Abstract

Brook trout are often stocked in small Shield lakes and ponds that are frequently modified by beaver activities. Construction of beaver dams play a major role in the creation (heaven) or destruction (hell) of trout habitat by altering temperature or dissolved oxygen values during critical periods, thus limiting brook trout growth and survival. In one dystrophic 4 ha shield lake water levels fluctuated 1.5 m over a ten year period (1992-2002), which included the life cycle of a beaver dam. High water inundation resulted in a 31% increase in lake surface area and a maximum depth of 4 m. Under higher water levels, flooded wetlands provided an increase in food supply, however end of winter dissolved oxygen demands in recently inundated wetlands were near anoxic (<0.2mg/l) conditions, creating toxic environments for trout. High water levels in summer permitted stratification, that provided relief from elevated surface water temperatures (> 25oC). Conversely low water levels resulted in lower dissolved oxygen concentrations at the end of winter (~ 3 mg/l) permitting trout to survive. Low water levels in summer however, resulted in minimal refuge habitat, as temperature regimes were considered lethal to survival. In these small lakes and ponds lake level management protocols that provide for high water levels during elevated summer temperatures and low levels during winter dissolved oxygen depressions, would improve survival of brook trout. Such protocols are frequently the natural outcome of resident beavers, a well maintained dam and normal precipitation patterns. Significant changes in any of these three factors would be detrimental to brook trout environs.

Brook Trout Heaven and Hell: Life in a Small Shield Lake Impacted by Beaver Dam Activity

