Keeping Landscapes Working

A Newsletter for Managers of Bay Area Rangelands

Volume 2, Issue 1 | University of California Cooperative Extension | Fall, 2003

Sheila Barry
Natural Resources Advisor
UCCE Santa Clara County
700 Empey Way
San Jose, CA 95128
(408) 299-2635 x 1005
sbarry@ucdavis.edu

A newsletter provided by the UC Cooperative Extension Natural Resources Program in the San Francisco Bay Area. This newsletter provides information to managers of both public and private rangelands. RANGELAND, which is land characterized by natural vegetation, i.e. grass, forbs and shrubs and managed as a natural ecosystem, is the predominant source of OPEN SPACE in the San Francisco Bay Area.

Sheila Barry, UCCE Bay Area Natural Resources Advisor

In This Issue

Keeping Landscapes Working is published through the cooperative efforts of the University of California's Santa Clara County Cooperative Extension Service and the County of Santa Clara

Stockponds – a valuable rangeland feature

In the 1940's and '50's about 21,000 ponds and small reservoirs were constructed in California with the assistance of the United States Department of Agriculture Soil Conservation Service. Landowners also constructed many other ponds independently. Most ponds were built to provide water for livestock or small, short-term irrigation needs, and many do not hold water year around. In addition to their initial function, these ponds are now recognized for their recreation and aesthetic value and as fire protection resources and wildlife habitat. Most recently, temporary stock ponds have been recognized for their importance in providing surrogate habitat for threatened and endangered species such as the California tiger salamander.

Pond Habitat for California Tiger Salamanders

The California tiger salamander (*Ambystoma californiense*) is a California Species of Special Concern and a candidate species for the federal Endangered Species List. This salamander is endemic to the Central Valley, and its bordering foothills, as well as coastal grasslands. It is well adapted to the Mediterranean climate of cool, moist winters and hot, dry summers. California tiger salamander generally breed in ephemeral pools that fill during the winter months. They rarely use permanent ponds because of introduced predators that often inhabit these ponds such as crayfish, bass and bullfrogs.

It is estimated that approximately 70 to 90% of these salamanders inhabit natural vernal pools. The other 10 to 30% use man made stockponds. In some regions like the San Francisco Bay Area, stockponds provide very important habitat for the species. For example, in the Livermore area there are 112 recorded locations of California tiger salamander. 98 (88%)of these sitings are in stockponds.

Although stockponds can provide habitat for salamander populations, it is important to recognize that all habitats are dynamic. Stockponds may dry out quickly during drought. If the inundation period is too short, (less than 3 months) larvae will not have

Continued on p. 2

Stockponds *Continued from p. 1*

time for metamorphism. On the other hand, flooding may destroy ponds or cause siltation, either of which may result in loss of habitat and loss of the salamander population. Periodic maintenance of stockponds may be of equal value in maintaining this habitat as is improving their function and value to the landowner. It should be noted that maintenance such as the removal of silt may cause a temporary loss of habitat.

In addition to the removal of silt, another major pond maintenance issue is the protection of the dam from an eroding spillway. Eroded spillways are not only a major source of sediment in many watersheds, but the headcuts they create threaten the integrity of the dam and therefore the stockpond. Many of these spillways have produced such large gullies which cut so deeply into the dam face that repair is expensive and challenging.

Many ponds with severely eroded spillways have either lost capacity or were not appropriately designed to handle overflow events. Whereas, a simple earthen spillway may suffice for a small pond in an ideal location, for most ponds the earthen spillway should be left for emergency overflow and a pipe spillway should carry normal flows. Engineers at the USDA NRCS can help with design criteria.

Controlling Pond Algae with Barley Straw

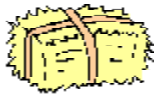
Based on information from Carole A. Lembi, Department of Botany and Plant Pathology, Purdue University, Indiana

The use of barley straw for algae control has received a lot of publicity in recent years. You may find small barley bales being sold in nurseries and garden shops for use in water gardens and small pools. The word-of-mouth reports of success with this method have led many people to believe that barley might also control algae in ponds and lakes. What has research so far told us about the potential for barley to control algae in larger bodies of water?

