1-1980

Summary Draft Water Quality Plan - Lake Tahoe Basin

State Water Resources Control Board

SUMMARY

Draft Water Quality Plan

LAKE TAHOE BASIN

"...at last the Lake burst upon us — a noble sheet of blue water lifted six thousand three hundred feet above the level of the sea, and walled in by a rim of snowclad mountain peaks that towered aloft full three thousand feet higher still! It was a vast oval. As it lay there with the shadows of the great mountains brilliantly photographed upon its surface, I thought that it must surely be the fairest picture the whole earth affords...". Mark Twain in Roughing It (1872).

January 1980

STATE OF CALIFORNIA

State Water Resources Control Board

A SUMMARY:

LAKE TAHOE WATER QUALITY PLAN

I. INTRODUCTION

Erosion Is Damaging Lake Tahoe

Lake Tahoe is a special place, a unique reminder of the grandeur of nature. However, the Lake's clear blue waters are no longer as pure as in Mark Twain's time. Erosion from construction and other human activity is washing sediment and nutrients such as nitrogen and phosphorus into the Lake and these nutrients have stimulated growth of algae. Measurements over the last twenty years document a dramatic increase in algal growth rates. Once clear inlets and shallow areas display thick growths of algae. Under natural conditions, erosion washed 3,100 metric tons* of sediment into the Lake each year. Development at the Lake has raised that quantity to 61,000 metric tons, a twenty-fold increase.

Water Quality Program

In 1974, the State Water Resources Control Board, which oversees water quality programs in California, asked the Tahoe Regional Planning Agency (TRPA) to develop an effective water quality program to protect Lake Tahoe. TRPA submitted a plan in 1978. The State Board rejected the TRPA plan becuase it did not contain an effective erosion control program. No commitment was made to control erosion from existing development. Further development on high erosion hazard lands and near streambeds would have been allowed. Pollution of Lake Tahoe would have continued and accelerated.

State and federal water quality laws dictate a different result: further degradation of Lake Tahoe cannot be allowed.

Few quarrel with this nondegradation policy until they consider the costs and restrictions of an effective program. Protecting Lake Tahoe will require a major reduction in sediment and nutrients reaching the Lake. Remedial measures must be undertaken to stabilize and revegetate eroding areas. These projects will require a major commitment of public funds. Strict controls must be placed on future development to prevent new erosion problems.

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*A metric ton is 2,205 pounds.

Making The Plan Fair And Effective:

A Challenge to the State Legislatures and to Congress

State and federal laws have given the State Board the task of approving and enforcing a water quality plan which fully protects Lake Tahoe. The controls proposed by the State Board fulfill that responsibility using existing authority. The State Board cannot, however, compensate owners of vacant subdivided lots who will not be allowed to build.

Providing equity for these lot owners is a major goal of the State Board. Many proposals have been made to purchase undeveloped land in the Tahoe Basin, including designation and funding for a Lake Tahoe National Scenic Area. A land purchase program would make the State Board effort in the Lake Tahoe Basin a complete and equitable solution. The State Board actively supports such a program. The Board will propose its own land purchase program if no adequate legislation appears likely to be successful.

For the immediate future, the State Board will allocate $10 million in Clean Water Bond funds for erosion control projects at Lake Tahoe. This money, and money committed by other state and local agencies, can be matched by a federal grant. Some of the federal funds can be directed towards purchase of property or development rights. These funds will provide a start; more must be raised.

The United States Congress and the California and Nevada legislatures must face the challenge: adopting a complete and equitable economic solution to the Tahoe problem. Only funding for property acquisition and erosion control projects will bring an end to the debate and division over Lake Tahoe.

II. THE THREAT TO THE LAKE

"So singularly clear was the water, that where it was only twenty or thirty feet deep, the bottom was so perfectly distinct that the boat seemed floating in the air! Yes, where it was even eighty feet deep. ...the water was not merely transparent, but dazzlingly, brilliantly so." Mark Twain, in Roughing It (1872).

