

# THE MONO LAKE NEWSLETTER

Winter 1985

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Larry Ford

**Court Cuts Diversions, Spares Rush Creek!**  
**Public Trust Suit in State Court**  
**Biological Research Updates**

# THE MONO LAKE NEWSLETTER

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**ON THE COVER:** Mono County residents rallied to the defense of Rush Creek, Mono Lake's largest tributary stream. On Nov. 15, Los Angeles television (KABC) interviewed Mono County Deputy District Attorney Stan Eller, who threatened to arrest Los Angeles Department of Water and Power employees if they shut off the water. Behind and to his right is Bishop attorney Edward Forstenzer, who is donating his time to represent Mammoth Fly Rodders and California Trout on Rush Creek's behalf. Thanks to Forstenzer's efforts, an Inyo County judge issued a temporary restraining order forcing DWP to leave water in the creek pending a Jan. 11 hearing. The beneficiaries: at least 30,000 fat and healthy trout, and Mono Lake!

## Help Endangered Species!

You can help California's rare and endangered wildlife by participating in the wildlife tax check-off program. Last year it raised a half million dollars, but more is needed for the years ahead.

The funds are being used to purchase critical habitat for peregrine falcons, condors, San Joaquin kit fox, Nelson's ground squirrels and other species, and to enhance and restore habitat for bald eagles, blunt-nosed leopard lizards, Santa Cruz salamanders and many others.

To contribute to the fund, all the taxpayer has to do is enter a donation on line 90 of his California tax return. All of the money will benefit rare and endangered species.

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# Mono Lake Watch

## *Returns*



*Mono County Supervisor Andrea Lawrence testifies before the Los Angeles City Council Committee on Energy and Natural Resources at the Nov. 13 hearing on Rush Creek. State Sen. John Garamendi, the Mono Lake Committee and many environmental groups and individuals also testified on the creek's behalf.*

On the day after Thanksgiving, sonorous calls drifted out of the fog. Swans had returned to Mono Lake.

Their passage fall after fall graces our lives with joy and beauty. Coming with the first deep snows and icy fogs, the swans breathe life into a wintry landscape. We welcome them as something of a miracle.

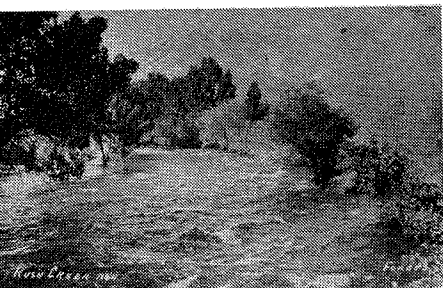
The swans interrupted a hectic autumn. For the first time in history, a court forced Los Angeles to cut back diversions and release water into Mono Lake. At long last, our public trust lawsuit began moving toward trial.

We rushed to hearings and meetings, posted news releases, prepared testimony, and struggled to keep on top of rapidly developing events.

In the midst of all this bustle, the swans opened our hearts to the world beyond our clangorous typewriters and cluttered desks. We, too, returned to Mono Lake, renewing our spirits for the work ahead.

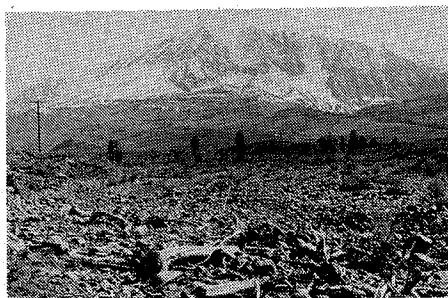
On behalf of life everywhere, we thank you for your faith in our efforts and wish everyone a joyful, fulfilling and peaceful New Year!

# Reprieve for Rush Creek, Water for Mono Lake!

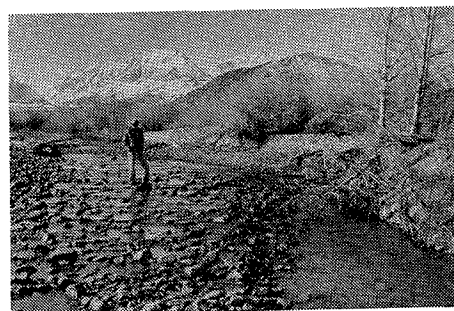


Enid Larson

*Ca. 1930: Lower Rush Creek is famous for trophy trout, and is rated seventh in the country by Fish and Stream magazine.*



*1981: Rush Creek is a bone-dry wash, its water diverted into the Los Angeles aqueduct.*



Dick Dahlgren

*1984: Rush Creek lives again, but for how long?*

For the first time in history, a court has ordered the Los Angeles Department of Water and Power to release water into Rush Creek and Mono Lake that it intended to divert into the aqueduct.

DWP would have dried up Rush Creek Nov. 1 were it not for a scrappy Mammoth Lakes realtor and fly fisherman. Dick Dahlgren "discovered" the stream in mid-October. "I couldn't believe it," he recalls. "Fourteen-inch brown trout were coming down to within a few yards of Mono Lake to eat brine shrimp."

Dahlgren, who is president of Mammoth Fly Rodders, decided he couldn't let those trout perish. He dispatched a letter to Mayor Bradley congratulating Los Angeles "for restoring one of the finest brown trout fisheries in the country," and urging him to save it.

Back in the 1930s, Rush Creek was famous for trophy trout. Its banks were lush with aspens, cottonwoods, willows and pines interspersed with meadows and cattail marshes. John Muir wrote glowingly of following the stream "through gentian meadows and groves of rustling aspen to Lake Mono."

But that was before DWP constructed Grant Lake dam and diverted Rush Creek's flow into the Los Angeles aqueduct. Until recently, the stream was usually dry as a bone. Marshes and meadows vanished, and most of the trees died. A trout stream became a dry, rocky wash.

Since the fall of 1981, however, there has been more water than DWP could divert. Flows of up to 300 cubic feet per second have roared down Rush Creek into Mono Lake. At times water spilled over Grant Lake dam, washing trout into the stream.

The vitality and size of the resurrected fishery is almost beyond belief. Dahlgren guessed there might be 20,000 trout in the 10 miles of Rush Creek between Grant Lake dam and Mono Lake, but his estimate was conservative. Fish and Game's "trout census team" found 30,000-50,000 "fat and healthy" browns and rainbows, and called the stream "phenomenal" and the "best" they had seen all summer.

These are wild trout, not hatchery fish. Most were spawned in Rush Creek during the past few years. They are free of "whirling" disease, which plagues hatcheries and threatens Sierran lakes and streams. Moreover they are spawning prolifically, and could double their numbers by summer.

But the trout appeared doomed when Bradley ignored Dahlgren's appeal. With the help of the Mono Lake Committee and State Senator John Garamendi, however, the message got through to Los Angeles Councilman John Ferraro, chairman of the Energy and Natural Resources Committee. Ferraro convinced DWP to keep Rush Creek flowing until his committee could hold a hearing.

On Nov. 13, the Mono Lake Committee joined Garamendi, Dahlgren, Mono County Supervisor Andrea Lawrence, California Trout, Audubon societies, the Sierra Club and approximately 30 Los Angeles residents in testifying in Rush Creek's behalf. Councilman Ferraro and Hal Bernson were impressed, and urged DWP to leave water in the stream at least until February, when snowpack, runoff and water supply projections become available. But Ferraro also warned "DWP does not have to come to the council for permission for their actions."

It didn't take long for DWP to disregard the committee's recommendations. Within minutes after the hearing, chief aqueduct engineer Duane Georgeson told reporters "the water will be shut off and the issue will be studied." Rush Creek water is needed in Los Angeles, he argued, and would cost Los Angeles residents \$6.8 million per year in replacement costs [not true; see box]. The next day, DWP cut the creek to a trickle to facilitate "fish rescue operations." Fish and Game crews were able to save less than three percent, and trout in lower three miles perished for lack of water.

Then the issue really heated up. Mono County Deputy District Attorney Stan Eller threatened to arrest and prosecute DWP employees if they tried to shut off Rush Creek. Mammoth Fly Rodders, California Trout and Dick Dahlgren brought suit. Infuriated local residents, carrying signs reading



"Stop Water Imperialism," "Save Rush Creek" and "Save the Trout," marched on DWP's Mono Basin headquarters. Suddenly the embattled trout were news on Los Angeles, San Francisco and Sacramento television, and in newspapers across state.

The climax came Nov. 20, when Judge Donald Chapman issued a temporary restraining order forcing DWP to leave 19 cfs in Rush Creek until a hearing could be held regarding a permanent injunction.

Soon the fishermen secured additional allies. In December, the Mono Lake Committee and the National Audubon Society filed an amicus brief on Rush Creek's behalf.