The English Experience

The technique of using barley straw to control algae was developed in England about 10 years ago. It is widely used in many bodies of water in England, including large reservoirs and canals. In general, it is thought that fungi decompose the barley in water, thereby releasing an inhibitory chemical that kills or prevents the continued growth of the algae. The specific chemical(s) has not been identified, and it is not clear whether the chemical is exuded from the barley itself or if it is a metabolic product produced by the fungi.

Laboratory studies conducted by English researchers suggest that not all algae are susceptible to barley. In fact, some of the studies are even contradictory, claiming that certain types of algae are susceptible while other studies claim they are not. But in most cases, the field evidence indicates that water clarity improves over time due to a reduction in algal populations.



Continued on p. 4

Grazing Has Value for California Tiger Salamander Habitat

California Tiger Salamander
Ambystoma tigrinum californiense

In the US Fish and Wildlife Service's proposed listing for the California tiger salamander (May 23, 2003), the Service recognized the value of livestock operations in providing habitat for the California tiger salamander. They have proposed a special rule that would exempt existing routine ranching practices from the prohibitions on take for the Central California tiger salamander. Their hope is that this special rule will encourage landowners and ranchers to continue their livestock-related practices that are not only important for livestock operations, but also provide habitat for the Central California tiger salamander.

Their rationale for the proposed special rule was based on the two following considerations:

(1) Creating and maintening stockponds. As mentioned previously in this newsletter, in some regions where vernal pools no longer exist due to landscape changes or alteration of local hydrologic conditions, the Central California tiger salamander use stockponds for breeding. The Service recognizes that routine management practices on manmade stockponds must be performed in order to protect water supplies and protect the integrity of the water storage system.

(2) Maintening open rangelands and rodent burrows. Less vegetation may facilitate the movement of Central California tiger salamanders from upland areas to breeding ponds. In addition, the Central California tiger salamander uses burrows constructed by small mammals as upland habitat during the non-breeding season. Throughout the California tiger salamander range, these burrows are often constructed by California ground squirrels. Height and density of vegetation controlled by grazing livestock are likely habitat factors affecting the suitability of an area for California ground squirrels. Although California ground squirrels can compete with domestic livestock for forage and are subject to population control, control efforts are generally limited in extent.

In addition to these two considrations, there is at least one other important benefit of livestock grazing for the California tiger salamander habitat that should be considered:

(3) Maintaining pool inundation periods. Where vernal pools provide important habitat for California tiger salamanders, pool duration is the principle factor affecting their persistence and survival. The larvae perish if a site dries before they complete metamorphosis (minimum 3 months). The longer the ponding duration, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce. Given the importance of inundation period for California tiger salamander survival, the impact on pool inundation periods by livestock grazing should not be overlooked.

Complete rest from livestock grazing can shorten the inundation period of a vernal pool site by altering soil infiltration capacity. This change in the pool's inundation period is actually interrelated with the invasion of exotic annual plants, which may increase evapotranspiration. Exotic annual grasses will take advantage of any opportunity to germinate around the edge of a vernal pool if a change in inundation period permits. As they become established in an area, their presence can further shorten the inundation period to support their survival. Grazing can effectively control annual vegetation growth.

Cattle and sheep, the two most common domestic grazing animals in California, have coexisted with California ground squirrels and Central California tiger salamanders since the arrival of early Spanish explorers to California in the 16th century. As ranch lands are developed and converted to other uses, including uses which result in lack of annual vegetation management, California tiger salamander habitat is threatened. Saving the working ranch is proving to be key to conserving many of California's endemic rangeland species.

