

KENNEBEC WATER DISTRICT CHINA LAKE WATERSHED

EXECUTIVE SUMMARY

The Kennebec Water District (KWD) serves approximately 40,000 people in the towns of Waterville, Winslow, Fairfield, Vassalboro, Benton and Oakland from its China Lake supply. The 16,975-acre watershed of China Lake is located in the towns of China (primarily), Vassalboro and Albion, Maine. Narrow projections of land divide the lake into two sections known as the East and West Basins. Approximately 25 tributaries flow into the lake, however, only one outlet stream is present in the northwest corner of the lake. The lake is relatively large and the basins are moderately deep.

KWD owns most of the shoreland located in the West Basin. The East Basin shoreland and upland areas located throughout the lake watershed are held in private ownership. Land use controls that provide protection for water quality consist of 250-foot Shoreland Zoning and a Phosphorus Control Ordinance. A Watershed Management Plan has also been adopted to implement Best Management Practices and other strategies that will prevent further degradation of lake quality.

Approximately 69 percent of the watershed is forested. Wetlands, urban grasses, pastures and croplands cover about 28 percent of the watershed. The East Basin watershed and shoreland are significantly more developed than the West Basin. Historically, agricultural, forestry, residential and recreational land uses contributed to significant nutrient enrichment of the lake with phosphorus loading being the primary pollutant of concern.

The KWD water supply intake is located in the West Basin near the lake outlet. Recent analytical testing shows the source meets applicable state and federal drinking water standards.

China Lake is eutrophic with algae blooms occurring routinely in the summer and fall months. The Maine DEP has developed a TMDL for allowable phosphorus loading into the lake. Available information indicates that current external loading of phosphorus is below the assimilative capacity of the lake, however, lake sediments provide an additional source for algae growth. Under these existing conditions, the lake is more sensitive to runoff from existing land uses and more susceptible to future growth.

The susceptibility of China Lake to land uses is ranked moderate to high. The lake's natural capacity to buffer runoff has been diminished. Water quality has deteriorated to a state where additional phosphorus loading would be highly detrimental to the health and environment of the lake. Stakeholders have undertaken significant steps to develop policies and programs that will prevent further degradation and help guide the lake toward recovery. Some improvement in lake quality may have already started to occur, therefore, these efforts need to continue and be strengthened in order to protect the lake from future growth impacts.

SWAP RANKING AND RECOMMENDATIONS

The SWAP assessment factors indicate that overall susceptibility of the water quality in China Lake is high. The lake sediments retain a significant mass of phosphorus loading that will continue to support eutrophic conditions for many years. Thus, it is important to minimize or eliminate external sources of phosphorus loading in order to allow the lake to recover. Specific factors considered in assessing the overall risk are summarized below.

CHINA LAKE SURFACE WATER ASSESSMENT

Zone	Measure	Findings	Risk Level
Watershed	Ambient Water Quality Existing Conditions & Future Development	Class GPA, partially supporting uses. Historical land use has caused the lake to be highly sensitive to human activity. Roadways serve as major collectors of residential and agricultural runoff. Land use activities are a continued threat to water quality if phosphorus and other nutrients reach the lake. CRLA, CLA, KWD are working to mitigate conditions through the Watershed Management Plan, Phosphorus Control Ordinance and use of BMPs. Future development is likely to occur as the region continues to grow.	Moderate Moderate-High
	Overall		Moderate-High
Shoreland	Lake Classification	Eutrophic – algae blooms common. Potential for erosion along the lake shoreline and on steep slopes with gravel roads or disturbance from residential construction.	High Moderate-High
	Soils		
	Activities Posing a Threat	East Basin - shorefront development is dense with septic disposal systems, cultivated yards and road runoff. West Basin – KWD ownership protection of shoreland.	Moderate-High Low
	Potential for Future Threats	Future development of remaining open shorefront. East Basin – Shoreland Zoning, local ordinance controls, BMPs, etc. may mitigate development threats and help to improve conditions cause by historical land use.	Moderate
	Overall		Moderate-High
Intake	Raw Water Quality	Meets applicable drinking water standards; nuisance algae requires treatment.	Low-Moderate
	Ownership/Control	Ownership protection for intake area and shoreland provided by KWD.	Low
	Activities Posing a Threat	Intake area marked with buoys although access is provided in the near vicinity	Low-Moderate

	Potential for Future Threats	from a public boat landing. Accidental or unauthorized activity with access to intake area generally unrestricted.	Low-Moderate
	Overall		Low-Moderate
Overall			Moderate-High

Recommendations

The overall ranking for the lake susceptibility to threats of contamination is moderate to high. The CRLA, CLA, KWD and local communities have developed and implemented programs to prevent further degradation of China Lake and to strive toward restoring the lake to a condition of improved water quality. The key efforts to continue in this regard include:

- Implement strategies set forth in the 1999 Watershed Management Plan which include: the use of BMPs, Youth Conservation Corps projects, sustaining financial support, conducting watershed surveys for sources of contamination, increased public education and awareness, and comprehensive water quality monitoring.
- The Phosphorus Control Ordinance is undergoing review to incorporate new provisions that will strengthen land use controls. It is important for the stakeholders of China Lake water quality to take an active role in the review process, to develop better controls and to gain public support through education and active participation.

Additional steps to be considered are as follows:

- Develop and implement a water quality program to assess the mass loading of phosphorus and other nutrients from tributaries that drain into the lake. Based on knowing the relative contribution of nutrient enrichment caused by each subwatershed, land use controls can be focused more on the areas that need improvement.
- Work with shoreland owners, particularly in the East Basin, to implement a strategy that will consolidate small shorefront lots into larger singular lots and thereby reduce the overall density of development along the shore of the lake and reduce mass loading from subsurface septic system discharges. Additional objectives to pursue with shoreland owners include reducing landscaped areas and increasing buffers of natural vegetation, increasing setback distances for lawns and gardens, and redirecting or minimizing runoff into the lake from gravel roads and pavement.
- Establish a long-range plan to protect land in the watershed through land purchases, conservation easements, etc., and by establishing protective agreements with local landowners. In particular, the plan should target shoreland owners in the East Basin in order to mitigate high use impact areas that have already become established and to protect any natural buffers and undisturbed properties remaining in the shoreland.

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