The injunction hearing is scheduled for Jan. 11 in Mono County Superior Court in Bridgeport. On Nov. 29, Chapman denied DWP's motion for a change of venue, but agreed to bring in a "neutral" judge, David Otis of Siskiyou County. Rush Creek's defenders have an excellent case, and will be angling for water on Lee Vining Creek as well [see box].

A victory would help Mono Lake. Minimum flows of 25 cfs on Rush and Lee Vining creeks would contribute 36,000 acre-feet to Mono annually, approximately half the amount required to stabilize the lake at its present elevation. Higher minimum flows, especially in spring, may in fact be needed to maintain healthy fisheries.

Moreover these streams support wildlife as well as fish. Bald and golden eagles, ospreys and peregrine falcons have already been observed along Rush and Lee Vining creeks. With the recovery of willows, cottonwoods and other greenery, these streams could be oases for all kinds of birds and animals.

But for now the focus is fish. "I call them Walt Disney trout," says Dahlgren, "because their coloration is so vivid. I remember the first one I caught. You never saw a healthier-looking fish. It was as fat as it was long, about six inches, and had beautiful purple markings."

## Mono Advisory Group

At the Rush Creek hearing Oct. 13, Los Angeles City Council members John Ferraro and Hal Bernson advocated the formation of a "citizen's advisory group" to consider the Rush Creek issue "as part of the overall Mono Basin problem."

Ferraro proposed the group consist of representatives from the Los Angeles Department of Water and Power, City Council, Mono County, Sen. John Garamendi's office, fishing groups and the Mono Lake Committee. "Maybe they could come up with some answers," he said. Councilman Hal Bernson viewed the advisory group as an "opportunity to open up the dialogue on the whole Mono Basin issue." DWP chief aqueduct engineer Duane Georgeson suggested it could dovetail with ongoing meetings between the DWP and the Mono Lake Committee.

Ferraro's proposal is a hopeful sign some Los Angeles council members are seriously interested in resolving the Mono Lake problem.

## SAVING RUSH CREEK: Costs to Los Angeles

Contrary to DWP's statement, Los Angeles does not need every drop of Rush Creek water. During wet years, it cannot divert all the water anyway. During average and dry years, it would have to share only two to three percent of its supply.

Water conservation could save this amount many times over, and save energy as well. Alternatively, DWP could purchase replacement water from the Metropolitan Water District, albeit at higher cost.

Only during dry periods would DWP's cost rise to approximately \$6.8 million, still only 22 cents per L.A. resident per month. Over the long term, factoring in wet years, the cost would be substantially less. For the past three years, it has cost DWP *nothing* to keep Rush Creek flowing.

## The Rush Creek Lawsuit

On Nov. 16, Dick Dahlgren, Mammoth Fly Rodders and California Trout filed suit to prevent DWP from drying up Rush Creek. Mono County, National Audubon and the Mono Lake Committee subsequently supported the suit with an amicus brief. Ultimately this litigation could keep water flowing into Mono Lake.

The suit alleges DWP, by drying up Rush Creek, violates California Fish and Game codes and fails to comply with the California Environmental Quality Act.

DWP would seem in blatant violation of Fish and Game Code Section 5937, which states "the owner of any dam shall . . . allow sufficient water to pass over, around and through the dam to keep in good condition any fish that may be planted or exist below the dam." DWP claims, however, a 1940 agreement between Los Angeles and Fish and Game exempts it from compliance with this law. This agreement gave Fish and Game \$25,000 and the use of city land for the Hot Creek Fish Hatchery near Mammoth Lakes. Yet it said nothing about dessicating creeks and destroying fisheries, finding only that "construction of fishways over [Grant Lake and Long Valley dams] is not practicable."

CEQA requires an environmental assessment of all projects with substantial environmental impacts, yet DWP has never seriously addressed the consequences of its Mono Basin diversions. It claims it is exempt, as its project was constructed long before CEQA was enacted. In 1981, however, the Third District Court of Appeals rejected DWP's environmental impact report on Owens Valley ground-water pumping in part because it failed to address surface diversions from Mono Lake's tributary streams.

*We applaud Dick Dahlgren, Mammoth Fly Rodders and California Trout for courageously defending Rush Creek. Barrett McInerney of Cal Trout has given selflessly of his time and expertise, and Bishop attorney Edward Forstenzer has defended the stream without compensation. The fishing organizations deserve our gratitude and support: MAMMOTH FLY RODDERS, P.O. BOX 7382, MAMMOTH LAKES, CA 93546 and CALIFORNIA TROUT, P.O. BOX 2046, SAN FRANCISCO, CA 94126.*

# Public Trust Lawsuit Back in State Court

A federal judge has remanded the Mono Lake public trust lawsuit back to California Superior Court in Alpine County. This means the case is finally moving toward trial.

It's been a long wait. Almost six years ago, on May 12, 1979, the Mono Lake Committee joined the National Audubon Society, Friends of the Earth and other plaintiffs in suing the Los Angeles Department of Water and Power for diverting Mono Lake's tributary streams and violating the public trust. Since that time, DWP has done everything in its power to delay the litigation. Finally, on Feb. 17, 1983, the California Supreme Court ruled we could "rely on the public trust doctrine in seeking reconsideration of the allocation of the waters of the Mono Basin."

But the case faced further delays. Back in 1980, DWP filed cross-complaints against every other water user in the Mono Basin. Among the 117 new parties was the U.S. Government, which had the case transferred to the U.S. District Court in Sacramento. Since that time, DWP has been maneuvering to move it back to state court. Following the supreme court decision, DWP joined the state of California in filing motions to give the state jurisdiction. We contended the case belonged in federal court where it could proceed to an expeditious trial.

On Nov. 8, 1984, after nearly 15 months of deliberation, Federal Superior Court Judge Lawrence Karlton gave us a Pyrrhic victory. He agreed our federal nuisance claim, based largely on interstate air pollution, warrants federal jurisdiction. But he also found "the real interest in this litigation is not dust but salinity, and as to that question, federal common law has been displaced." Accordingly he severed the case, keeping the federal nuisance claims but remanding the "public trust" heart of the suit to Alpine County. This complicates the litigation, since we now find ourselves in two separate courts.

Still, any ruling is good news, for it means the suit is moving once again!

# State Appeals Sheep Ruling

The California Department of Parks and Recreation has appealed a Mono County Superior Court ruling that sheep have a "right" to graze in the Mono Lake Tufa State Reserve.

The grazing crisis came to a head at Simon's Spring, where 1,600 sheep have been damaging delicate tufa formations and spring-fed marsh and meadow habitats for the past two summers. This area, situated on Mono's southeastern shore, is especially important to nesting and migratory water birds. In the fall of 1983, state reserve rangers cited Joseph Mendiburu, one of California's largest woolgrowers, for trespassing. Mendiburu, however, chose to fight the case in court.

The sheep won the first round. On Sept. 24, Mono County Superior Court Judge Harry Roberts ruled Mendiburu "shall have the right to continue the grazing of livestock within the reserve since the court finds such grazing is a reasonable use of land existing . . . on or before Jan. 1, 1981 . . . and is not . . . incompatible with any of the uses or purposes for which the reserve is established." The court prohibited grazing among the tufa formations, but allowed Mendiburu to graze within 50 feet if he erected a fence.

The state is fighting this decision, which could devastate Mono's shoreline habitats and severely impact wildlife. In its appeal, the state maintains "the trial court decision . . . is erroneous as a matter of law for two reasons. First, Mendiburu never obtained a lease from the state to use its lands for grazing. Therefore, any use of the uncovered [lakeshore] land by Mendiburu prior to the creation of the reserve was illegal and the legislature could not possibly have intended to exempt unlawful conduct as a prior 'reasonable' use. Second, the manner in which sheep grazing is conducted is inherently unreasonable because it is inconsistent with the general purpose of a reserve that demands the protection and preservation of existing natural conditions."

## 1984 In Review

**FEBRUARY.** The U.S. Bureau of Land Management declares 16,000 acres around Mono Lake an "Area of Critical Environmental Concern."

**MARCH 30-31.** The Mono Lake Committee and the Los Angeles Department of Water and Power co-sponsor UCLA Conference on Mono Lake. The conference catalyzes a continuing series of meetings between MLC, DWP and Los Angeles City Council representatives.

**APRIL.** Despite alternative sources, DWP resumes Mono Basin diversions. By the end of the year, it diverts approximately 75,000 acre-feet south to Los Angeles.

**MAY 7.** Gov. George Deukmejian signs research bill appropriating \$250,000 for three-year study of Mono Lake ecosystem.