A. The Nature Of The Erosion Problem

The Lake Tahoe Basin is extremely sensitive to human activities. Steep slopes, unstable soils, and a short growing season for vegetation to be reestablished increase erosion potential. Under natural conditions, native vegetation holds the soil together and filters sediment and nutrients from runoff. Road building, residential and commercial construction and other human activities disturb natural conditions. Once disturbed, soil takes long periods to restabilize. In the last 20 years, development has increased erosion rates to 20 times natural levels. New development permitted under current Tahoe Regional Planning Agency regulations would boost the total to 27 times natural levels.

B. Erosion Sources

The main erosion problems are:

- Erosion from bare and unstable road cuts, old logging roads, skid trails, and areas used by offroad vehicles.
- Destruction of "stream environment zones" by development. Streambeds and areas next to them, such as marshes and meadows, naturally filter sediment and nutrients from runoff.
- Construction on "high erosion hazard" lands. These lands, because of their slope, and soil and vegetation type, erode at high rates when disturbed.
- New subdivisions. Road building and lot grading cause severe problems even on relatively stable lands.
- Covering too much land. The more a lot is covered by roads or buildings, the less runoff can be absorbed and the less vegetation remains to remove pollutants.

C. The Increased Growth Of Algae

Historically low algal growth rates make Lake Tahoe one of the clearest lakes in the world. A six inch white disc can be seen 120 feet down. In no other California lake can one see to even half that depth. Only two lakes in the world, Crater Lake in Oregon and Lake Baikal in Siberia, rival Tahoe's clarity.

However, the quality of the Lake is changing because of development in the Basin.

Figure I shows algal growth measurements taken in the open waters of Lake Tahoe over the last twenty years. A dramatic 100% increase in algal growth rates is documented.