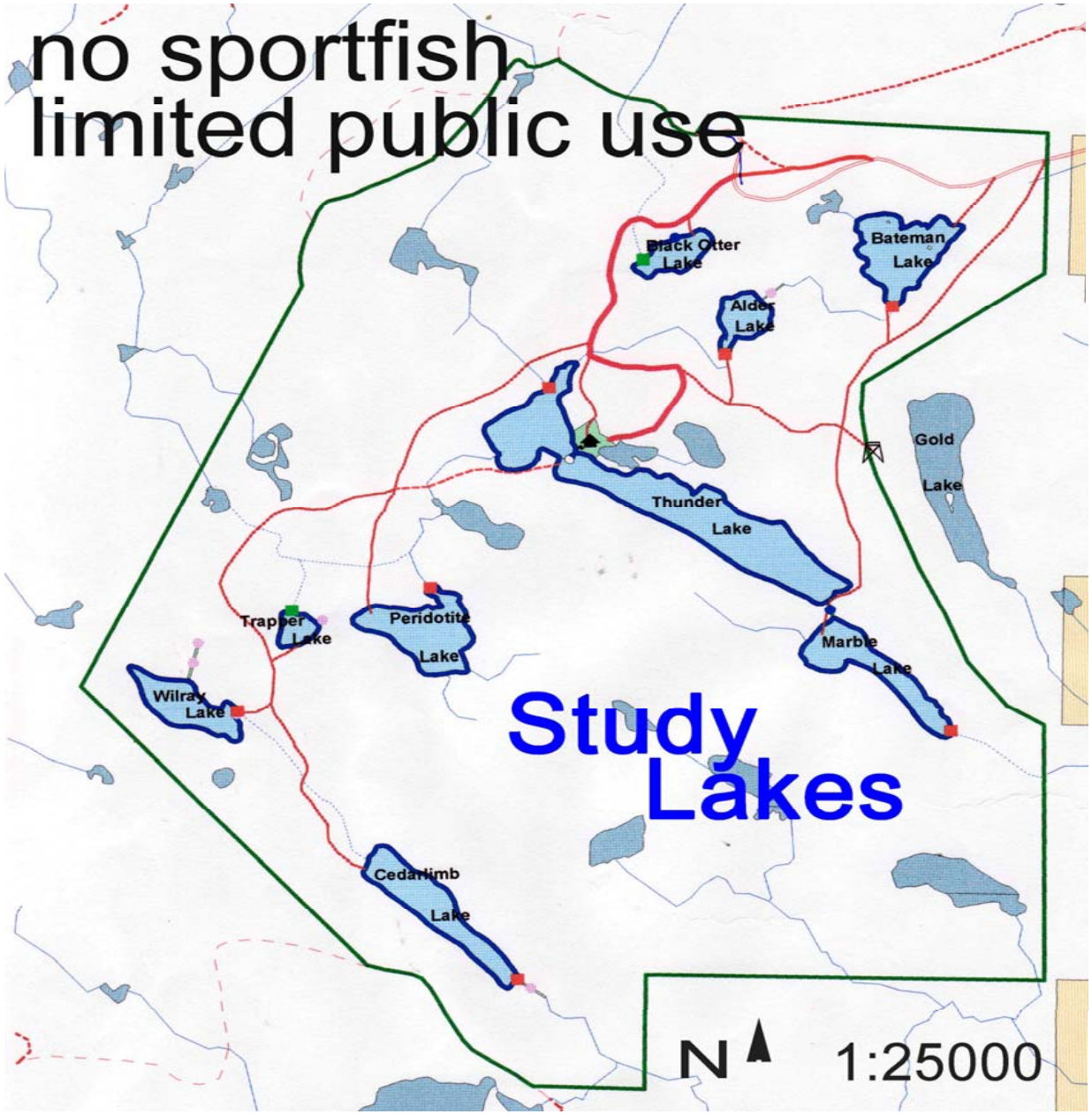
AFS 138th Annual Meeting

Ottawa, Ontario, Canada, August 19, 2008

John W. Parks **Derek J. Parks** **Wayne G. Groom**

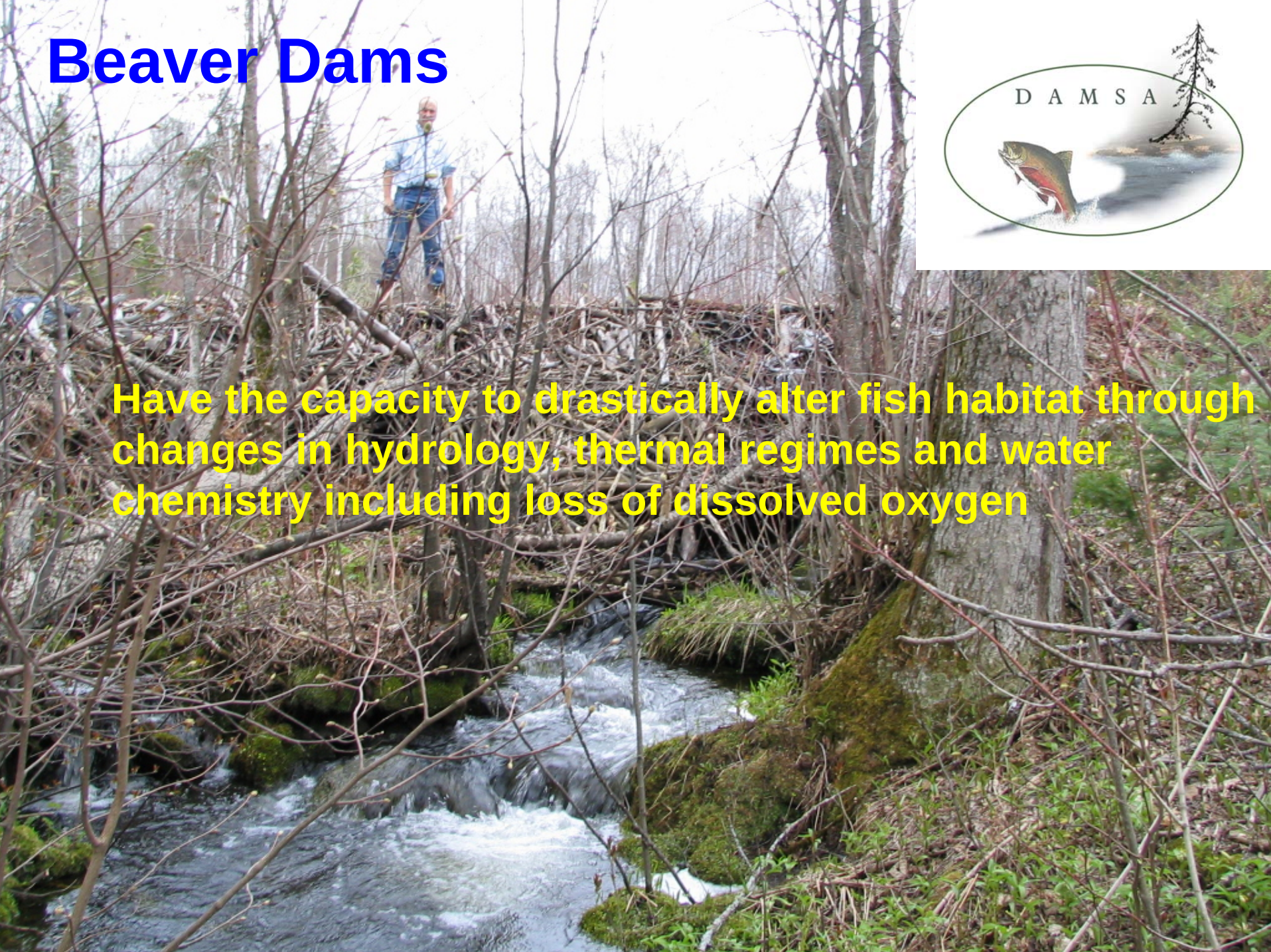
Damsa Project (1989-2003)

