**Equations:** There are a variety of different physical processes that are considered by this model; including shortwave and longwave radiation, flux of latent and sensible heat, as well as evaporation determined by the mass transfer technique of Harbeck [1962].

Equation 1: The governing equation of the model incorporates all parameters that go into calculating evaporation, including: – temperature(); – time(day) ; - lake area at depth (); – depth(); – molecular diffusion of water() ; eddy diffusivity of water(); – volumetric heat capacity of water(); – a heat source term.

Equation 2: the heat source term (Dake & Harleman 1969) is a measure of subsurface heating in a lake based on the absorption of penetrating solar radiation, based on Beer’s law. Parameters involved in this equation include: ￼ - percent of shortwave radiation absorbed in surface layer; - net shortwave radiation at the water surface; – light extinction coefficient for water; - depth

1) (1)

2)

Equation 3: The upper boundary (surface) boundary condition is set and defined by a heat energy balance at the lake’s surface (3) (Hostetler & Bartlein 1990). The net long-wave radiation from the atmosphere is , long-wave radiation emitted from the lake is ,the flux of latent heat is , and the flux of sensible heat is with variables in units of . The upper boundary condition considers all energy absorbed in and radiated from the lake’s surface.

3)

Equation 4: The lower boundary condition sets the boundary for an insulated lake bottom. The equation considers the molecular diffusion of water plus eddy diffusivity multiplied by the change in temperature (T) with respect to lake depth (m) .

4)