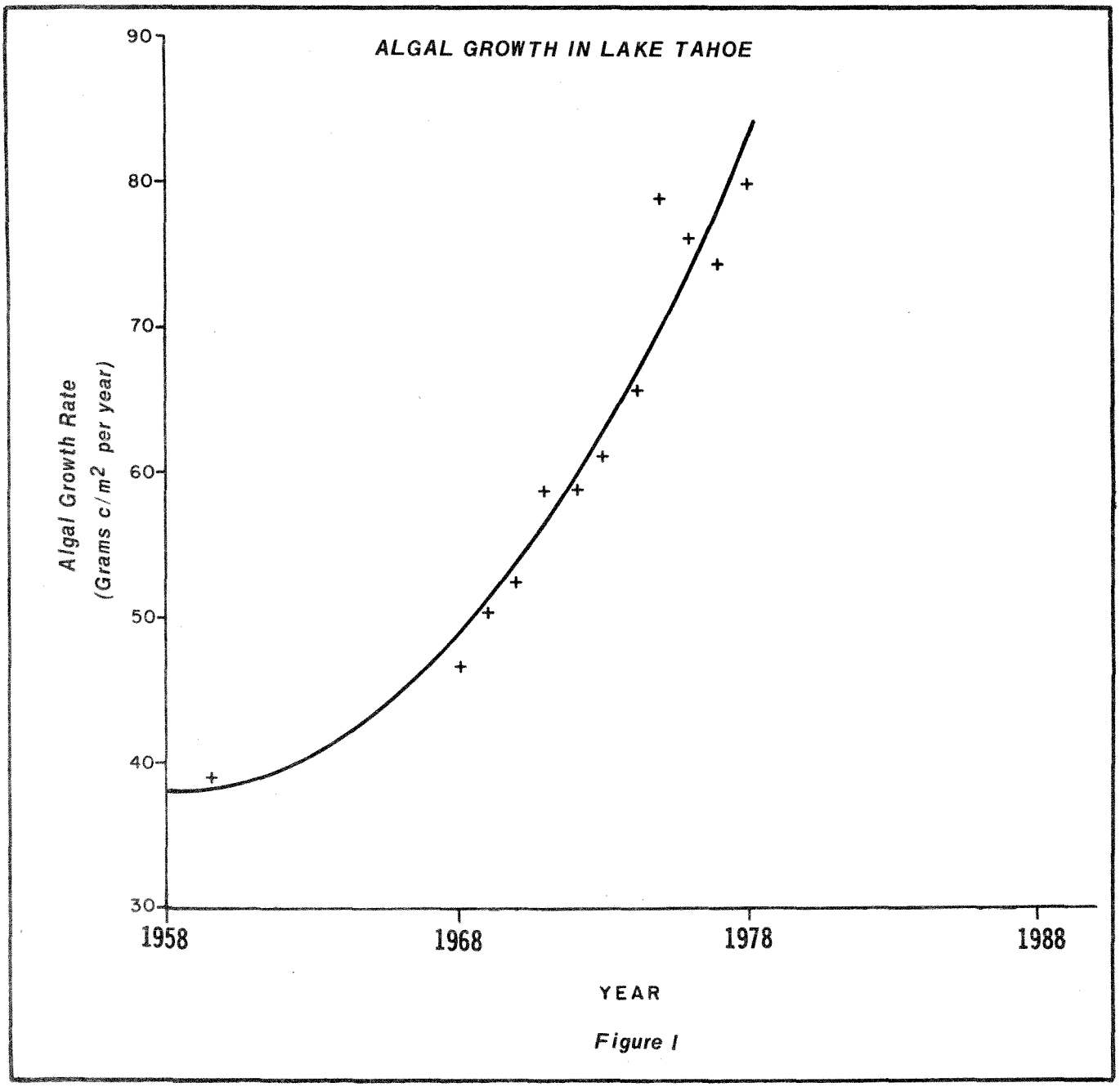

Figure I

In nearshore areas, observers note an increase in algae attached to rocks and piers. The amount of attached algae is many times greater in water near developed areas. During the spring rain and snowmelt, water coming into the Lake from streams creates muddy plumes.

Studies by the Tahoe Regional Planning Agency and the Lahontan Regional Water Quality Control Board show that streams draining developed watersheds carry far higher levels of sediment and nutrients than streams from undisturbed watersheds. Silt can smother organisms which provide food for fish and can destroy spawning habitats. Algal growth potential in streams in disturbed watersheds is much higher than in undisturbed watersheds.

D. Seriousness Of The Algae Problem

Documented changes in Lake Tahoe's water quality do not reflect the full impact of erosion from existing development. Once land is disturbed, erosion continues and nutrients accumulate in the Lake year after year. Nutrients remain in the Lake for decades or even centuries. Because of its size and low outflow, water going into Lake Tahoe stays there for an average of 650 years. Nutrients do not stay as long because some settle to the bottom, but concentrations build up over many years.

Scientists cannot say when Lake Tahoe could turn green, but at present erosion levels, nutrients will continue to increase and the rate of algal growth will continue to rise. Water quality will continue to decline. Only a major reduction in erosion will stop the decline and prevent further degradation of the Lake.

III. THE EROSION CONTROL PROGRAM

Five alternative control programs are discussed in the water quality plan, representing different degrees of protection from erosion. The most restrictive alternative would stop all development at Lake Tahoe, build all proposed erosion control projects and reduce sediment reaching the Lake to about 35,900 metric tons a year. The least restrictive alternative proposes no action by the State Board and would eventually increase sediment reaching Lake Tahoe to about 81,800 metric tons a year. Changes in the amount of sediment reflect comparable changes in the amount of nutrients reaching the Lake.

Table I shows the major differences between the five alternatives:

