

172 PRONG BINDER

07
10-30 Oregon State University
WATER RESOURCES RESEARCH INSTITUTE
Covell Hall 115
Corvallis, Oregon 97331

Non-Profit Org.
U.S. Postage
PAID
Permit No. 200
Corvallis, OR 97331



Library
Serials Dept.



Oregon's Environment

February 1977
Number 30

CRITICAL WATER SHORTAGE

As a famous writer once noted "everyone talks about the weather...", and if he were living in the West today, he would have finished by saying "and is a little worried about it". The drought in the Pacific Northwest has become a matter of major concern to all residents of Oregon. Many of them belong to agencies and other organizations which are trying to evaluate the effects, and consider courses of action. They are looking at, among other things, the impact on irrigation, reservoirs, fish and wildlife, forest areas, domestic supply, range and pasture conditions, industrial needs, and power requirements. This is a continuing process and becomes more important in view of Governor Straub's prediction that water rationing will undoubtedly be necessary next summer.

AGRICULTURE

In response to a request from the Governor's Office, the Extension Service at Oregon State University organized a committee to provide information regarding the outlook for agricultural production and sales. Agriculture gets approximately 81% of water used in Oregon. A survey was conducted of county agents in the state. Based on estimates for the 1976 crop, sales from farms and ranches for 1977 will probably be about \$960 million (or 92% of 1976) given that we have normal rainfall for the remainder of the 1977 growing season. If the drought continues, it is estimated that sales will be about \$680 million, or 65% of 1976.

With normal rainfall, Oregon should produce about 41 million bushels of wheat or 2/3 of last year's crop of over 60 million bushels. Barley and oats, with enough rain, will actually increase in acreage and production because of price relationships and a shift in acreage (primarily into barley). With drought, less than half of the oats and barley produced in 1976 are projected.

The grass seed industry has also been affected by the drought. Lack of rain resulted in herbicide damage to some perennial ryegrass fields, and freezing temperatures have caused some further damage.

If normal rainfall resumes, grass seed crops in western Oregon could produce up to 90 percent of normal. Central and eastern Oregon grass seed crops depend on irrigation water, which appears to be available now.

The drought has caused little damage to berry crops and tree fruits and nuts. Vegetable crops production will depend on irrigation water supplies and processor contracts. Field crops such as potatoes, mint and sugarbeets are not expected to be harmed.

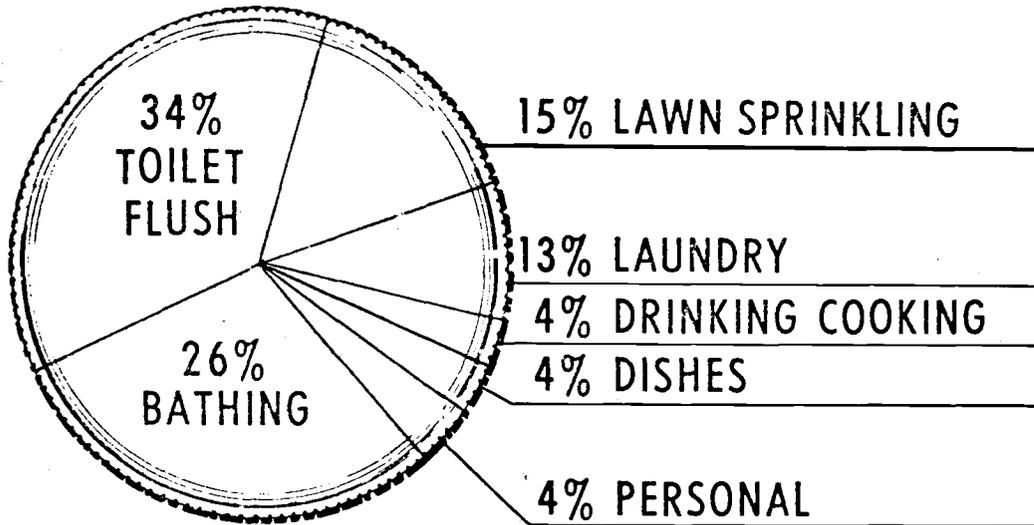
Oregon's beef cattle, sheep and other livestock are generally in good condition. Milk production has not been affected by the drought so far, and no losses are expected if normal rainfall returns.

However, continued drought conditions would seriously affect the livestock industry, it was noted. Forage production would be severely reduced and lack of stockwater is already causing problems in many areas of the state.

Fred Hagelstein, OSU Extension Service Assistant Director, said that even if weather conditions improve, irrigation water supplies are expected to be extremely short in many areas because of a scant snowpack.