Barley *Continued from p. 2*

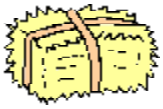
The American Experience

American researchers have been somewhat slow to initiate research on barley. However, some studies have been conducted and showed inconsistent results. Dr. Lembi's initial research at Purdue University was conducted in a laboratory and showed that some algal species were susceptible to barley while others were not. A similar study at the University of Maryland also showed that algal species varied in their susceptibility. When larger studies were conducted in stock tanks (outdoors) and in plastic cylinders (in the greenhouse), a decrease in phytoplanktonic growth (the microscopic algae that color the water green) was often documented, but an increase in mat-forming algae (the algae that form floating mats on the surface of the water) was also noticed.

In addition to differences in susceptibility to algal species, results in the field may also vary because of water conditions, climatic conditions or other factors. We will only be able to guarantee results when we fully understand the process. It is clear that we are not dealing with a process that is going to produce rapid, visible results like an algicide application would. Algae that have been treated with copper sulfate, for example, can start to turn white within a couple of hours after treatment. Results with barley, according to the English researchers, can take several months.

What Does the EPA Say about Using Barley?

The Environmental Protection Agency (EPA) has the responsibility for maintaining and/or restoring the health of our nation's bodies of water. It is also the agency that regulates the use of pesticides for pest control in the United States. All pesticides must undergo thorough testing for their potential to cause adverse effects on non-target species, human health, and the environment. A pesticide that is approved by EPA for use receives a registration number. Only registered products can legally be used as pesticides.



After a successful field test in a lake in Minnesota, a number of lake associations were anxious to begin using barley. Before the Minnesota Department of Natural Resources would approve its use, it asked the EPA for guidance.

EPA's response is summarized as follows: A pesticide is a chemical that is used for the control of a pest. Since barley controls algae (a pest) by release of a chemical, it must be considered to be a pesticide. However, no one (or company) has ever registered barley for use as a pesticide. It has not gone through the testing that is required for registration. Therefore, barley cannot be sold as a pesticide (in other words, as a product that controls algae).
The most serious implication of this ruling is on certified commercial applicators. These are individuals who have been state certified to apply aquatic pesticides for hire. For-hire applicators cannot apply barley for algae control; this application would be the same as distributing an unregistered pesticide.

A private pond owner or homeowner is in a different situation from a commercial applicator. For the homeowner, barley qualifies as a "home remedy" and does not come under EPA restriction. Home or pond owners who wish to purchase barley and apply it themselves to ponds on their own property are perfectly free to do so. A person who lives on a public lake, however, cannot apply barley because public waters are "owned" by the government and therefore would fall under EPA restrictions.

It is unclear whether garden shops and nurseries are selling barley straw illegally. Most of those applications go into water gardens, which are privately owned, very small, and not likely to have an impact on the natural environment.

There is also a matter of semantics. As long as someone does not claim algae control per se, they could apply barley. The obvious alternative reason for the application is that barley might act as a water clarifier. Although there is little evidence that barley acts like typical clarifiers such as alum (which causes the precipitation of phosphorus, a nutrient needed for algal growth), this is one way in which the perception of "direct algae control or kill" can be avoided. Is this a legitimate way to justify the use of barley? Until further clarification is obtained from EPA, this is a matter for the individual to decide.

If You Do Choose to Use Barley, How Should You Do It?

Guidelines from the University of Nebraska

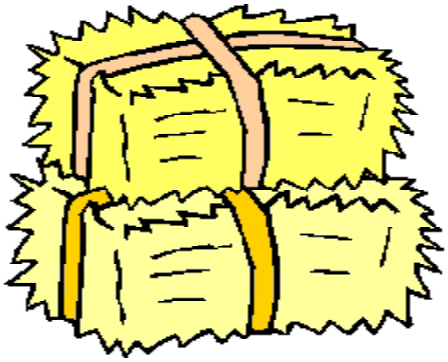
These guidelines were supplied by the Lake Water Quality Extension Program, 103 Plant Industry Bldg., University of Nebraska, Lincoln, NE 68583-0814, 402-472-7783. Much of the information was obtained from the Centre for Aquatic Plant Management's website (http://www.execpc.com/~agsys/barley.html).