TABLE I

SUMMARY of ALTERNATIVES

ALTERNATIVES	REMEDIAL MEASURES	COST of EROSION CONTROL PROJECTS (Basinwide)	DEVELOPMENT CONTROLS	AMOUNT of SEDIMENT REACHING the LAKE (Basinwide)	Estimated Number of Lots That Could Be Developed in California	EFFECT on WATER QUALITY
A. NO GROWTH	All erosion and runoff control projects built. Improved management of surface runoff required.	$95 Million	No Development Allowed	35,900 metric tons	0	Slight Improvement
B. STRICT ADHERENCE TO LAND CAPABILITY	Same as A	$95 Million	No Development: –on high erosion hazard lands –in stream environment zones –in excess of land capability (strict interpretation) –unless remedial projects are built	36,300 metric tons	100	Slight Improvement
C. PROPOSED ALTERNATIVE LESS RESTRICTIVE ADHERENCE TO LAND CAPABILITY	Same as A	$95 Million	No Development: –on high erosion hazard lands –in stream environment zones –in excess of land capability (less restrictive interpretation) –unless remedial projects are built	37,700 metric tons	4,000	Status Quo Maintained
D. CONTROL WORST PROBLEMS	Only highest priority projects built Improved Management of surface runoff required	$24 Million	No new subdivisions, No development on High Erosion Hazard Lands and in Stream Environment Zones.	49,300 metric tons	12,000	Continued Decline
E. NO GROWTH	None	0	None	81,800 metric tons	16,000	Accelerated decline

The following discussion describes the alternative proposed by the Board in this draft water quality plan.

A. Correcting Existing Problems:

$95 Million In Erosion Control Projects

More than 300 remedial projects will stabilize slopes, revegetate bare areas, and direct runoff around unstable areas.

For example: A subdivision on the west side of the Lake is built on steep terrain. The slopes along the roads need to be stabilized. Foundation walls should be built at the bottom of the slope. Shrubs and grasses should be planted on the remainder. Projects proposed by the Board can reduce sediment from the development by 80%.

Another example: Erosion from an abandoned gravel quarry near the South Tahoe Airport. Regrading steep slopes to a gentler angle, constructing foundation walls and revegetating will slow erosion. Barriers should stop unauthorized off-road vehicles from increasing the disturbance. This project will reduce sediment from the quarry by 85%.

The draft plan sets a schedule for constructing remedial projects over a twenty-year period. The projects are almost entirely on public property. They will result in a 23% reduction in sediment reaching Lake Tahoe from existing sources.

The plan submitted by TRPA and rejected by the State Board recognized the erosion problem. It did not, however, commit funds to build needed projects. The final plan submitted by TRPA deleted the draft plan's schedule for correcting existing erosion problems.

B. Better Management Of Surface Runoff

Runoff from streets, parking lots, snow disposal areas, golf courses, ski resorts, and other existing sites adds pollution to Lake Tahoe. These discharges can be reduced or eliminated by better management techniques.

For example: Fertilizer applied to golf courses in the Basin contributes nutrients to the Lake. Careful and more limited application will lessen the problem.

Another example: Parking lots and roads all around the Lake contribute oil, grease, sediment and nutrients to the Lake. Improved maintenance, including street sweeping and diverting runoff to treatment facilities or percolation trenches will greatly reduce the amount of pollutants reaching the Lake.

Controls are also needed on forest land. These include stopping erosion from dirt roads, strict controls on timber harvesting, and prohibiting ski area expansion which disturbs high erosion hazard lands.

C. Controls On Development To Prevent Erosion

In addition to requiring correction of existing erosion and runoff problems, the alternative proposed by the Board will limit new development.

1. Development of new subdivisions will be prohibited. Even before the first house is built, about 20% of a subdivision is disturbed by road construction and utility installation. Houses disturb an additional 10–15% of the land. Even development on the most stable lands using advanced controls at least doubles erosion over natural levels. A typical subdivision on low hazard lands increases erosion twenty times. On moderate hazard lands, erosion rates can increase up to a hundred times.

   (The California Tahoe Regional Planning Agency (CTRPA) has enforced a moratorium against development of new subdivisions since 1975.)

2. In existing subdivisions, additional development will be prohibited if it is:

   - On high erosion hazard lands. Development on these lands increases sediment by up to 1,000 times natural levels. (TRPA's draft water quality plan recognized the hazard, but would only have restricted development of new subdivisions on these lands. TRPA's final plan deleted even that restriction.)
   - In stream environment zones. Streambeds, marshes, and meadows act as natural filters, removing sediment and nutrients from runoff. (TRPA's draft plan recognized the problem and proposed a prohibition on new subdivisions in these areas. The final TRPA plan did not include this limited prohibition.)
   - Where development will cover too much land. The United States Forest Service and TRPA developed a "land capability system" which indicates what percent of an area can be disturbed or covered without major increases in erosion. The Board's alternative prohibits development in excess of the land's tolerance. (TRPA and CTRPA use this system, but their ordinances allow broad exceptions.)

