13,000 acre-feet.



Boulder Reservoir – windy (11/11/03)

Boulder Reservoir is a multi-use reservoir. It is used for drinking water, irrigation and recreation activities such as boating, skiing, fishing, swimming, hiking/jogging and wildlife observation. Boulder Reservoir resources currently supply twenty percent of Boulder's drinking water.

The Boulder Reservoir natural watershed encompasses a ten square mile area north of Boulder and just east of the foothills. Seventy percent of the land to the west of the

reservoir is open space along with well-managed grazing, light recreation and grass/hay crop production. Also within this watershed is Lake Valley Estates and golf course and Left Hand Valley Reservoir.

This watershed is a haven for wildlife, over the years I've observed osprey, Marsh Hawks, Bald Eagles, Swanson's Hawks, Ferruginous Hawks, herons, Great Horned Owls, Burrowing Owls, American Bittern, egrets, White Pelicans and Western Grebes. I always love hearing the 'whooppppp' of the Black Swift feeding on airborne small insects while I'm sampling Boulder Reservoir's tributaries. The noise is produced by their wings when they dive. Boulder Reservoir is a favorite stopping place for migratory birds and its watershed provides nesting habitat for many other bird species. Fish in the reservoir include bluegill, catfish, largemouth bass, rainbow trout,



Young great horned owls – Boulder Reservoir Watershed (4/27/04)



walleye and yellow perch. I've heard stories of a twelve pound walleye that was caught in Boulder Reservoir.



**Canoe race participants – CLRMA
“Day on the Rez” (8/28/02)**

Numerous recreational events are held at Boulder Reservoir, this is because the area has a feel of being in the country amidst tremendous views of the flatirons, the Continental Divide, and Haystack Mountain. In 2002, “The Day on the REZ” was held at Boulder Reservoir. This CLRMA event was held on a picture perfect day with demonstrations and vendor activities on the water and on shore, ending with a canoe race. A team of one of CLRMA’s influential leaders and one of our CU work study students won canoe the race due to the fact that they started thirty yards out in front of everyone as to avoid collisions at the starting line. Next time this leader will have to spot us thirty yards and will have to team up with another lake professional not one of our young, strong work study students!

While sampling around Boulder Reservoir, one can watch paratroopers soar through the sky and remote control model airplanes and helicopters buzz through the air. To the west of Boulder Reservoir, there is a model airplane airport equipped with a paved runway. Every Monday morning in the south-west corner of the reservoir, the remote controlled pontoon airplanes land in and take off from the water.

I've been involved with many special studies on Boulder Reservoir over the past fifteen years. Some of the studies conducted were:

- USGS loading and transport study
- CU-Center for Limnology
 - optimization of reservoir withdrawal elevation
 - analysis of modeling results
 - drifter study
 - water quality drought analysis
 - canal inflow mixing study
 - source of selected metals from in treatment plant sludge
- EPA national lakes survey



**CU Drifter Study – Boulder Reservoir
(9/11/03)**

One of my most memorable times was when a CU researcher who is now working for the state of Colorado broke out the floating drifter equipment that incorporated his wife's old nylon stockings. I will also never forget the time during the recent EPA national lakes survey when one of USGS's pre-selected GPS habitat assessment sites put us smack dab in the middle of the nude swim beach! We had to use quick evasive action to avoid disturbing their peaceful tranquility. It's rumored that one of the remote controlled helicopters equipped with a small camera is patrolling remote areas around the reservoir.



The “Energizer Bunny” monitoring program, as I refer to it, is our monthly monitoring program. This monitoring program has been up and running for fifteen years and it keeps going and is never totally completed. However, it’s very important that monitoring programs like this continue. Without good solid baseline trending information over time, it’s impossible to predict water quality change, plan and design the best fit treatment plant processes or know when reoccurring reservoir source water problems occur. We’ve continued to use our environmentally friendly canoe monitoring procedures without one injury or loss of equipment.