- - create new trophy brook trout fisheries for tourism purposes in waters devoid of sport fish
- - development/testing of sterile, monosex Lake Nipigon stock
- - improve waters where necessary for trophy development
- - fisheries/development near Thunder Bay, Ontario
- - project outline, results - www.damsa.ca

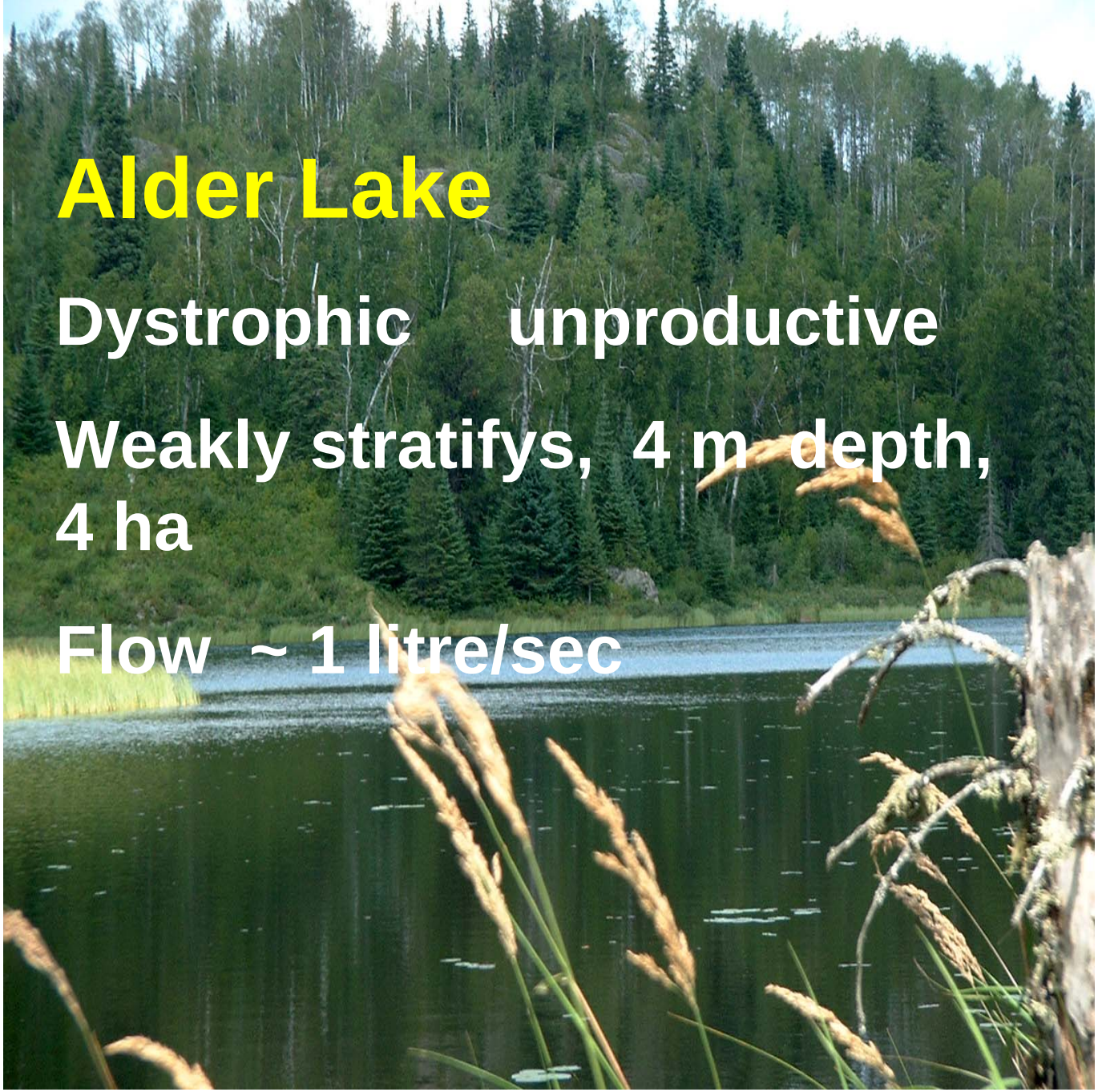


Beaver dams present in all waters in study area

Beaver Dams



Have the capacity to drastically alter fish habitat through changes in hydrology, thermal regimes and water chemistry including loss of dissolved oxygen