**MAY-JUNE.** Spring abundance of brine shrimp reaches unprecedented high, approximately three times 1979 and 30 times 1981-82 numbers.

**JULY.** Gulls fare poorly, fledging less than 6,300 chicks

compared to approximately 12,200-15,500 in 1983 and 26,800 in 1976-77. (here's -78 as you wrote)

**JULY-NOVEMBER.** Phalaropes, grebes and other migratory birds return in usual high numbers.

**SEPTEMBER 24.** Court allows sheep to graze in Mono Lake Tufa State Reserve. State appeals ruling, which threatens marshes, meadows and wildlife.

**SEPTEMBER 28.** Mono Basin National Forest Scenic Area becomes law, protecting 57,000 acres around Mono Lake and providing additional funds for research.

**NOVEMBER 8.** Mono Lake public trust lawsuit remanded to state court.

**NOVEMBER 20.** Court orders DWP to leave water in Rush Creek to protect the recently re-established trout fishery pending a hearing in January 1985.

**DECEMBER 31.** Mono Lake lies at a surface elevation of approximately 6,379.5 feet, the same as one year before.

# BLM Acknowledges Geothermal Water Concerns

The U.S. Bureau of Land Management has acknowledged geothermal development in Mono County could affect the quality and supply of surface and ground-water resources, and has stipulated use of such water may be restricted.

This is a victory for the Mono Lake Committee. Since 1983 we have been protesting the lease sale of 85,000 acres of public land in southern Mono County for geothermal development on the grounds water consumption had not been adequately considered. While we support the development of geothermal power with environmental safeguards, we are deeply concerned that large-scale development could consume excessive amounts of water—water that could be flowing into Mono Lake.

Until recently, BLM dismissed our concerns as groundless. But additional information convinced BLM that cooling water requirements do represent a potentially significant consumptive use of water.

In November, BLM agreed to attach the following stipulation to all Mono-Long Valley geothermal leases:

*The use of water resources in the Mono-Long Valley region is of critical concern. All operator proposals will be carefully evaluated for potential impacts to the quality and supply of surface and ground-water resources. Use of such waters for geothermal exploration and development may be restricted. Proposals which would result in unacceptable impacts to those resources will not be approved or will require modification.*

While the Mono Lake Committee would have preferred a ceiling on water consumption, this stipulation is an acceptable compromise.

## Hooray, Prize-winning Bike-a-thoners!

The 1984 Los Angeles to Mono Lake Bike-a-thon was a resounding success, raising approximately \$18,000 toward saving the lake. We are most grateful to the top six fundraising cyclists, and to the companies and resorts that enabled us to thank them with luxurious prizes:

- \* Norma Vedder received a *Raleigh Mountaintour* all-terrain bicycle, donated by Raleigh Bicycle Co. of America
- \* Vicki Silvas-Young received a three-day vacation on a luxury houseboat in Lake Shasta, donated by PlayMate Resort Marinas, Bridge Bay Resort, of Redding
- \* Bill Mendoza received a four-day vacation at Salishan Resort on the Oregon Coast, donated by Salishan Lodge, Gleneden Beach
- \* Dan Gutierrez received a *Bike-Solo* tent, donated by Alice Cooper of Alice K. Products, San Bernardino
- \* Michael Dressler received a raft trip on the American River, donated by Friends of the River
- \* Larry Spillane received a guided mountainbike day trip, donated by Wilderness Bicycle Tours, Topanga

## MLC on Scenic Area Advisory Board

MLC Chairman David Gaines is one of five people appointed to the Mono Basin National Forest Scenic Area's nine-member advisory board by the Mono County Board of Supervisors. The advisory board will make recommendations on policies, progress, activities, the management plan and the location of the visitor center.

Other appointments include Mono County Supervisor Glenn Thompson, Lee Vining businessman Don Banta, Mono County Planning Commissioner Dan Dawson and Mono Basin contractor and businessman Jeff Hanson. The remaining appointments will be made by Gov. Deukmejian, Los Angeles Mayor Tom Bradley and the Forest Service.

The Forest Service has approved the position of "scenic area manager," but has yet to commit additional personnel or funding.

## Environmental Legislative Symposium in Sacramento

Los Angeles Mayor Tom Bradley will be a keynote speaker at the Planning and Conservation League's second California Environmental Legislative Symposium in Sacramento Jan. 26-27.

The Mono Lake Committee will participate in the symposium, which will consider environmental priorities for the upcoming two year-legislative session. Workshops will be conducted on water development, pesticides, toxic materials, wildlife, renewable resources, grass-roots lobbying and other topics. MLC members are encouraged to attend. The \$50 cost per person includes three meals.

For more information and registration information, please contact PCL at: 1228 N Street, Suite 33, Sacramento, CA 95814; (916) 444-8726.

## Photographers: Photos Needed for '86 Calendar!

The Mono Lake Committee is joining with the Mono Lake Coalition, Grant Davis and Peak Productions in publishing a 1986 wall calendar that will feature 13 stunning color prints of Mono Lake. Grant Davis came up with the idea, and is donating his time to bring it to fruition.

Now we need photographs! If you have exceptional transparencies or prints of Mono Lake, we would like to consider them for the calendar. We will take every care to assure that photographs are returned safely, but cannot be held responsible for accidents. You may wish to send duplicates or work prints; we can request the original if your work is selected. We cannot offer monetary reward, but you will have the satisfaction of knowing your artistry will help save Mono Lake.

Please deliver or send photographs by Jan. 30 to: David Wimpfheimer, Mono Lake Committee, 1045 Sansome St., San Francisco, CA 94111.

# Biological Research Updates

## Mono's Still Uncertain Future

*Perspective by David Gaines*

Nine years of intense research have answered many questions about Mono Lake's biology, but relatively few about its biological future. Will it ever be possible to scientifically predict the impact of a shrinking lake and consequent changes in water chemistry, temperature, mixing patterns and other parameters on algae, brine shrimp, brine flies, birds and other organisms?

Probably not with certainty. Take, for example, the Mono Lake brine shrimp, which have been the subject of long-term experiments testing the effects of increased salinity through a full generation. At salinities above 13 percent, growth rates, brood size and hatching success decline dramatically. This suggests shrimp populations, at present diversion rates, will crash and possibly vanish in 10-25 years.

Some scientists dispute this conclusion, arguing an animal as fecund as the brine shrimp will adapt genetically to increased salt loads. This possibility, while unlikely on physiological grounds, cannot be dismissed as impossible, and is extremely difficult to test.\* The one

definitive test—let the lake decline, see if shrimp drop dead—might well be irreversible.

The best we can hope for are probable predictions grounded on careful analysis of experimental data and thorough understanding of ecology, physiology and genetics. But there will always be room to argue, to paraphrase the Los Angeles Department of Water and Power, there is "no scientific evidence" water diversions are harming Mono Lake—that is, until it is too late.

We are grateful to the biologists engaged in Mono Lake research for the following reports on their objectives, results and future research plans.

\*A final examination question in a graduate ecology course at U.C. Davis posed this question: "The Los Angeles Department of Water and Power maintains that diverting water from Mono Lake will not result in ecological catastrophe because the brine shrimp will be able to adapt to the increasing salinity, no matter how salty the water becomes. How would you go about determining whether the DWP is correct?"

## Algal Productivity

Robert Jellison

*Department of Biological Sciences, University of California, Santa Barbara, CA 93106*

This is the third year of our study of the primary production in Mono Lake. The photosynthetic activity of algae in the lake provides the organic matter for the brine shrimp and brine flies which in turn nourish the birds. Each of the past three years has presented slightly different seasonal dynamics. The most obvious differences are in the brine shrimp and algal populations and the timing of their dynamics. My research consists of ongoing monitoring of algal, nutrient and physical parameters, measurements of primary productivity, and experiments designed to determine what factors control productivity. Understanding primary productivity is critical to interpreting changes and making predictions about the lake.

My studies highlight the close coupling of various components in the lake. During the summer the algae in the surface waters are completely grazed on a daily basis. The algal levels present are a dynamic balance between large grazing losses incurred by the shrimp and high growth rates. The high growth rates rank Mono Lake as one of the most productive lakes in the U.S. Primary production by the algae is dependent upon the temperature, the species present, the amount of algae, the available light, and the nutrient supply. All of these are affected by the brine shrimp.

Experiments have shown that at various times nitrogen is a limiting nutrient. The two major sources of nitrogen are ammonia excreted by grazing shrimp and mixing of nutrient-rich bottom waters with the top where primary production occurs. We are calculating the relative importance of these two sources.

In addition to my work on nutrients, Ron Oremland from the United States Geological Society has started investigating bacterial processes in the lake. These are of fundamental importance to nutrient cycling.