Boulder Reservoir is mesotrophic when looking at chlorophyll a numbers. Trends in chlorophyll a numbers show that they are increasing slowly over time. The reservoir goes anoxic at the bottom early in the summer due to a small hypolimnion volume. However, the bottom water can be re-oxygenated by high irrigation flows through the reservoir that remove anoxic bottom water and replace it with oxygenated surface water. The reservoir is typically nitrogen limited during the summer. Another phytoplankton limiting factor is reduced light penetration due to suspended very fine inorganic silt/clay.



For the first time in 2007 aquatic vegetation started to become a concern in shallower water within the western portion of the reservoir. Curly Leaf Pondweed (*Potamogeton Crispus*) was identified which is considered an invasive species. We will attempt to map aquatic vegetation for the first time in Boulder Reservoir this coming summer and hope to continue an annual mapping effort to establish how much this plant is spreading. Everything I’ve read about Curly Leaf Pondweed says it’s not as dominant as other aquatic invasive plants because it dies off in late spring allowing native species to grow. Last summer at the Boulder Reservoir, this

plant persisted into the fall. Please contact me if anyone has observed curly leaf pondweed thriving throughout the summer.

Another change we’re seeing in Boulder Reservoir is an increase in a very small (1 um) colonial blue green algae, *Aphanothece smithii*. Over the last two years cell counts have peaked above 200,000 per ml yet the chlorophyll a numbers remained fairly low, below six ug/L. Low chlorophyll a can be explained by this particular algae’s very small size. We had a fairly bad (musty, dirty-MIB/geosmin type) taste in the water last October through mid-November, which coincided with one of these *Aphanothece* blooms. If anyone has associated this particular algae with a difficult to reduce drinking water taste please let me know. Also, at what concentration (number per ml) does this very small blue green algae become a drinking water taste problem?



CLRMA is planning another "Day on the Rez" at Boulder Reservoir to coincide with this year's lake appreciation month. We've set the date as Wednesday, July 23rd. Both lake and shore demonstrations, along with a vendors show, are planned for this event. We'll start the day with a continental breakfast and have a catered barbeque lunch at mid-day. At some point, we will collect the official Secchi Disk reading to submit to the Great American Secchi Dip-In. This will be the 4th year in a row that CLRMA has participated in this worthwhile activity. Since the canoe race was such a hit last time, we are scheduling the 2nd "Day on the Rez" canoe race. Hope to see all of you there!



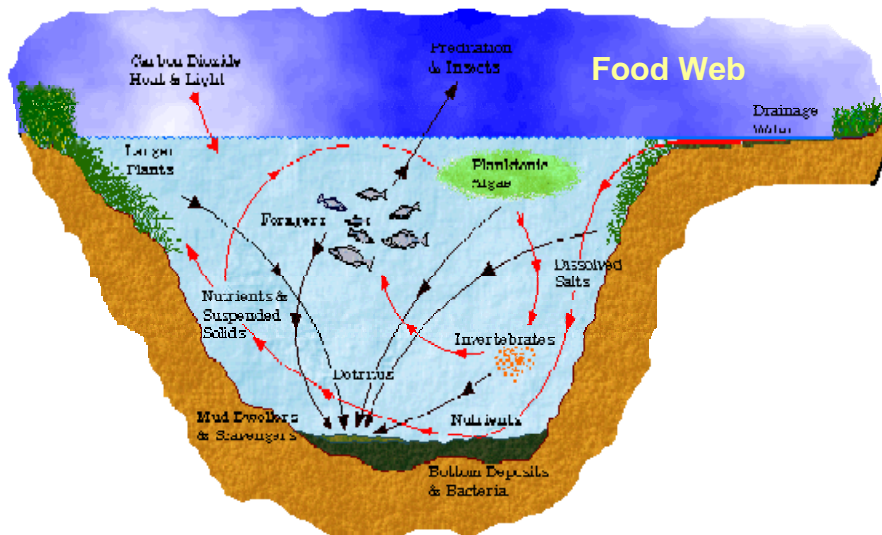
CLRMA "Day on the Rez" shore displays and activities (8/28/02)

Limno 101: Fish Ecology - by Chris Knud-Hansen

If you were to ask people on the street what comes to mind when you mention fish, responses would likely include "is there a sushi bar near by?", "smelly, particularly after a few days in the hot sun", "tasty grilled, complemented with a chilled Chardonnay", "ewww, they're slimy and slippery", "Hey, I've got a Billy Bass hanging in my living room", or simply "Huh??" The point is that people often think of fish out of water (and dead), and are less appreciative of their ecological importance in aquatic habitats.