3. The prohibitions against new subdivisions and construction on lands described above will hold erosion from new development to very low levels. But new development still causes some erosion, and a net reduction in sediment and nutrients is needed to maintain Lake Tahoe's water quality.

   Development of lots which are not in new subdivisions or in the three categories will be allowed only where the increased pollution is offset by remedial erosion control projects.

As more of the remedial projects are built, more development will be allowed. If the cities and counties fail to build the needed projects, the lot owner will be allowed to develop if he pays a share of the project costs in the jurisdiction where his lot is located.

Without these prohibitions another 19,200 metric tons of sediment will reach the Lake each year. As shown in Figure III, the erosion control projects, runoff management, and development restrictions will reduce sediment reaching Lake Tahoe to about 37,700 metric tons, 60% of existing levels.

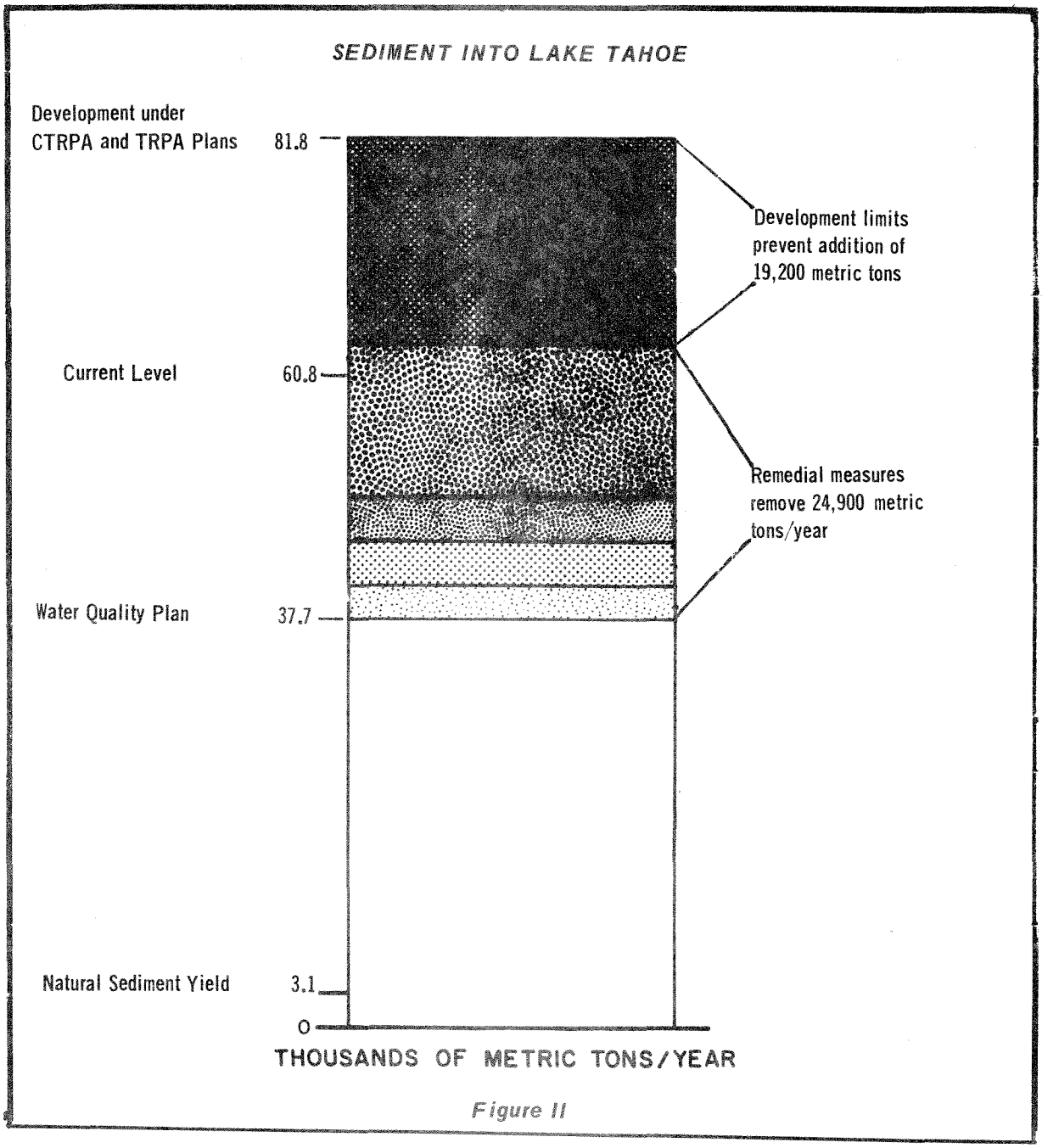

Figure II

D. Program Cost And Funding, Impacts On Jobs

1. Cost

a. EROSION CONTROL PROJECTS

Remedial erosion control projects will cost about $95 million (1979 dollars). Projects on the California side of the Lake account for about two-thirds of the projects and cost. 85% of the projects are the legal responsibility of local jurisdictions. Better management of surface runoff will also impose costs, principally on commercial property owners.

b. DEVELOPMENT CONTROLS

Controls proposed by the Board will prevent development of about 12,000 of the estimated 16,000 presently subdivided residential and commercial lots on the California side of the Lake. The impact in Nevada would be similar although there are fewer vacant lots. Obviously, lots which cannot be developed will decline in value. The best solution for the property owners is land purchase.

Purchase of the 12,000 lots could cost over $200,000,000.

Development prohibitions will reduce the value of some of the land, lowering property tax revenues for local government. This loss may be offset in whole or in part by increases in the value of developed lots. In addition, local government will avoid increased service costs which would come with further development.

2. Funding Sources