During the past two years large runoffs from exceptionally heavy winter snowfalls have raised the lake level and consequently lowered the salinity. From a high of about 92 g/l in 1982 the salinity of the surface waters has declined to about 75 g/l. This is equivalent to the salinities of the early '70s. This year is unique, however, in the persistence of large salinity gradients between the top and bottom. During the previous six years, the lake has mixed during the winter months as the surface waters cool and temperature-derived density gradients decrease. This past winter, however, mixing was prevented by the strong salinity gradients composed of light fresh waters overlying heavier saline waters. Not only was winter mixing prevented but these salinity gradients, coupled with thermal density gradients in the summer, decreased the mixing of nutrient-rich lower waters with the surface. Experiments conducted by Rick Wanninkhof from Columbia University showed extremely low levels of summer vertical mixing. We are investigating whether this had an effect on nutrient supply rates and primary production.



The most dramatic visual difference between last year and this year was the decreased levels of algae in the spring. Even the casual observer probably noted the lake turned from pea-soup green to its summer deep blue earlier than usual. The increased grazing by the large spring hatch of brine shrimp may account for all or most of this change. Further analysis of our data should determine if other factors may also have contributed.

This is an exciting time to be engaged in research at Mono Lake, as many individual projects are being conducted, sponsored by the DWP and other agencies. The creation of the scenic area and passage of the state research bill will provide further funding for research. Recently, increased communication and cooperation between scientists have been useful in integrating research results. The future looks promising for bettering our understanding of the lake's dynamics.

## Brine Shrimp Population Dynamics

Gwen Schnoor

*Los Angeles Department of Water and Power, Box 111, Los Angeles, CA 90051.*

1984 marks the second year DWP biologists and UCSB researcher Gayle Dana have joined efforts in monitoring the population dynamics of the Mono Lake brine shrimp.

The springtime shrimp abundance reached an unprecedented high of more than 60,000 shrimp per square meter. Since surveys using similar methods began five years ago, the highest previous count for the springtime population was about 20,000 per square meter in 1979.

Several environmental factors may have contributed to 1984's large hatch. While a decrease in lake salinity of ca. 10 parts per thousand result from the heavy freshwater inflow during 1983 and early 1984, laboratory experiments indicate this alone would not account for the increased hatch. A combination of environmental factors including temperature, oxygen and salinity may have acted synergistically.

Operative field studies are being designed to clarify the environmental stimuli which trigger hatching. This work is scheduled to begin in 1985.

While the springtime hatch of shrimp was abundant, relatively few females were bearing eggs. Furthermore, these fertile females had small broods. Consequently, the production of nauplii [immature shrimp] that mature in the summer was very low. The peak production of nauplii, which usually occurs in June, was only 5,000 per square meter this year. In contrast, the June density of nauplii in 1983 reached 200,000 per square meter.

1984's low production of young most likely reflects the reduced food supply which was available to the shrimp last spring. Each winter, the nutrient-rich deep waters normally mix with the less-dense surface waters. Due to the heavy inflow of freshwater, mixing did not occur in 1984. Consequently fewer nutrients were available for the algae, the brine shrimp's food source.

The recent wet winters have afforded researchers the opportunity to monitor the repercussions of climatic variability on this ecosystem. Developing a better understanding of the inherent year-to-year fluctuations in the brine shrimp population will help us determine the resiliency of the population and its ability to cope with changing conditions.

## Brine Shrimp Monitoring and Salinity Experiments

Gayle L. Dana and Petra H. Lenz

*Marine Sciences Institute, University of California, Santa Barbara, CA 93106*

The University of California brine shrimp monitoring program is in its seventh year. 1984 was the second year the program has been run in cooperation with DWP. A summary of the 1984 study is described by DWP's Gwen Schnoor above.

In spring of 1984 we completed the long-term salinity experiments started in 1983. In that year, Mono Lake shrimp were raised in different salinities and monitored for mortality, growth and

reproductive effort. In spring 1984, after a four-month induced dormancy, the overwintering eggs produced in the different salinities were tested for hatching success and subsequent survival of the second generation. The lower salinities (less than 133 ppt) caused a moderate decrease in growth rate, brood size and hatching success, and delay in reproduction. These effects increased substantially in higher salinities.

We hope to continue the monitoring program in 1985 as well as experiments which will help us to determine the potential impacts of water diversions on the shrimp. This research was funded by grants from the David and Lucile Packard Foundation and from the Inyo-Mono Fish and Game Commission.

## Dormant Stage of the Brine Shrimp

Laurie Drinkwater

*Department of Zoology, University of California, Davis, CA 95616.*

I have been studying the biology of the dormant stage of Mono Lake brine shrimp. The strategy of including a dormant stage in the life cycle allows a species to survive unfavorable conditions. These overwintering cysts of the brine shrimp are not eggs (eggs consist of one cell), but partially developed embryos whose growth has been temporarily arrested so they will remain dormant through the winter.

Studies with other brine shrimp populations have shown the hatching of the cysts is the stage most sensitive to higher salinities. This is due to the embryo's inability to osmoregulate. The ability to osmoregulate permits an animal to maintain its internal water content within the range necessary for its metabolism to function. As soon as the cyst shell is broken, the developing nauplius begins to osmoregulate. Adult brine shrimp are very good osmoregulators.

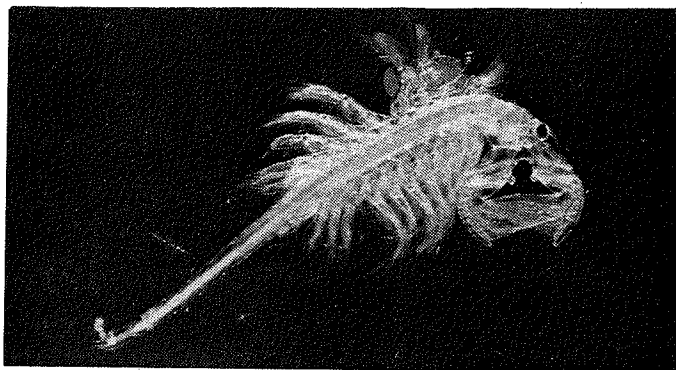
A second aspect which interests me is the phenomenon of developmental arrest. The induction and termination of dormancy usually involves a physiological process which is regulated by environmental cues allowing the dormant period to end when conditions are favorable. Although we now have a good understanding of the physical factors involved in releasing the cysts from dormancy, we don't know how these factors affect the physiology of the cysts. Understanding these internal processes may allow us to predict how the cysts will respond to specific changes in the environment.

My goals are to understand the effect of salinity on release from dormancy and hatching, and to monitor the metabolic processes which accompany these events. This work will be conducted in the laboratory using biochemical and biophysical methods.

Results to date indicate both release from dormancy and hatching are affected by higher salinities. Biochemical studies show the carbohydrate metabolism of Mono Lake cysts is similar to that of other populations, and begins in the first month of the cold incubation period, though at a very slow rate. This metabolism must occur for the cysts to hatch, and its rate increases until the third month when most of the cysts hatch (at 4° C).

Now that I have data for cysts under "control" conditions which permit 90 percent to break dormancy and hatch, I will be continuing these experiments next year at higher salinities which are known to inhibit release from dormancy and hatching.

This research is partially funded by a grant from the Los Angeles Department of Water and Power which is administered by the Office of Research at U.C. Davis.



Larry Ford

## Brine Shrimp: Tufa Shoal Populations

Frank P. Conte and Paul A. Conte

Dircon Consultants, Inc., 631 NW 35th St., P.O. Box 515, Corvallis, OR 97339

The major goals of my Mono Lake research program have been divided among two important species: (1) brine flies—supervision of a doctoral thesis on physiological ecology performed and reported on by David Herbst, and (2) brine shrimp—population abundance and spatial distribution, with special emphasis on the tufa shoal regions. This latter project has been performed in collaboration with M. Thun and G. Schnorr under the joint support and auspices of the Los Angeles Department of Water and Power and Dircon Consultants.

The declining water levels at Mono Lake have brought about severe alterations of the shoreline topography and, as a consequence, a change in the shoreline habitat. The impact on the abundance, productivity and spatial distribution of the flora and fauna residing in the shallow littoral zone is unknown. One conspicuous geological feature of this sub-habitat, tufa towers, provide a substratum for the littoral biota that is different from the typical mud and gravel sediments of the lake bottom. We know very little about the floristic distribution and growth requirements of the algae and bacteria occupying this sub-habitat. We consider these algae and bacteria important food sources for both flies and shrimp, especially for shrimp in times of phytoplankton scarcity.