Fish are at the top of most aquatic food webs, and those fish species that are not at the top are often eaten by those that are. The influence of fish on the aquatic community is directly related to their appetite. So, one way to categorize fish is by what they eat, which has a strong relationship to where they live. Most lake fish spawn in the shallow waters of the littoral zone. These areas often have rocks, submersed aquatic plants, depressions, and other places for young fry to hide from larger fish and other predators. The main food for fry and juvenile fish is zooplankton, small rotifers, protozoans, and other planktonic organisms, but the diet changes for many fish as they mature.



Depending on their food preference, adult fish can be classified as pelagic, littoral, or benthic. Pelagic fish feed in the open water, and include both piscivorous fish that prey on other fish (e.g., Northern pike and many salmonids) and planktivorous fish that feed primarily on zooplankton (e.g., chubs and sunfish). There are some tropical fish like tilapia that feed on phytoplankton, but most planktivorous fish focus on zooplankton. Fish that inhabit the benthic and littoral zones of lakes tend to have broader diets, including aquatic plants and insects, as well organic debris and associated microflora and fauna (e.g., attached algae, bacteria, fungi, insect larvae, and worms). Suckers, catfish and carp are particularly well adapted to bottom feeding. These are called detritivores, but fish that eat most anything are called omnivores.

A healthy lake ecosystem will have a variety of fish species occupying a similar diversity of habitats. But the fish community will change as a lake becomes more eutrophic. When excessive nutrient loading causes the algal population to become dominated by inedible blue-green algae (cyanobacteria), the zooplankton community suffers. When zooplankton have less edible algae, their production decreases. With less zooplankton to eat, fish fingerlings and planktivorous fish have less to eat. With less fingerlings and planktivorous fish, predator piscivores have less to eat. Many of the favorite sport fish (e.g., trout and bass) are top predators, and suffer greatly as a lake becomes green with cyanobacteria blooms. In contrast, detritivores such as carp, catfish and other bottom feeders often thrive.

Eutrophication not only affects food web dynamics, but the impact on fish habitats can also be devastating. Because cyanobacteria are essentially inedible, they die and sink to the bottom of the lake. Microbial decomposition of this organic matter can deplete bottom waters of dissolved oxygen. When dead algae settle on littoral sediments, the subsequent oxygen depletion at the sediment/water interface can smother fish eggs greatly reducing fish recruitment. When the dead algae settle into deeper colder waters, dissolved oxygen can be depleted right up to the thermocline. For coldwater fish like salmon and trout that rely on cold well-oxygenated waters, their habitat can become totally inhospitable; and at fall turnover, the mixing of anoxic bottom waters can result in a significant fish kill. On the other hand, bottom-feeding detritivores have a greater tolerance for low dissolved oxygen concentrations and can live comfortably in the warmer, shallower waters.

There are some lake management approaches that involve manipulating the fish community. Perhaps the most common is the introduction of sterile grass carp (white amur). Grass carp, native to Asia, preferentially feed on submersed aquatic plants and filamentous green algae. These fish are voracious and can totally decimate the aquatic plant community. They can provide cosmetic relief, but much of the fish community suffers because of the loss of habitat diversity and the lack of refuge for fish fry and fingerlings. Another lake management approach tries to reduce algal biomass by stocking a variety of top predators to feed on an over abundance of planktivorous fish that feed on the zooplankton that feed on algae. This form of biomanipulation increases zooplankton populations (particularly the large, filter feeding Cladocera), and hopefully algal consumption, by reducing predation pressures on the zooplankton community. Eliminating planktivorous fish by adding the natural toxin rotenone tries to achieve the same goal.



Many, if not most lakes have lost natural fish communities due to accelerated nutrient enrichment, introduction of exotic species that either eat or out-compete native species (e.g., the Great Lake experience with the predaceous lamprey and fast growing alewife), and the introduction of chemical toxins including industrial wastes and agricultural biocides. As a consequence, many lakes are stocked

with more desirable piscivorous sport fish (e.g., trout). This makes fisherman happy, but does not necessarily reverse the damage caused by human activities.