The State Board will commit $10 million in State Clean Water Bond funds for erosion control projects at Lake Tahoe. This money and other funds committed by the California Department of Transportation and the cities and counties in the Lake Tahoe Basin can be used as the State share to match a federal grant under the U.S. Environmental Protection Agency's Clean Lakes Program. The federal grant can be used to purchase property which cannot be developed because of this plan. The State Board expects to raise at least $5 million for property acquisition in this manner. More money is needed for erosion control and for property purchase. Other sources of funds are discussed below.

a. EROSION CONTROL PROJECTS

- Federal grants. Three other existing federal programs could provide grants for erosion control projects on public property. They are the Environmental Protection Agency's Research and Development Grants, the Soil Conservation Services's Resource Conservation and Development Program and Small Watershed Program. Federal appropriations could also be provided for erosion control at Lake Tahoe.

- Other State funds, including gas tax revenues and special appropriations could be provided by the California Legislature.
- Local funds. Limitations on local government budgets are serious. When TRPA adopted its plan in 1978, the cities and counties expressed a willingness to spend between $50,000 and $200,000 each annually on erosion control. However, this was before Proposition 13 passed. Despite budget limitations, cities and counties should give erosion control projects high priority. In many cases there will be long term benefits, such as a reduction in road maintenance costs. In others the threat of enforcement action should motivate compliance. The State Board is asking each jurisdiction to indicate funding capability as part of their comments on this draft plan.
- Other new programs. Visitor fees, including road use and parking fees (Basin use fee), an increase in hotel and motel taxes and recreation fees could raise up to $20 million annually.

Table II presents the Board's estimate of how a large portion of the money needed for erosion control projects in California could be raised with full cooperation of state and local agencies. Additional funds could be raised through legislation.