In our studies, we have arbitrarily divided the lakewide brine shrimp population into two communities: a tufa shoal community and deep water community. The total number of shrimp lakewide was approximately 15-20 billion animals for the 1982 growth season and some 25-30 billion animals for the 1983 season. These numbers are greater than the total population estimate of four billion animals for the 1978 growth season reported by Lenz (1980). Interestingly the tufa shoal community appeared to remain constant with five billion animals for both 1982 and 1983. This represented 27 percent and 17 percent of the total lakewide populations respectively, despite the fact the tufa shoal area occupies 34 percent of the total lake surface. If the shrimp population were dispersed uniformly, the tufa shoals should contain a larger portion of the total population.

Variation in shrimp densities among the tufa stations was large, ranging from 500-200,000 animals per square meter. This type of spatial distribution is called "over-dispersion," and the environmental factors influencing this dispersal pattern do not appear dependent upon changes in oxygen or salinity. Other physical factors, such as temperature, wind currents, water circulation, and light intensity remain as possibilities.

The central deep-water community of brine shrimp was estimated at 12-15 billion animals in 1982, but expanded to 22-25 billion animals in 1983. Since the 1982 census was derived from locations primarily in the western half of Mono Lake, the increase in 1983 could have been a result of sampling bias. Wide variations in shrimp densities occurred, ranging from 70,000-450,000 animals per square meter. The environmental factors influencing this over-dispersive pattern appear to be largely physical, such as temperature, light and oxygen.

## Brine Fly Salinity Tolerance

Timothy Bradley

University of California, Irvine

Preliminary experiments were initiated during summer 1984, on the salinity tolerance of larval brine flies, *Ephydra hians*, at two test ponds along the shores of Mono Lake. The experiments were designed to examine the effect of salinity increases on *Ephydra* larvae under field conditions in which natural aquatic flora and fauna were present. Previous experiments examined salinity effects on *Ephydra* under laboratory conditions. This research is funded by a grant from the Los Angeles Department of Water and Power, and will continue during 1985.



## Ecology and Physiology of Lake Bottom Insects and Algae

David Herbst

Departments of Entomology and Zoology, Oregon State University, Corvallis, OR 97331

The shallow waters around the shores of Mono Lake are home to multitudes of larvae and pupae of the alkali fly *Ephydra (Hydropyros) hians*. The middle name of this insect means water-fire, and indeed the caustic chemical waters of the lake are as close to burning as water can be.

Mono's shallow lake bottom and rich mineral waters serve as a substrate for the growth of several species of algae which are an important food source to the developing fly larvae.

Monitoring the abundance and distribution of flies and algae around Mono Lake indicates certain areas are far more productive than others. Shallow tufa shoals off Black Point, for example, show densities an order of magnitude greater than other locations in the western portion of the lake. There may be several reasons for this: wave-protected shallows allow the accumulation of organic sediments and growth of a rich mat of algae on the sediment surface; abundant tufa is available for crawling larvae; freshwater seeps are widespread and may lower local salinity; and temperatures of 30-40° C in the sediments on hot afternoons promote growth and development.

Experiments are being conducted which examine the influence of salt concentration on the growth and survival of the alkali fly and benthic (bottom) algae. Results indicate a salinity intermediate between that equivalent to seawater and that of the present-day lake is most favorable to the growth of larval flies. The algae show a broad salinity range, although organic content decreases as salt content increases.

Given that the removal of salts from water ingested by fly larvae requires an expense of energy, physiological adaptation to higher salinities might be possible by either increasing the food budget (i.e., the amount of food consumed), the completeness of digestion or efficiency of transforming absorbed nutrients into tissue. These possibilities are also being investigated.

Since larval growth and subsequent adult body size are reduced by increased salinity, the reproductive ability and adult lifespan of different-sized flies have also been a subject of my research. Examining larger flies from different populations, and a range of Mono Lake flies, indicates fat reserves for egg production increase relative to body size, and are dramatically low in small flies. Furthermore, small flies produce fewer eggs later in life, have shorter lifespans, and often not reproduce at all.

This work has progressed without any major source of funding, but has been supported in part by small grants from the American Museum of Natural History, Sigma Xi, and the Oregon State University Department of Zoology.

## Ticks and Gulls

Tom G. Schwan

Yale Arbovirus Research Unit, Yale University School of Medicine, 60 College Street, P.O. Box 3333, New Haven, CT 06510

This letter briefly summarizes my research objectives concerning ticks and tick-borne viruses associated with California gulls breeding on islands in Mono Lake. Areas of investigation are (1) the relationship between tick infestations and virus with disease and mortality of gulls, (2) the identification of viruses infecting ticks and birds, (3) the prevalence of virus infection in ticks and gulls, (4) the transmission of virus from ticks to gulls, (5) the biology and life cycle of the ticks, and (6) the taxonomic status of the Mono Lake tick population.

Field work during 1984 included three trips to islands in Mono Lake during January, July and August. During these trips approximately 4,000 ticks were collected from under rocks near sites where gulls had nested; 52 blood samples were collected from gulls.

In the laboratory ticks are presently being tested for virus using tissue culture, suckling mouse assay, and the enzyme linked immunosorbent assay, called ELISA. Gull blood will be tested for both virus and antibodies to Mono Lake virus by tissue culture and ELISA.

Life cycle studies of the ticks are progressing with domestic chickens serving as the alternate laboratory host. Morphological studies using standard light microscopy and scanning electron microscopy have helped reveal characteristics which indicate the tick population may, in fact, be an undescribed species. Attempts to hybridize the Mono Lake ticks with their closest relative, a tick of cliff swallows, are also underway.

Chickens have been inoculated with Mono Lake virus to determine how long virus circulates in the blood and when antibodies to the virus appear, important aspects to the transmission of this virus between birds.

Our work is being funded by the Los Angeles Department of Water and Power, the Department of Epidemiology and Public Health of the Yale University of Medicine, and through a National Institute of Health Training grant in virology.

## California Gulls: The 1984 Season

David Shuford

Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, CA 94970

In 1984 the Point Reyes Bird Observatory completed the second year of its work on the population ecology of the California gull at Mono Lake. This is a continuation of the long-term study initiated by David Winkler in 1976. Our work focused on detailed studies of all aspects of reproductive success. In addition we gathered data on the effects of heat stress, parasite infestations and food supply on chick survival.

Our data from the Negit islets, in combination with that of Dr. Jehl from the Paoha islets, yielded estimates of 44,836 adult gulls nesting lakewide in 1984 compared with 45,116 in 1983. In contrast fledgling production in 1984 was about 4,500-6,300 lakewide compared with about 12,200-15,500 in 1983. Among the factors that seem to be responsible are: (1) increased nest densities, (2) heat stress, and (3) tick infestations. Food supply was excellent, and appeared to have no effect on lowered reproductive success.

The number of adults nesting in 1983 and 1984 was virtually the same, but the number nesting on the Negit islets increased from 64 percent to 83 percent of the entire population, greatly increasing nesting densities overall. The increase on the Negit islets came from a shift of birds from the Paoha islets as a result of habitat loss due to erosion and inundation with the rising lake level.

Studies have documented that decreases in gull nesting success correlate with increasing densities due to higher rates of predation on eggs and chicks by neighboring gulls. This appeared to be the case at Mono Lake in 1984. Although hatching success was similar to 1983, there was much higher chick loss at early ages at the time chicks are most vulnerable to predation.

For a nine-day period in late June and early July, temperatures hovered close to 32° C (90° F) on the nesting islets. Our nest watches revealed many chicks leaving territories in search of shade or the lake's cooling waters. These chicks were frequently attacked when passing through other gulls' territories. Although we were unable to quantify the extent of mortality from this cause, it was significant. Heat—at least indirectly through increased intraspecific attacks—definitely caused greater mortality in 1984 compared with 1983.

Data collected from copper chick models in full sun and shade on Krakatoa (one of the Negit islets) and amidst historic nesting sites on Negit Island confirmed Chappell et al's findings that chicks in full sun may experience heat loads 25-30 Celsius degrees (77-86 Fahrenheit degrees) higher than chicks in the shade. Even though data collected by Sheila Mahoney show air temperatures on the smaller islets are somewhat cooler than on Negit, our data demonstrate shade can be much more important than a few degrees variation in air temperature.

Although adult gulls do shade their chicks, both parents often leave the chicks alone as they grow large enough to fend for themselves. Even when the parents are present they cannot provide full shade to the nearly full-sized chicks near season's end. In 1981 severe heat-related mortality came at just this time, i.e., late in the season when large chicks were being left alone by their parents.