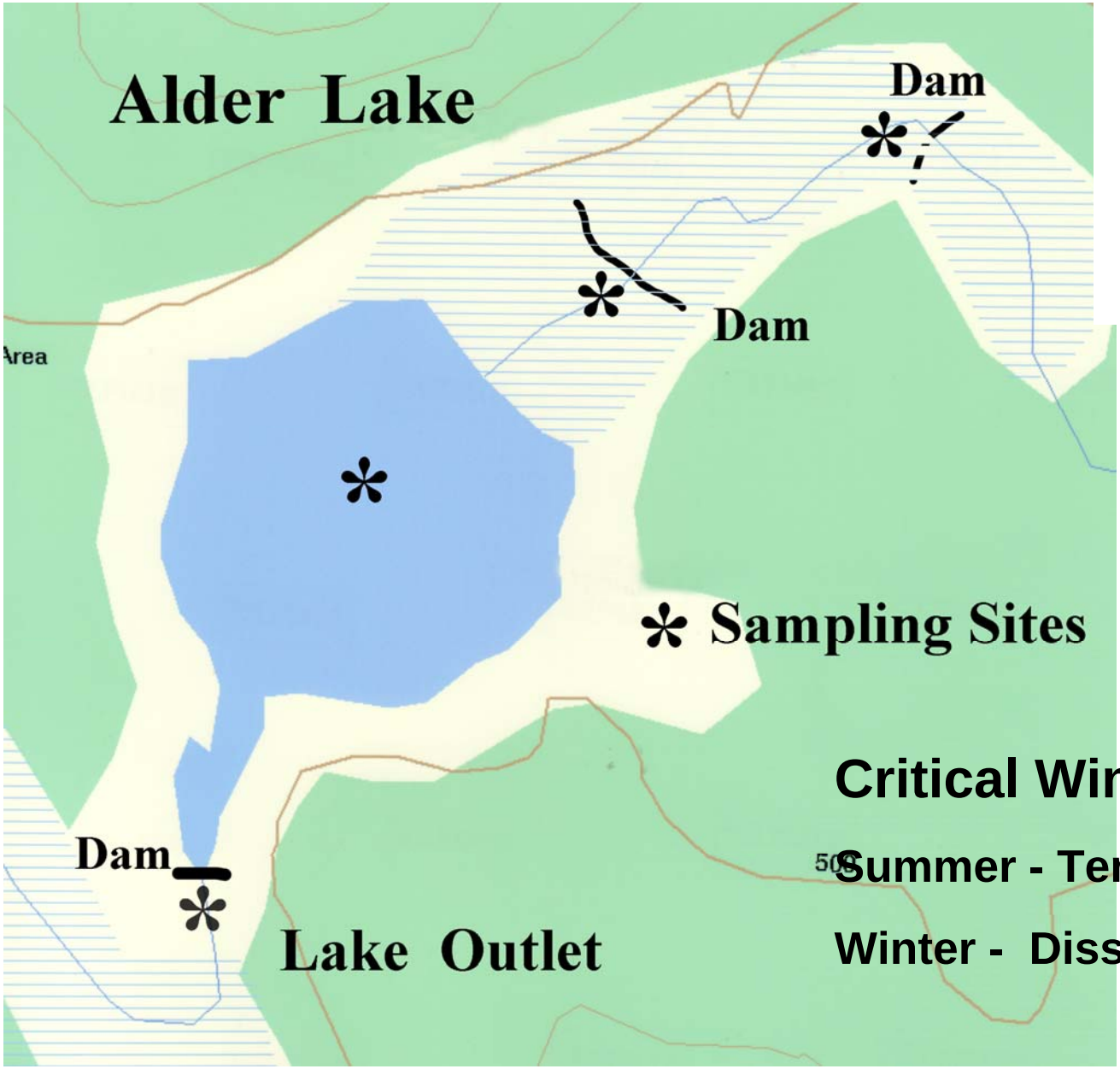
Alder Lake

Dystrophic unproductive

Weakly stratifys, 4 m depth, 4 ha

Flow ~ 1 litre/sec

Dam Outflow



Sampling Strategy

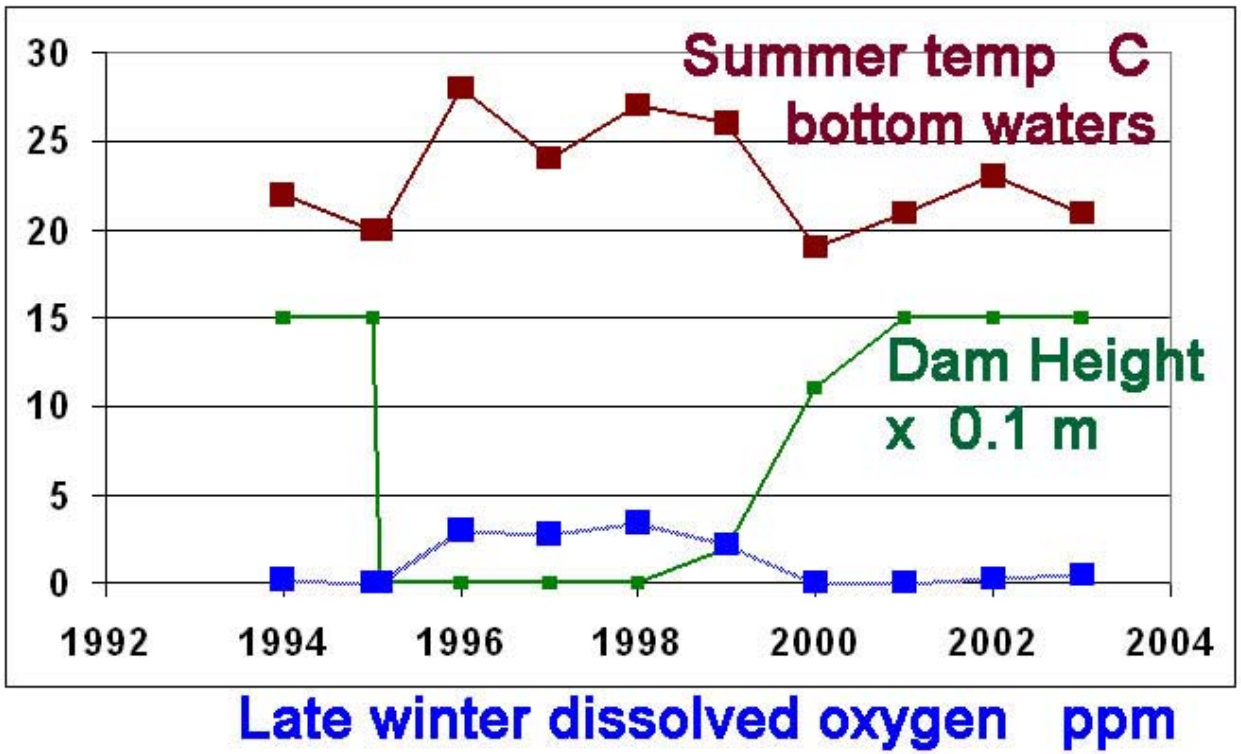
Critical Windows

Summer - Temp Bottom waters

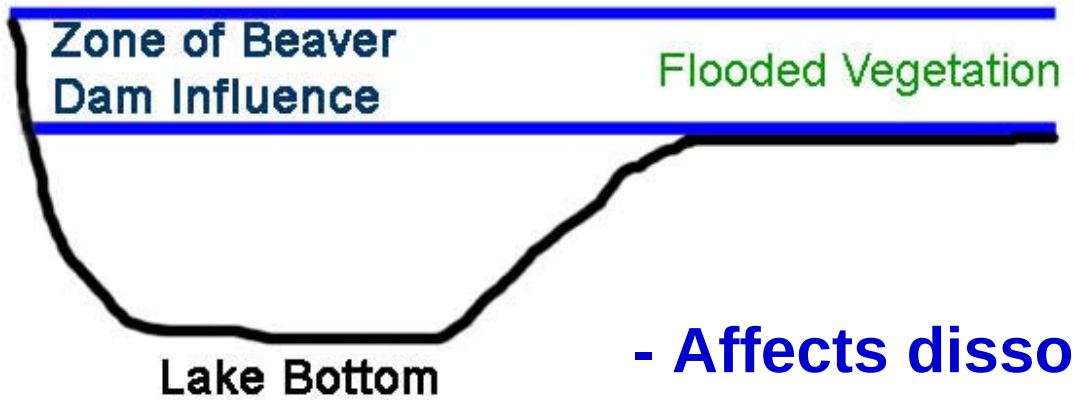
Winter - Dissolved Oxygen

Results/Observations

Alder Lake



Zone of Influence



- Affects dissolved oxygen depletion in winter

- Affects summer stratification in shallow lakes

Another winterkill water

Lowering Zone of Influence

Nice Little Fishery Started

More brook trout fisheries may be possible with “appropriate” beaver dam/water level management

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Questions or Comments
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