TABLE II

POSSIBLE USE of STATE and LOCAL COMMITMENTS to MATCH FEDERAL GRANTS

COMMITMENTS

State Water Resources Control Board	$10 million (bond funds)
California Department of Transportation	7.8 million
Cities and Counties	5–10 million
TOTAL	$22.8–27.8 million

USE OF COMMITMENTS TO MATCH GRANTS

GRANTS		COMMITMENTS	TOTAL
$7.5 million in 75% grants (research and development, Resource Conservation and Development, and Small Watershed grants)	+	$2.5 million (state and local share)	= $10 million
$20.3–25.3 million in 50% grants (Clean Lakes grants)	+	$20.3–25.3 million (state and local share)	= $40.6–50.6 million
TOTAL $27.8–32.8 million in federal grants	+	$22.8–27.8 million (state and local share)	= $50.6–60.6 million

Cost of erosion and runoff control projects in California in priority groups 1–11, including design and administration is $52.5 million.

Total cost of all projects is $62.7 million (1979 dollars).

At least $5 million of the funds received as Clean Lakes grants will be used to purchase land or development rights to lots where construction would cause water quality problems.

b. PROPERTY ACQUISITION

A Lake Tahoe National Scenic Area or similar program to acquire land in the Basin is needed to provide equity for the owners of lots which cannot be developed.

All possible sources of funds for property acquisition should be pursued. These include:

- Federal funds raised through sale of Bureau of Land Management lands outside the Tahoe Basin.
- The California Tahoe Conservancy Agency was established by the California Legislature in 1973 to acquire property in the Basin. To date, the Legislature has not provided funds. Funds should be provided. Funds obtained from a federal Clean Lakes Grant could be directed to this agency for property purchase.
- Federal appropriations such as the recent $12.5 million appropriation to purchase a casino site in Nevada.
- State bond funds such as the $25 million proposed in the Renewable Resources Bond Act, SB 567, by Senator Nejedly, now before the California Assembly.
- Road use or parking fees (basin user fee).
- The U.S. Forest Service land acquisition plan calls for purchase of an additional 33,000 acres in the Tahoe Basin. The Forest Service does not ordinarily buy individual lots which are not suitable for public recreation. This policy should be changed to help protect the Lake.
- The League to Save Lake Tahoe and other private non-profit agencies are considering efforts to acquire property in the Basin. The City of South Lake Tahoe has a modest land purchase program. Such efforts should be encouraged.

If no adequate State or federal proposal for land purchase is near enactment by the time this plan is adopted, the State Board will seek legislation itself.

This plan, however, will not be delayed while legislative efforts solve economic problems.

As required by state and federal law, the proposed regulatory program prohibits degradation of the Lake. The Board actively supports efforts to purchase land, but cannot allow deterioration of the Lake by delaying needed regulation.

3. Construction Jobs

About 200 jobs will be created each year building erosion control projects. However, they will not make up for the loss in housing and commercial construction jobs. A net loss of about 100 jobs a year below current levels is expected under the proposed plan.

IV. IMPLEMENTATION

A. Local Implementation

Erosion control projects and controls on development can best be carried out by cities and counties in the Tahoe Basin, by the Tahoe Regional Planning Agency and the California Tahoe Regional Planning Agency. During the four-month public review period, if these agencies agree to build the projects or implement controls, they can be delegated responsibility for portions of the plan. If no commitments are made, the State Board will implement the plan. Table III shows the agencies with primary responsibility and authority to solve water quality problems in the Basin.