So, as you dip your sushi roll into the soy sauce, or gaze hungrily at the blue plate special, take a moment to ponder the ecological niche that particular fish may have once inhabited. It may have been at the top of the aquatic food chain, but, burp, apparently one link down on the terrestrial food chain.



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Ask the *Lakespert* by Steve Lundt

Q: *My master, who is an alpha lake expert who works from home, keeps talking about fetch but he doesn't throw anything. I'm confused. What kind of fetch is he talking about?*

Thanks, Scout McMeow (Hareball, CO)

A: The word "fetch" has many meanings (10 come up at www.dictionary.com). By your name and use of the word "alpha", my guess is that you are canine and have been trained to go get things. Fetch, "to retrieve game (often used as a command for a dog)"¹, is also used in the limnological profession to describe the longest, uninterrupted distance over which the wind blows across a lake. Knowing this axis of a lake is vital in lake management.

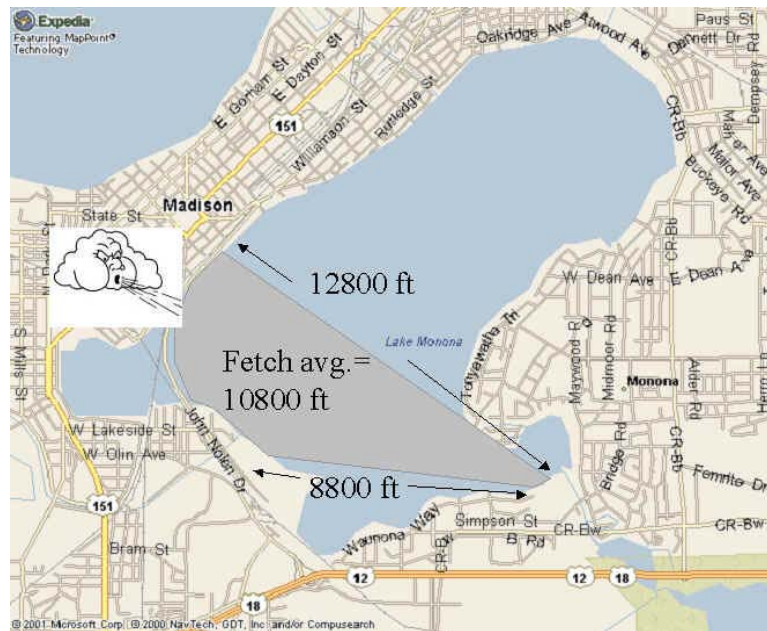


The lake's shape and orientation to the prevailing winds determines the fetch. Long narrow lakes in canyons can experience strong fetches while circular lakes may not. Knowing the fetch direction and distance for a lake or reservoir tells you a lot about that body of water.

Length – Length of fetch can affect the mixing regime of a lake, which plays a major role in water temperature and oxygen profiles, internal loading, and the overall water chemistry. Greater the distance, greater the wave action causing mixing and internal rocking of the lake water. Large lakes can even experience several feet of a tidal change caused by the fetch. The shoreline at the end of a long fetch can be severely impacted by waves causing localized shoreline erosion and turbidity issues.



The height of the highest waves observed on a lake appears to be proportional to the fetch distance. There is even a formula: $h = 0.105 \times \text{square root of } x$, where h is the maximum height of a wave and x is the fetch distance. If you apply this formula to Lake Superior, the maximum wave height predicted would be 7.3 meters or 24 feet! The maximum observed wave height for Superior was 6.9 meters so that is a pretty close prediction².



Direction - Direction of the fetch determines where floating debris ends up. If you are planning to build a nice lake-front home or an expensive drinking water intake system, make sure you do not do it at the far end of a lake's fetch where algae, debris, and trash will naturally collect. Bays and coves on the downwind side of a fetch can be a dumping ground for the rest of the lake. If the direction is across the short axis of the lake, then wind will play less of a role and be sheltered.