The information presented here supports the idea Negit Island provides better nesting habitat than the islets with regard at least to heat stress. The main historic nesting area on Negit has greasewood scrub and large rocks that provide extensive shade in contrast to both groups of small islets which offer minimal shade.

During the course of collecting food samples we discovered large numbers of soft-bodied ticks, *Argas cooleyi*, on the gull chicks. While banding during early July we checked a sample of chicks to assess the degree of tick infestation on different islets. These data, along with those on pre-fledging mortality, showed a correlation between the degree of tick infestation on individual islets and chick mortality. Although ticks can increase mortality, the exact mechanism(s) are unclear. Whether the chicks become sick from being infected by a virus transmitted by the ticks, become weakened due to blood loss, or die from some other cause is unknown. Presumably the effects of ticks and heat stress are interactive and cumulative, as chicks weakened by one factor are likely to be more susceptible to the other.

In 1984 Negit remained an island for the second year in a row, but the gulls did not return to nest. Although a coyote was removed before nesting began, at least one coyote remained on the island through the season. We can only speculate as to how well the gulls would have reproduced if they had returned to a coyote-free Negit. It is obvious nesting densities would have been lower if the birds displaced from the Paoha islets had shifted to Negit Island instead of the Negit islets. Second, more shade would have been available during the 1984 heat spell. We have no way of knowing, however, if these factors would have in fact increased nesting success.



Speculation about the suitability of nesting habitat on Negit Island versus that on the smaller islets can be resolved only by allowing gulls to return to Negit and quantifying their reproductive success over several years. Data on reproductive success for 1976, the only year data is available while gulls were still nesting on Negit, yielded an estimate of 23,000 chicks emigrating from Mono Lake. Although this is the highest total for any of the seven years reproductive success has been quantified, there are not enough data to set to rest the controversy over the importance of Negit to the nesting gulls. For these scientific reasons we have urged the appropriate agencies to remove all of the coyotes from Negit as soon as possible. This would set the stage for the eventual return of the gulls, and enable us to answer these important questions.

## Ornithological Research: Salt-loading, Gulls

Joseph R. Jehl Jr.

Hubbs-Sea World Research Institute, 1700 South Shores Road, Mission Bay, San Diego, CA 92109

Sheila A. Mahoney

Department of Biological Sciences, Florida Atlantic University, Boca Raton, FL 33431

Hubbs-Sea World Research Institute began ornithological research at Mono Lake in 1980 with the support of the National Geographic Society. Since 1981, our studies have been funded primarily by the Los Angeles Department of Water and Power under a cooperative agreement with the U.S. Fish and Wildlife Service. These studies have amassed new information on the post-breeding biology of three common North American migratory birds—Wilson's phalarope, northern phalarope and eared grebe—and specifically on their ecological requirements while at Mono Lake.

By conducting beached-bird censuses through most of the year, we have been able to determine annual patterns of mortality. Further, because Mono Lake is only one of a series of hypersaline lakes in western North America, its importance to migratory bird populations

cannot be resolved through studies at Mono Lake alone. Accordingly, we have made observations at Lake Abert, Oregon, and Great Salt Lake, Utah, which are also used by large numbers of grebes and phalaropes.

In 1984, in addition to monitoring the migratory bird population at Mono Lake, we completed studies on (i) the physiological ecology of several species, (ii) measured microclimates in several current and historic gull nesting locations, to study the effect of heat stress on reproduction, and (iii) documented changes in the size and condition of the gull-nesting islets on the western side of the lake. Some of the results are now being analyzed. Those from the physiological research, however, are sufficiently complete that they can be outlined here.

A major issue raised early in the Mono Lake controversy was whether increasing salinity would affect bird populations. It was argued, for example, gull chicks fed on brine shrimp and brine flies would perish from salt-loading and dehydration. Physiological studies on California gulls, eared grebes, American avocets and Wilson's phalaropes, coordinated by Dr. Sheila A. Mahoney, however, have shown salt-loading is not a problem for those species.

The invertebrates on which they feed are osmoregulators and maintain the salinities of their body fluids at a level much less salty than the lake environment; simply, the prey is not very salty in the first place. Further, by using varied behavioral and anatomical methods, the birds are able to rid their prey of most of the lake water that may adhere to it. Thus, by using defensive methods, the birds avoid problems of salt-loading, and the gulls do not present "salty" food to their chicks. These studies seem definitive and the results have been submitted for publication to refereed journals. We plan no further studies on this subject.

The status of the California gull colony remains a controversial issue. Despite predictions of its imminent demise, a review of the historical evidence shows the colony is far larger than it was earlier in this century. Between 1916 and the late 1970s, the population increased from ca. 3,000 birds to ca. 50,000 birds. This growth did not occur uniformly, but is strongly correlated with the appearance of new nesting islands that have become available since 1940, as the lake dropped because of water diversions. Thus, judged by total population size, ecological changes at Mono Lake since 1940 have not been deleterious to gulls. A report on our findings has been submitted for publication.

Starting in 1983, HSWRI began studies on the reproductive success of gulls nesting on the "Paoha islets" on the western half of the lake. These studies complement those on the "Negit islets" by Point Reyes Bird Observatory and, together, constitute the most accurate information yet available on annual changes in breeding success.

Five factors—weather, space, predators, parasites and food—influence the success of all animal populations. And all have affected the Mono Lake gulls to varying degrees in recent years.

In 1984, reproductive success on the Paoha islets was extremely low. Overcrowding in the colonies, in part due to the loss of nesting islets from a major rise in lake level in 1983-84, resulted in much predation by the gulls on their own eggs and young. Predation by great horned owls was also important in some areas. But other factors were almost certainly involved and sorting them out is a difficult, time-consuming, and often inconclusive procedure.

"Obvious" interpretations—such as the alleged starvation of thousands of gull chicks in 1981—often prove to be unsupportable when subjected to detailed study. Thus, it is disconcerting to find "explanations" of the low gull production in 1984 have already surfaced, even though the data have yet to be analyzed. This is unscientific, but is also wasteful of time and energy, because it places researchers in the position of having to comment on or disprove allegations made on the basis of little or no fact. Understanding will come more quickly if those involved in gathering data have the opportunity to present their findings before others feel constrained to interpret them.

Recently passed legislation provides funding for more research at Mono Lake. If the results are to be used in resolving environmental issues, they must be fully considered and as accurate as possible before they are disseminated. And that is why this report on our research in 1984 can only be a general overview at this time.

## Removing Coyotes: Views from Our Readers

*Late bulletin: A Dec. 20 survey of Mono's islands found no evidence of coyotes on Negit, and probably one animal on Paoha.*

The Mono Lake Committee should endorse the quickest means of removing coyotes from Negit Island, even if this means shooting the animals. MLC should be open and straightforward about its position. While we lament the loss of a few unlucky coyotes which are easily replaced in nature, we cannot tolerate an unnatural, man-caused coyote population on Negit Island that will forever prevent gulls from nesting there. If live trapping is a viable alternative, let's do that.

... Larry L. Norris

I have learned there is a possibility of shooting the coyotes on Negit Island as a last resort instead of trapping them or removing them some other way. Shooting goats on San Clemente Island and burros in Death Valley is a different problem because they are feral. Even though man caused the coyotes to appear on Negit, they are still wild. Put my vote down as *nay* for shooting the coyotes!

... Keith Axelson

# California Gulls: Another Perspective

David Winkler

Department of Zoology, South Parks Road, Oxford University,  
Oxford

I am not currently involved in field work at Mono Lake, but I am in the process of preparing several manuscripts on aspects of my previous research. This work, along with some that has been recently published, might help to evaluate some of the points of controversy.

Studies I have conducted on the osmoregulatory capabilities of California gull chicks indicate they are little if at all different from other gull species. I concur with Dr. Jehl and Mahoney that the bulk of the osmoregulatory load in at least the gulls appears to be handled by an ability of the gull parents to rid the food of its adhering saltwater before delivering it to the chicks. I know of no convincing evidence of exactly how this is accomplished, and I am aware of no anatomical adaptations in the Mono Lake birds that can be invoked to explain this pre-delivery filtering. In any event, a demonstration that present salt loads are within the birds' capabilities is hardly surprising.

But this cannot be taken as an assurance salt-loading will not be a problem in the future. Unless the parents are 100 percent efficient in removing lake water from the prey, an increase in the lake's salinity will increase the salt load to the chicks. Also, the prey are not perfect osmoregulators, and as salinity in the lake increases, the salinity of the prey's body fluids will also increase. While experiments to date should make an intelligent prediction of the birds' responses to a given salt load possible, the unanswered question is what the salt load will be in future Mono Lake environments. The answer to this question is critical, and seems difficult if not impossible to obtain.