When to Apply the Straw

The decomposition process is temperature dependent and occurs faster in warmer water. When the water temperature is below 50°F, it takes approximately 6-8 weeks for the decomposing straw to produce enough of the growth inhibiting chemical to effectively control algae. It only takes 1-2 weeks, however, when the water temperature is above 68°F. Once the straw begins to produce sufficient amounts of the chemical, it is likely to control algae for about 4-6 months. Therefore, straw should be applied in mid-to-late April in order to control summer algal growth in Nebraska ponds and lakes.

Amount of Straw to Apply

The amount of straw required to control algal growth is primarily dependent on the surface area of the lake. Lakes with a history of algae problems should be treated at a rate of 225 pounds of barley straw per surface acre. This rate is equivalent to about 0.8 ounces of straw per 10 square feet of surface area. Lower doses can be tried, but should not



fall below 90 pounds of straw per acre or 0.3 ounces per 10 square feet.

The effectiveness of the straw is reduced by sediments suspended in the water (i.e. "muddy" water). Therefore, a higher dose may be required in "muddy" lakes or lakes with extremely severe algae problems. In these types of lakes, apply 450 pounds per acre (1.7 oz per 10 square feet), but do not exceed 900 pounds per acre (3.3 oz per 10 square feet). The decomposition of the straw requires oxygen, and the application of excessive amounts (greater than 900 lbs per acre) of straw could reduce the oxygen content of the water to levels that stress or kill fish.

How to Apply the Straw

(1) The straw bales must first be broken apart. Bales are packed too tightly and do not allow adequate water movement through the straw.

(2) The loose straw should be placed in some form of netting. In larger lakes and ponds, CAPM suggests wrapping the straw in the cylindrical netting commonly used for wrapping Christmas trees. This netting can be used to construct straw-filled tubes up to 65 feet long which contain about 110 pounds of straw. Loose woven sacks (e.g., onion sacks) can be used in small ponds that require low doses.

(3) Use floats to suspend the straw-filled netting in the upper three to four feet of the lake. The straw will lose its effectiveness if it sinks

Continued on p. 6

Example: Determining the amount of straw required to treat a 5 acre sandpit lake.
(1) The surface area of the lake is 5 acres.
(2) The selected dose is 225 lbs of straw per acre.
(3) Multiply the area of the lake (in acres) by the amount of straw required per acre to calculate the total amount of straw required to treat the whole lake (5 acres x 225 lbs/acre = 1125 lbs).
(4) To calculate the number to bales needed to treat the lake, divide the total amount of straw required to treat the whole lake by the weight of a single bale of barley straw. For this example, assume one bale weighs 45 pounds. The size and weight of bales can be highly variable, however. It is recommended that the approximate weight of the bales be determined at the time of purchase (1125 lbs ÷ 45 lbs/bale = 25 bales).

Barley *Continued from p. 5*

below this depth. Water movement near the surface will keep the straw well oxygenated and distribute the growth inhibiting chemical throughout the upper portion of the lake. This ensures that the chemical is produced where the majority of the algae are growing and away from the bottom sediments which will inactivate the chemical. Therefore, it is recommended that floats be inserted inside the netting at the same time the netting is filled with straw. The netting is then anchored into place using rope attached to bricks or concrete-filled buckets.

Where to Apply the Straw.

In order to improve the distribution of the growth inhibiting chemical, CAPM recommends placing several small quantities of straw around a lake. Place each net of straw roughly equidistant from other nearby nets and the shore. The placement of the nets does not need to be exact. Practical considerations such as corridors for boating and angling may influence the location of the nets.

In small ponds where only one net of straw is required, place the net of straw in the center of the water body.