Lake fetch is also important when it comes to recreation. Many of the definitions mentioned earlier had to deal with nautical situations. In fact, the root of the word means "journey". When boating, especially sailing, it is important to take notice of the direction of the wind to avoid being apart of that debris buildup on the far shoreline. The size, speed, and quickness of the waves are related to the length and direction of the fetch. Even fishing can be affected by fetch. Fish like to follow their food so many times better fishing can happen at the downwind end of the lake fetch where the algae and zooplankton concentrate.

Fetch is an important characteristic to know when dealing with lakes and reservoirs. You better hope that your master doesn't throw your favorite tennis ball in the same direction as the fetch and yells, "feeetch". Start swimming if he does.

1. "fetch." *Dictionary.com Unabridged (v 1.1)*. Random House, Inc. 08 Jan. 2008. <[Dictionary.com http://dictionary.reference.com/browse/fetch](http://dictionary.reference.com/browse/fetch)>.
2. Wetzel, Robert G., *Limnology*, 2nd Edition. Saunders College Publishing. 1983.



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Hanging Lake – Berthoud Pass

CLRMA Spotlight Questionnaire – Shelley Stanley, City of Northglenn

Age: I won't tell but I will say that I grew up digging the Beatles, grooving to Joni Mitchell and marching to Bob Dylan and Joan Baez. I did not participate in any flag or bra burnings. Okay, no flag burnings.

Yrs w/ CLRMA/NALMS: 5 years

Yrs in CO: I am a Department of Defense kid so we moved in and out of Colorado several times. All told about 25 years.

What do you do: Mostly I attend meetings. So I guess you could say I sit on my keister. Seriously, I essentially do watershed work related to water quality for the City of Northglenn. Let me translate, I am Northglenn's representative on water quality committees, workgroups, and watershed associations. I make the connection between water quality regulations, use protection, and the City's water and wastewater plants. I look at my work as water quality protection for current and future generations. My job is varied and interesting. I love it.

Family: I have one daughter named Susan and a large extended family. Susan is 20. I would like to say she is grown up but alas, she is still working on it. As I am getting mentally younger (or is it simpler?), I expect there will be a time when we are the same mental age. My parents and both my brother and sister's families also live in the Denver metro area. All in all there are 20+ Stanley's in the Denver area.

When I'm not working I am... Reading, sewing, gardening, or walking Freddie, my rotten little Corgi.

Your idea of happiness: A peaceful mind, long summer days spent outside; reading a book on the deck of a ship in the middle of nowhere; watching the ocean change colors as you sail from the North Atlantic to the Gulf, and waking up to birds singing.

Not many people know that... I have a pressed thistle collection. It started when I was doing range land reclamation work in Wyoming. Got to admire thistles, they are hardy.



What do I like to do most: Laugh, followed closely by eating good food and drinking wine in the company of friends and family. I was tempted to say drinking fine wine but honestly, wine is mostly about the setting. Even a so-so wine in good company is delicious.

If I won the lottery: I'd keep working but breathe a lot easier about retirement. I'd give some away, put some away, and spend some frivolously on fighting gravity.

Last book I read: "Celebration of Discipline, The Path to Spiritual Growth" by Richard J. Foster

What political office: None if I can help it, but I love the political process. I lived in the Philippines during Marcos' rule. I saw what Marcos' idea of democracy was. Complain as much as you want, it is still better than being greeted at the polling place by a man with a machine gun.

Toughest aspect of my job: Keeping my patience and trying to explain to non water people what I do without having their eyes glaze over. A common response is, "I didn't realize there was a job like that."

What famous person would you like to meet most? I almost said Jesus Christ but thought the better of it, be careful what you wish for! I would like to meet C.S. Lewis and/or Mark Twain. Both were great writers, mental giants, and funny too. I'd like to talk politics, religion, and other taboo subjects. It would be enlightening to listen to their perspectives. Maybe some of their intellect would rub off.

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.