David Shuford and I are presently preparing a historical review of the gull colony at Mono Lake. We have uncovered enough information to disagree with the interpretation of Dr. Jehl and his co-workers of trends in the past 100 years. Although we have no precise estimates of the colony's size in the mid-19th century, it is apparent Negit Island supported a very large nesting population at that time. It also appears that this large population was reduced in size, if not eliminated, by commercial egg-harvesting operations during the boom-town days of Bodie and Aurora. Thus, the very small population of California gulls at the turn of the century was not representative of the "carrying capacity" of Mono Lake.

Jehl and his co-workers have discovered a correlation between the areas of islets exposed by the dropping level of the lake and the numbers of gulls nesting at the lake. They go on to imply these changes in islet area have made possible an increase in the numbers of nesting gulls and "ecological changes at Mono Lake since 1940 have not been deleterious to gulls." One of the first lessons of any statistics student is "correlation does not prove causation," and a correlation only carries an implication of causation if ancillary lines of evidence can substantiate such a claim. In the present case, such an interpretation is flawed by several considerations, of which the most important is that over half of the increase in gull populations prior to 1979 had occurred on Negit Island. While these birds were counted by Jehl *et al.*, the land area upon which they nested was not. The correlation presented would be weak evidence alone of a causal link between islet area and gull numbers. In the absence of an accounting for the area on Negit Island available to nesting gulls, it is probably not worth serious consideration.

There is no question the gull population at Mono Lake has increased dramatically since diversions of the lake's tributary streams began. But to jump from this observation to the statement that "ecological changes . . . have not been deleterious to gulls" ignores and obscures the profuse evidence that changes at Mono Lake since 1978 have substantially affected the gulls. The bottom line is gull chick productivity has fallen dramatically since the land-bridging of Negit Island. The land-bridging of Negit brought invasion of mainland predators and a plummet in numbers of nesting gulls and chicks produced. Although the numbers of nesting adults have recovered to some extent, chick productivity has remained low in succeeding years. The causes for these low levels of chick productivity are complex and may never be fully understood, but there are many strong lines of evidence pointing to the conclusion the decline in the level of Mono



Lake and associated ecological changes have played a large and consistent part.

It may well be that nesting habitat is now limited at Mono Lake and temporary rises in the lake level may cause the loss of some nesting gulls on the low islets to the west of Paoha Island. But this is no rationale to plead for the continued lowering of Mono Lake. If Mono Lake were returned to its 1976 level and predators were eliminated from Negit Island, enough nesting habitat would be provided for all the gulls nesting on the Paoha islets many times over.

Continued declines in Mono Lake can only mean further reductions in the available nesting habitat through land-bridging of the Negit islets (and eventually the Paoha islets). And further lake level declines will lead to increases in salinity and other limnological changes, the effects of which are difficult to predict. But the decision at Mono Lake has always been whether to be cautious in the face of intrinsically uncertain but ominous predictions, or to remove all uncertainty and conduct the "experiment" of allowing the lake-level declines to continue. This "experiment" has always been, and remains today, one which we will probably never be able to repeat, as the "subject" will probably not survive.

## Recent Publications on Mono Lake Biology

The following list updates the comprehensive review published in the *Mono Lake Newsletter*, Vol. 6, No. 2, p. 11 (Autumn 1983). For a copy of that review, please contact our Lee Vining office.

Chappell, Mark A., David L. Goldstein and David W. Winkler. 1984. Oxygen consumption, evaporative water loss, and temperature regulation of California gull chicks in a desert rookery. *Physiol. Zool.* 67 (2): 204-214.

Jehl, Joseph R. Jr. and Sheila A. Mahoney. 1983. Possible sexual differences in foraging patterns in California gulls and their implications for studies of feeding ecology. *Colonial Waterbirds* 6:218-220.

Mahoney, Sheila A. and Joseph R. Jehl Jr. 1984. Body water content in marine birds. *Condor* 86: 208-209.

Zink, Robert M. and David W. Winkler. 1983. Genetic and morphological similarity of two California gull populations with different life history traits. *Biochemical Systematics and Ecology* 11: 397-403.



# Bird Counts and Cryptic Messages

The Christmas Bird Count is an annual tradition at Mono Lake. This year 13 hardy counters braved subzero temperatures and freezing fog to tally 68 species. Among the most exciting were a tundra (whistling) swan, an amazing 26 rough-legged hawks, a hooting blue grouse, two pygmy owls, a Nuttall's woodpecker and two northern shrikes.

The bird count is published in the journal *American Birds* along with an alphabetical list of participants. In 1980, the list was unscrupulously altered to encode a cryptic message. Can you decode it (solution at end of article)?

**Total, 66 species, 1831 individuals.**—Carol Anable, Lois Angelis, Walter Diversions, R. D'Stroing, Moe Nolake, Curren Seesought, Laik Solo, Wright Soone, Day Vidgaines, Lee Vining, Dave Winkler (compiler).

The Los Angeles Department of Water and Power got the gist of it. In a letter to *American Birds* editor Robert Arbib, DWP Chief Engineer Paul Lane said, "It was my understanding . . . the Christmas bird count was intended to be a factual and unbiased survey . . . the inclusion of a 'hidden

message' in the place of actual Mono Lake survey participants cannot add to your reputation of factual objectivity. Indeed your act . . . calls into question the accuracy of the information for this and perhaps other areas in your census effort."

In his reply, Arbib regretted not having discovered the secret message. "Our CBC editor," he wrote, "had read, edited and proofread about 700,000 words, and this one slipped through (and she waded through many names as curious as Lois Angelis or Write Soone) . . . the Mono Lake bird count itself has never been questioned for accuracy, and to say this prank 'calls into question the accuracy of the information . . . etc., etc.' is preposterous. We look upon this purely as a rather sneaky little caper that was intended to appeal for funds for Mono Lake . . . The perpetrators have been reprimanded and warned."

*Los Angeles, Water Diversions, Are Destroying, Mono Lake, Currency Sought, Lake So Low, Write Soon, David Gaines, Lee Vining*

## WATER CONSERVATION:

Richard Soehren

*California Office of Water Conservation*

*(reprinted from Water Conservation News, Vol. 4, No. 2)*

*This, the first of a series on water conservation, focuses on the needlessly water-wasteful toilet. Installation of efficient, one-gallon-a-flush models could save, in Los Angeles alone, over 50,000 acre-feet per year. That's two-thirds of the water needed to save Mono Lake! \**

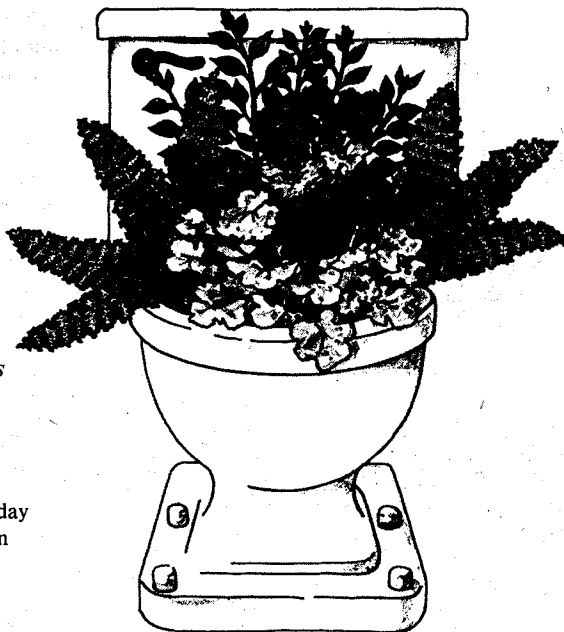
\* Assuming three million Angelenos flush toilets four times a day at an average of five gallons per flush. Savings come to 17 billion gallons a year, or approximately 52,000 acre-feet.

Thomas Crapper would be proud.

Back around 1880, Mr. Crapper made great improvements in the fixture we know as the water closet. After he made his mark in history, there weren't many big changes in the toilet for a long time. Recently, however, there have been some very significant design improvements.

Remember that bag, bottle or brick you put in your toilet tank back during the drought? Well, you and a lot of other people who conserved water showed a toilet doesn't need five or six gallons of water to do its job. Those devices displaced about a quart of water, and most toilets did just fine without that extra quart.

Some toilet manufacturers realized the same thing, of course. Even before our drought, there were a few low-flush toilets available. Most of them used three to four gallons per flush, and some of them actually worked. When California and several other states began to require these low-flush toilets in new buildings, the market increased and the products improved. Stringent new performance standards for toilets brought even more improvements, and today's



Toilets  
Are  
Getting  
Better!

water closets work as well on 3.5 gallons as the old ones did on six.