Sources of Barley Straw

Large Ponds and Lakes
- Go to local suppliers of hay and straw products

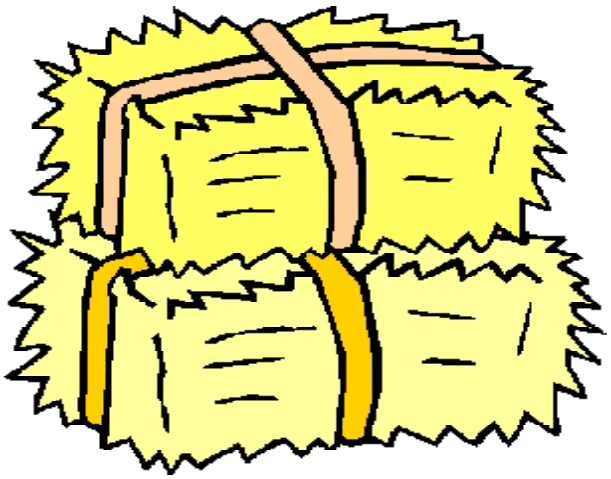
Small Garden Ponds
- Aquatic Eco-Systems, Inc. Apopka, FL 407-866-3939
- Plantabs, Baltimore, MD 1-800-227-4340
- Pond Solution - www.pondsolutions.com
- Mellingers, Ohio 1-800-321-7444

Sources of Netting

- Aquatic Eco-Systems, Inc. (standard netting) Apopka, FL 407-866-3939
- The Campbell Company, Inc. (Christmas tree netting)Wautoma, WI 1-800-242-2019
- Kelco Industries (Christmas tree netting) Milbridge, ME 1-800-343-4057

Barley straw for algae control web sites.

These cover much of the research and practical application.
http://www.bestfish.com/infosht3.html
http://www.squirrelaway.com/barley.htm
http://www.ianr.unl.edu/pubs/wildlife/NF429.HTM
http://www.agnr.umd.edu/users/cmrec/3-7art2.htm
http://www.pondsplus.com/Infofiles/art03.htm
http://www.agric.gov.ab.ca/agdex/400/485_716-2.html



October 24, 2003

FIRST SUSPECTED CASE OF WEST NILE VIRUS DETECTED IN A HORSE

Horse infected in San Diego County

SACRAMENTO – The California Department of Food and Agriculture is announcing a suspected case of West Nile virus (WNV), a mosquito-borne illness, in a horse in San Diego County. The horse is recovering under the care of a veterinarian. This would be the first known case in which a horse has been infected in California.

Horses are a dead-end host for WNV, meaning they cannot infect people or other animals. Mosquitoes become infected after feeding on birds that have high levels of the virus in the blood. The mosquitoes then pass the virus on to horses while feeding on them. Not every horse exposed to the virus will develop WNV. Of the horses that do develop clinical signs, approximately 30 percent will succumb to the disease.

Signs of the disease in horses include stumbling, staggering, wobbling, weakness, muscle twitching or inability to stand. A veterinarian should be consulted if a horse is exhibiting these signs.

> "CDFA strongly recommends that horse owners take all precautions, including mosquito control measures, to protect the equine population," said CDFA Secretary William (Bill) J. Lyons, Jr. "Since mosquitoes are the primary means of spreading this disease, a key to prevention is reducing exposure to mosquitoes."

Vaccinations for horses are available. Horse owners should contact a veterinarian to discuss this preventive measure, especially in counties where there is known WNV infection. The timing of the vaccine is critical because it must be administered prior to disease exposure.

CDFA has collaborated with other state, federal and local agencies to detect and respond to the disease in California. CDFA has also taken its public education program about WNV directly to the equine community at horse-related events throughout California for several years, providing free testing and stressing mosquito control measures.

More information is available online at: http://cdfa.ca.gov.com and http://westnile.ca.gov. and from local mosquito and vector control districts.

Information on human health is available at the California Department of Health Services, 866-847-2246 or www.dhs.ca.gov.

University of California
Cooperative Extension
Santa Clara County
700 Empey Way
San Jose, CA 95128

PRESORTED NONPROFIT
US POSTAGE
PAID
SAN JOSE CA
PERMIT NO. 109

Keeping Landscapes Working

Fall, 2003