MUNICIPALITIES

A spokesman for the Oregon Water Resources Department has said that most cities will probably have a fair supply of water even if it doesn't rain. City reservoir and irrigation reservoirs, in most cases, have some carryover of water from last year's rain. In general, cities in the Willamette Valley will be least affected by the drought. Some coastal communities are in trouble already. Several communities are expected to begin running short of domestic water by next month. Fish runs are suffering from the driest winter on record. The tourist business will feel the crunch. The coastal area doesn't draw upon a snowpack and must rely on runoff from the windward slopes of the Coast Range. Some towns -- those with shallow wells -- could have problems. Most cities'



Average Annual Household Water Use

Willamette Basin Municipal Consumptive Use, 1960-1966, as Percentage of Water Supplied

City	Annual consumptive use %	5-month dry season consumptive use, %	Monthly dry season consumptive use, %				
			May	Jun	Jul	Aug	Sep
Corvallis	24	40	16	40	51	51	29
Eugene	33	49	27	56	62	54	36
Forest Grove	18	30	12	39	46	20	28
McMinnville	36	54	38	55	65	60	38
Salem	33	49	23	52	60	54	41
Sweet Home	34	52	16	44	62	57	58
Simple Six-City Average	30	46	22	48	58	49	38
Weighted Six-City Average*	27	44	18	44	55	49	38

* Weighted by population

claims to water are earlier than the state's claim for maintaining stream flows, so residential users are not generally faced with a crisis.

CONSUMPTIVE USE BY WILLAMETTE BASIN MUNICIPALITIES

A recent study of the consumptive use of water for six Willamette Basin cities -- Salem, Eugene, Corvallis, McMinnville, Forest Grove, and Sweet Home -- showed that the annual consumptive use was 27% during the 1960-66 period, varying from 18% to 36% for individual cities (see Table on Page 3). The average monthly values for the group varied from nearly zero in the winter to 55% in mid-summer. Between May and September, the 5-month dry season consumptive use averaged 44%. This means that of all water supplied to city users during that period, 44% was "consumed" (lost to evaporation and transpiration) and did not return to the sewage plant. Principal factors affecting consumptive use values and patterns for the cities were weather conditions, lawn and garden watering, and the proportion of municipal water used for residential rather than industrial and commercial purposes. During the study period, air-conditioning was uncommon in most households and many businesses. Residential lawn watering was the largest single source of municipal consumptive use. Industrial and commercial water use is largely nonconsumptive, in the absence of an appreciable air-conditioning load.

INDUSTRIES

The forest industry reports that limited water may affect germination, growth, and forest protection. Growers planting seedlings this winter may find the first year's survival of young trees cut down because of a dry summer, according to a Weyerhaeuser spokesman. Forest fires have occurred in areas normally covered by snow. The drought has placed the future of the aluminum industry in the Northwest in doubt. Alumax has already announced that it might have to reconsider its decision to build a plant near Hermiston. Cannery officials are concerned about the size of the crops and the level of water in the rivers. The Department of Environmental Quality (DEQ) is examining the pollution outlook and the possible need for new requirements for industry. A number of industries, including pulp and paper mills, discharge wastes into the Willamette River.

POWER

The Governor's Office has said that a regional plan for curtailment of power probably will be necessary by next fall. However, a spokesman for the Northwest Power Pool Coordinating Group has stated that the Columbia River runoff may not meet power requirements this summer. Because much regional energy is produced by BPA, Oregon cannot effectively act alone in curtailing electricity use. Electrical generation needs are served largely by hydro-electric dams. The dams in the system are presently storing water not needed immediately for power generation. This is influenced greatly by the navigation and fish resource needs. All agencies are urging conservation wherever possible to avoid, if possible, the restrictions of rationing.

Repair all leaky faucets. Turn down thermostats at home and in the office. Use less water in bath tub. Put full loads in washing machine.

MORE CITY PEOPLE

A 1975 study published by the National Planning Association predicts that most of the fastest-growing metropolitan areas through 1985 will be located in the South and Far West; faster growth will occur in newer areas of urbanization. The study also predicts that, by 1985, some 175 million people (75 percent of the U.S. population) will live in metropolitan areas compared with 150 million (72 percent) today.

Urban centers will grow, swallowing up the quiet suburban communities so many know and love. Open space, historical properties, and agricultural land will fall to development of high-rises, bedroom communities, and commercial complexes.

"Change and growth are occurring at the urban fringe. These are the areas that used to provide food for the cities, and we must help structure the change in those areas. Growth around metropolitan areas in the next 25 years will be massive. Conservationists must be present, and allow those pieces of urban fringe that should be developed to be developed. We should structure our open spaces so they are meaningful to people in the cities," says the study.