But three and a half gallons is still a lot of water, and some ingenious people have been able to devise fixtures that do the job on less than a gallon. These toilets don't use air pressure or chemicals or any other complicated systems; they work the same as the traditional toilet, but much more efficiently. They perform at least as well as their cousins that flush with 3.5 gallons and they pass the same tough performance standards. At the present time they cost more than the old standard flush toilets. As more of these very efficient fixtures are produced, and as the price of water continues to rise, the very low-flush toilet will probably become much more competitive. In a few years the one-gallon flush may be as common as the six-gallon flush was just a few years ago.

Yes, Mr. Crapper would be proud.

For more information on water-conserving toilets, contact Richard Soehren at the Office of Water Conservation, P.O. Box 388, Sacramento, CA 95802, or call (916) 322-1067.

# Luxury Bus Tour a Fun-filled Success

The Mono Lake Luxury Bus Tour with California Parlor Car Tours was a jam-packed, fun-filled success. For four glorious autumn days, the 42 enthusiastic participants were thoroughly pampered and spoiled as they journeyed from San Francisco to Yosemite, Mono Lake and Bodie. Everyone raved about the tour, which raised over \$6,000 for saving the lake.

The tour began with a personal greeting by Mr. Bipin M. Ramaiya, president of California Parlor Car Tours. His generosity and belief in saving Mono Lake made the entire trip possible. For the token sum of \$100, he provided the bus, driver and fuel. The bus was spacious, comfortable and the epitome of luxury in every respect, while the driver, Steve Irwin, could not have been more thoughtful and friendly.

As the bus headed toward Yosemite, MLC board member Grace de Laet and husband Rick hosted a "get acquainted" champagne reception. Grace and Rick worked hard and long to organize the tour. Their dedication, energy and high spirits assured its success.

The champagne reception set a tone of excitement and jollity that was to animate the group as it explored the wonders of Mono and Yosemite. Historian Jean Ridone, MLC Executive Director Martha Davis and MLC Chairman David Gaines discussed the varied landscapes and their future. Mono's beauty really spoke for itself, winning the lake many new champions.

Accommodations at the Ahwahnee Hotel in Yosemite and the Best Western Lakeview Lodge in Lee Vining were

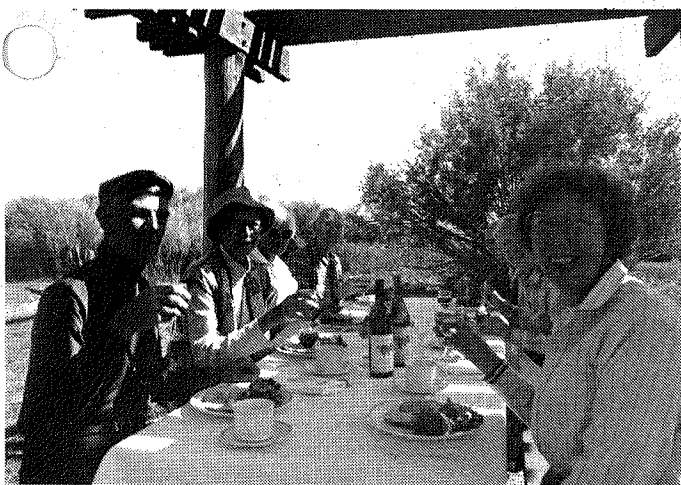


luxurious. We are especially grateful to Edward Hardy and the Yosemite Park and Curry Co. Over the years, YCC has strongly supported Mono Lake through contributions and congressional testimony.

While all the meals were culinary delights, special mention must be made of the sumptuous picnic banquets. Along the Merced River, Chef Dominique of San Francisco's French Club prepared a gourmet feast under giant old oak trees. Each table was spread with white linens and adorned with red and white wines. Two culinary angels, Susan Beck and Mary Pipersky of Susan Beck Catering (Mammoth Lakes), also produced sumptuous banquets. At Mono Lake, they decorated the tables with golden aspen boughs and sagebrush sprigs, at Tenaya Lake with fresh pine sprays and persimmons.

The high points of the tour would fill several newsletters: Mono's tufa groves, the ghost town of Bodie, Yosemite's Glacier Point, lavish fall colors, and on and on. Suffice it to say a grand time was had by all, and we hope to do it again in the future!

*Special tributes and thank yous to Mr. Bipin M. Ramaiya, president of California Parlor Car Tours, whose generosity made the bus tour possible, and to Mr. Edward Hardy, president of Yosemite Park and Curry Co., for staunch and generous support. We are also grateful to Mildred and Ed Bennett, who worked like professional caterers and kept everything going smoothly.*



## MLC Seeks Interpretive Coordinator

We are seeking applicants for the summer position of Interpretive Coordinator. Based in Lee Vining, the IC has responsibility for developing, expanding and directing summer interpretive programs in the Mono Lake area, and for scheduling and overseeing summer interns. Qualifications include experience in environmental interpretation and public relations, familiarity with Mono Lake, and the ability to work effectively with volunteers and interns. The salary is \$1,000/month, plus four days vacation. The job begins May 15, and extends through September. Please send resumes to: IC Search Committee, Mono Lake Committee, P.O. Box 29, Lee Vining, CA 93541, or give us a call for further information.

## Ano Nuevo Elephant Seal Trips

Again this year, Mildred Bennett is organizing three bus trips from Berkeley to Ano Nuevo to see the elephant seals. All proceeds will help save Mono Lake.

The first trip is scheduled Jan. 25, and will go—rain or shine. The cost is \$18 before Jan. 12 and \$20 after that date. These popular trips fill rapidly, so make your reservation early.

Two additional trips will be conducted in February. Watch San Francisco Bay Area Audubon and Sierra Club newsletters for details, or contact the Mono Lake Committee.

For information and reservations, send a self-addressed, stamped envelope to: Ano Nuevo, c/o M. Bennett, 2719 Marin Ave., Berkeley, CA 94708. Or call (415) 526-1260.

# DA To Intervene If Water Shut Off Arrests Threatened

sals that a violation of these  
ive occurred," Eller added.  
said that he had been in con-  
the Mono County Sheriff's  
ent to instruct deputies to

the wise would be sufficient, but  
we're ready to enforce at any time."

the stream," Dahlgren said.  
David Gaines, chairman of the  
said that  
were  
iding  
for

tempt starting Thursday.  
The operation, which involved  
lower portion of the stream r  
Mono Lake, resulted in the nettin  
one German brown trout, accor  
to Rowan.

## Judge's Mono Lake Ruling

## Judge Rules L.A. Water Cutback Order DWP Can't Shut Down

Los Angeles

An Inyo County Superior  
Court judge yesterday issued a  
temporary order cutting back  
the amount of water the city of

Los Angeles can divert from  
Mono Lake's main tributary, a  
city Department of Water and  
Power official said.

Judge Donald Chapman or-

dered the city to main-  
19 cubic feet per seco  
acre-feet per year from  
The city had been lea-  
feet per second in the

## Trout Creek Stream Spawns Water Battle Groups Seek to Halt DWP's Diversion

By ROBERT A. JONES,  
Times Staff Writer

By RONALD B. TAYLOR, Times Staff Writer

Rush Creek, the embattled trout  
stream along the eastern Sierra  
Nevada, received a temporary re-  
prieve Tuesday as an Inyo County  
Superior Court judge blocked the  
Los Angel  
and Powe  
water that  
Judge I  
the tempo  
the reques

Yet another battle in the Mono  
Lake water wars was shaping up  
Friday along the snowy banks of  
Rush Creek, a trout stream in Mono

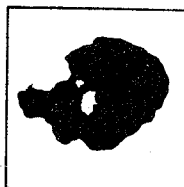
Rush Creek Bridge across Cali-  
fornia 395 and marched on the  
nearby DWP offices. And local law  
enforcement officials implicitly

into Mono L  
have been imp  
into the DWP aq  
time since the 1940s  
owed f  
becaus  
Also, l  
fish h  
a trout  
late F  
ined.

## L.A. ordered to maintain Mono Lake stream flow

### JOIN US!

Still not a Mono Lake Committee member? Join us, and  
increase our strength and effectiveness. We will keep you  
informed, through our quarterly newsletter and action alerts, of  
what's happening and how you can help. Regular membership  
is \$15/year (\$25 Sponsor, \$50 Supporting Member, \$100  
Monophile, \$500 Monomaniac, \$8 "I Can't Afford More").  
Checks should be payable to the Mono Lake Committee, and  
are not tax deductible.



**The  
Mono Lake  
Committee**

Post Office Box 29  
Lee Vining, California 93541

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Organization

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