TABLE III

SUMMARY OF LAKE TAHOE BASIN 208 PLAN

WATER QUALITY PROBLEM	SOLUTION	RESPONSIBILITY	PRIMARY AUTHORITY to ENFORCE CONTROLS	BACKUP AUTHORITY (If no commitment from agency with responsibility or primary authority)
EROSION and URBAN RUNOFF • bare areas • unstable roadway slopes • dirt roads • eroding roadside ditches and shoulders • concentrated runoff	EROSION and DRAINAGE PROJECTS • revegetate bare areas • stabilize and revegetate slopes • provide protective cover on dirt roads • build roadside drains • storm sewers	CITIES and COUNTIES (with assistance from state and federal grants, including $10 million in state bond funds) STATE TRANSPORTATION DEPARTMENTS (highways) FOREST SERVICE (National Forest Lands) PRIVATE LANDOWNERS	CITIES and COUNTIES REGIONAL PLANNING AGENCIES • Tahoe Regional Planning Agency • California Tahoe Regional Planning Agency FOREST SERVICE (Special Use Permits)	WATER QUALITY AGENCIES • State Water Resources Control Board • Lahontan Regional Water Quality Control Board • Nevada Division of Environmental Protection
ON-SITE RUNOFF PROBLEMS • areas of intensive vehicular use • unsurfaced private roads and driveways • snow disposal facilities • construction sites • golf courses	ON-SITE RUNOFF CONTROLS • drainage facilities • protective cover • best management practices	LANDOWNER	CITIES and COUNTIES REGIONAL PLANNING AGENCIES FOREST SERVICE (Special Use Permits)	WATER QUALITY AGENCIES
ADDITIONAL DEVELOPMENT CREATING EROSION and RUNOFF PROBLEMS	DEVELOPMENT RESTRICTIONS • no new subdivisions • construction prohibited – on high erosion hazard land – in stream environment zones – in excess of land capability • best management practices required for permitted construction	LANDOWNER	CITIES and COUNTIES REGIONAL PLANNING AGENCIES	WATER QUALITY AGENCIES
EROSION on FOREST LANDS • dirt roads • off-road vehicle use • campgrounds • ski resorts • tree removal • livestock grazing and confinement	FOREST PRACTICES • close and revegetate unneeded dirt roads • restrict off-road vehicles to designated areas and trails • best management practices for campgrounds, ski areas, tree removal and livestock grazing and confinement • restrictions on campground and ski area expansion	PRIVATE LANDOWNERS FOREST SERVICE (National Forest Lands)	CITIES and COUNTIES REGIONAL PLANNING AGENCIES FOREST SERVICE (Special Use Permits)	WATER QUALITY AGENCIES

B. State Implementation

The State Board strongly prefers that local agencies enforce needed restrictions and build erosion control projects. However, the State Board will enforce the needed controls through water quality programs if necessary. This plan, when it is adopted by the State Board, is binding on both the State Board and the Lahontan Regional Water Quality Control Board.

The State and Regional Boards can enforce the plan's prohibitions against development through administrative orders or in court. In addition, control measures can be required through waste discharge permits.

- The permits of sanitation agencies in the Tahoe Basin can be amended to prohibit the agencies from allowing new development to hook-up if it is prohibited by the plan.
- Permits can be issued to owners of lots in, for example, stream environment zones, which prohibit discharge of sediment and nutrients from the lot. If the owner proposes to develop the lot, the State or Regional Board can sue to prevent construction.
- Permits can be issued to property owners requiring correction of existing problems, such as runoff from parking lots, roads, and ski slopes.
- Permits can require that the construction allowed by the plan use adequate erosion control measures.

The Regional Board can issue discharge permits to the State or local agency owning eroding property. The permit can require that each agency submit plans for reducing the discharge from each erosion problem. As previously discussed, the State Board will provide $10 million for erosion control projects.

Violation of prohibitions or discharge permits carries liability of up to $10,000 a day.

Finally, if cleanup is not undertaken, or erosion control projects not built, the Regional Board can have the work done and sue the responsible party to recover costs.

CONCLUSION

Two factors compel the State Board to develop a strong Tahoe protection program. One is that the law requires such a program. The second is that delay will cause irreversible damage to Lake Tahoe.

Given the task of full protection, the draft Water Quality Plan focuses on three principles.

- Current erosion problems must be corrected.
- Development on unsuitable sites must be curtailed.
- Federal and state water quality laws provide the mechanism for requiring erosion control projects and restricting development.

These principles are necessary for a successful Lake Tahoe pollution control effort. To provide equity for lot owners who cannot build, federal and state lawmakers must provide funds to purchase property or development rights. That would make this plan fair as well as effective, accepted as well as necessary and a complete solution for water quality at Lake Tahoe.