For land protectionists, the projected sprawling development portends ecological doomsday. That is why environmentally cognizant state and community leaders and citizens are seeking ways to control development--to achieve quality growth. From *"Protecting Nature's Estate: Techniques for Saving Land"*. December 1975. Superintendent of Documents, U.S. Govt. Printing Office, Wash., D.C. 20402. Price \$3.25. Stock #024-016-00082-0)

Do not let water run continuously when you shower. Do not hose down the driveway to clean it.

BEND'S SEWERS

The City of Bend, Oregon, is conducting a study on sewer systems with support from EPA. The primary difficulty encountered by Bend in its attempt to provide sewer service by 1980 is one of economics. Conventional sewers, even with federal assistance, would probably be too expensive. Therefore, the use of pressure and/or vacuum sewers is being investigated to cut costs.

Savings would accrue from the fact that such systems are laid to a depth dictated only by frost penetration, which in the Bend area is approximately 36 inches. In addition, these systems utilize small-diameter plastic sewer pipe which may be laid in a manner which requires less time and effort, resulting in further cost savings. Another advantage of these systems is their "tightness," which essentially results in the elimination or minimization of infiltration. Reduced infiltration means that the hydraulic capacity of treatment and pumping facilities is reduced significantly on a flow per capita basis.

If either or both of these sewerage methods can be successfully demonstrated prior to the development of the plan to sewer the community, their use in many areas of the City has the potential to drastically reduce the overall cost of and minimize the disruption caused by sewerage the community.

The proposed study entails the design, construction, and operation of parallel vacuum and pressure sewer systems, each serving from 10 to 20 homes, in an area where the construction of conventional gravity sewers is prohibitively expensive and potentially dangerous. The construction requirements and cost will be carefully documented and compared to similar information on gravity sewerage. Operation and maintenance needs will be documented and wastewater characterizations made to provide further comparison between these systems. Completion date for the study is June 30, 1977.

LEBANON GETS FUNDS

More than \$3 million -- \$3,003,129, to be exact -- was awarded to the City of Lebanon in Oregon's Linn County last December to help build modifications to the city's municipal wastewater treatment plant and the Westside pump station. The award was the largest made during the month under EPA's wastewater treatment construction grants program which supplies 75 percent of all eligible costs to local communities for the planning, design and construction of treatment facilities. Other recent grants included: Twin Rocks Sanitary District, Tillamook County, Oregon, \$283,500; Unified Sewerage Agency of Washington County, Oregon, \$15,000; Caldwell, Idaho, \$28,125; Whittier, Alaska, \$19,440; and the Municipality of Metropolitan Seattle, \$6,000 (for the preparation of plans and specifications for auxiliary power for the Mercer Island pump station).

NON-POINT SOURCES

". . . The biggest battle against water pollution is just beginning. In reality, we have only scratched the surface of the problem. Ninety-two percent of the suspended solids which now enter the nation's waterways comes from non-point sources. When these statistics are considered, along with the fact that a moderate size city discharges as a result of runoff from its streets 100,000 to 200,000 pounds of lead and 6,000 to 30,000 pounds of mercury per year, we can begin to appreciate the magnitude of the problem that still faces us.

"These second generation problems dwarf those we are now grappling with. For some of them we don't even have proposed solutions. Yet without solutions to these problems,

clean water for many areas will remain little more than a slogan -- an empty promise we can never keep." (From a speech by John R. Quarles, deputy administrator of EPA, October 1976)

NO AMENDMENTS

Proposed amendments to the Federal Water Pollution Control Act died in conference when Congress adjourned in October. Despite extended debate, conferees for the House and Senate were unable to reach agreement. Congress returned for the new session in January, and mid-course changes will be considered again. Congress is expected to seek guidance with extensive public hearings in 1977 when it does consider PL 92-500. There is some expectation that deadlines will be modified, some goals clarified, some standards and procedures refined.

WATER SAVING TIPS

Water for gardening may be in short supply this summer.

But by planning carefully, home gardeners can use water very efficiently to grow their own vegetables, says Duane Hatch, Oregon State University Extension home gardening coordinator.

Hatch offers the following suggestions to get the maximum use of water in the garden.

1. Don't use mounds or hills (i.e., a raised soil level with a rounded top) because water penetration is almost nil. Flat soil is better, and a basin or depression around plants such as cucumbers and squash will catch the water and give better results.
2. In the cool, early part of the growing season, use a plastic mulch around tomatoes, cucumbers, melons, peppers and other warm season plants. Plastic will

warm the soil in addition to conserving water. Later in the season use an organic mulch, such as straw or grass, to save water and keep down weeds.