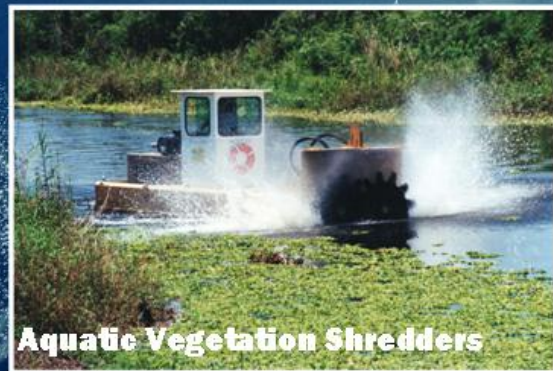
<http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/>

<http://www.epa.gov/Region8/water/didymosphenia/>

<http://www.protectyourwaters.net/hitchhikers/>



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Ripples – Continuing Development of Colorado Lake Nutrient Criteria – summarized by Sharon Campbell

Colorado is among the states that have declined to adopt EPA’s recommendations for nutrient criteria. Assumptions in EPA’s methodology that were problematic for Colorado include the lack of pre-development conditions for reservoirs and a disconnect in the linkage between a reservoir and the surrounding landscape. In Colorado, reservoirs often store water diverted from other drainages, that may have very different ecological and geological conditions that influence reservoir water quality. Colorado also prefers to establish more flexible, even site-specific criteria that reflect the highly variable conditions in our state. The rationale for development of Colorado lake nutrient criteria document can be found at http://cwqf.org/Workgroups/Content/Nutrient_Criteria/Documents/Lakes%20and%20Reservoirs/Colorado%20Lake%20Nutrient.pdf. In a progress report from October, 2007, the Colorado Water Quality Control Division the following table was presented:

Colorado Water Quality Control Division Summary of Nutrient Criteria Development Strategies		
Use Category	Lakes and Reservoirs	Rivers and Streams
Aquatic Life	Select chlorophyll a level that balances 1) productivity of managed sport fisheries, 2) sustainability of the community, 3) recreational and aesthetic values	N and P standards based on evaluating RALU’s biological assessment metrics.
Recreation/ Aesthetics		Chlorophyll a standard based on user surveys done by other states.
Water Supply	<i>Direct Use Water Supply</i> Reservoirs: Chlorophyll a standard aimed at preventing taste and odor problems and limiting the potential for dominance of blue-green algae.	Nothing at this time.

Colorado WQCD is currently evaluating two types of chlorophyll thresholds – an average for the growing season and a bloom frequency. The growing season is defined as July-September and lakes are classified by fisheries types, cold, cool and warm water fisheries. Threshold for grown season chlorophyll are suggested by fisheries type as cold water (6µg/L), cool water (15 µg/L) and warm water (25 µg/L). The concentration threshold for algal bloom is 40 µg/L, not to be exceeded more than 20% of the time during the growing season. Phosphorus concentrations are to be characterized by response ratios that establish the potential response of algae to chlorophyll in each lake. Work on site-specific nutrient criteria and response ratios is continuing on several reservoirs around the state. The standards and control regulations for some of the four original Clean Lakes Study reservoirs (Chatfield, Cherry Creek, Dillon and Bear Creek) are undergoing review and re-assessment as a part of the regularly scheduled standards review. Barr Lake and Milton Reservoir are undergoing extensive data collection and evaluation prior to proceeding with a proposal for site-



specific standards. These site-specific efforts will support and inform the more regionalized nutrient criteria development effort as envisioned in the 2002 Nutrient Criteria Plan.

Colorado WQCD will complete the data acquisition phase in December, 2008 and begin to draft the implementation guidance document in 2009. The Rulemaking Hearing on nutrient criteria is scheduled for June, 2010. Please check the WQCD or the Colorado Water Quality Forum web site (<http://www.cwqf.org/>) for progress reports and updates to this important water quality process for Colorado lakes and reservoirs.

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: To be determined – please let Sharon Campbell know if you have a presentation to offer or recommend.

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: To be developed but will also include the official Great American Secchi Dip-In reading!

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 or 19th (Thursday evenings)

Location: TBD but on a lake if possible – Evergreen Lake or Cherry Creek Yacht Club are being considered.

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

Date: October 1-3, 2008

Location: Vail Cascade Hotel, Vail, Colorado

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

Cost: Approximately \$150 per person



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