3. Practice better-than-usual weed control. Weeds steal valuable moisture that vegetables could use.

4. Investigate trickle irrigation systems. These along-the-row plastic ooze-type systems can save half to two-thirds of the water usually applied to the garden. They put the water right along the row and allow a minimum of evaporation.

In addition, they do not wet the foliage, thereby lessening the risk of disease. And they do not water the weeds between the rows.

"The only drawback to trickle irrigation is the expense," says Hatch. "But using it will pay off over a period of time."



PLAN YOUR GARDEN!

LAKE RESTORATION TECHNIQUE

Drawdown/sediment consolidation appears to be a feasible lake restoration technique, according to a study conducted in Florida. Its use is recommended for shallow lakes in which extensive muck deposits cause problems because of their ready suspension by wind-driven waves and outboard motors and their consequent nutrient release. Drawdown is most attractive for lakes in which the littoral zone slopes gently so that a small vertical drawdown exposes large areas of bottom. Any drawdown project needs to consider the effects of increased flow and possible sediment transport on downstream water bodies. If pumping is required to achieve substantial drawdown, care must be taken to minimize the amount of loose sediment that is pumped from the lake, the report states.

A serious effort should also be made to evaluate the potential for physical removal of muck and peat from lake bottoms for purposes of soil amendment. It is not naive to consider muck and peat a misplaced resource. An integrated program of drawdown/sediment consolidation and sediment removal in selected areas to deepen the lake and provide sand bottom for fish spawning would appear to be the most desirable approach.

A number of questions about the drawdown/sediment consolidation technique remain unanswered by this project and deserve further study. Consolidation appears to be irreversible and primarily physical in nature. Further work on the mechanism of consolidation and on the physical-chemical changes in the sediment matrix causing the irreversibility would be in order. The general applicability of drawdown as a means of sediment consolidation needs further work. The sediment characteristics required for good consolidation should be explored, probably through demonstration projects on various types of lakes.

(continued →)

Several engineering and socio-political problems, such as the extent to which the lake level can actually be lowered, the effect of drawdown on downstream water quality, and diminished freeze protection provided by the lake during drawdown, were not addressed by this study and will ultimately determine the feasibility of drawdown for restoring lakes. Drawdown should be undertaken during late winter and early spring because there is greater rainfall in summer and the colder temperatures will limit germination of terrestrial vegetation. Two months appears an adequate drying time; longer periods result in problems of vegetation growing on the dried soil. Hyacinths should be controlled during drawdown and refill, and ideally should be physically removed from the lake.

Drawdown is not by itself a cure-all, but coupled with other measures drawdown can improve lake water quality. Serious consideration should be given to removal of dried muck from shore areas, perhaps transporting it by truck. The possibility of pumping the wet muck sediments onto muck farms should also be explored. Fish spawning areas can be added to lakes, either by removing the muck down to the sand bottom or by covering the dried muck with sand. The former method would seem preferable since it will increase the lake depth. Consideration should be given to planting or seeding the littoral areas with desirable forms of aquatic vegetation. The cessation of preventable nutrient loading is, of course, imperative. (From "*Lake Drawdown as a Method of Improving Water Quality*". EPA-600/3-77-005, dated January 1977. Available through NTIS, Springfield, Va. 22161)

SAVE ELECTRICITY

-- If away from home for three days or more, turn off the water heater and turn thermostat on furnace to lowest setting. Put nightlights on timeclock to avoid unnecessarily burning them in the daytime.

-- Consider installing fluorescent lights where possible. Depending on type of fluorescent bulb, it is up to four times more efficient than incandescent lighting, and the bulbs last much longer.

-- Use lower wattage bulbs where less light is needed, such as hallways or closets. But don't use several low wattage bulbs where a larger bulb will do.

-- If you have a conventional freezer, defrost it regularly -- before a quarter of an inch of ice has built up. Thick ice reduces cooling power of freezers.

-- Avoid putting hot dishes into freezer or refrigerator. Hot dishes overwork the appliance.

-- Many washing machines can be adjusted for less agitation time. If water is soft, only about five minutes agitation is usually needed. Heavily soiled clothes can be soaked for 15 minutes before agitating, usually resulting in cleaner clothes than if agitated a full 15 minutes.

-- Install a shower head flow restrictor. It will reduce the amount of hot water used by about 15 percent.

-- Remember, clothes lines don't use any electricity.