

Hasse Lake Fisheries Restoration

Dr Peter Aku

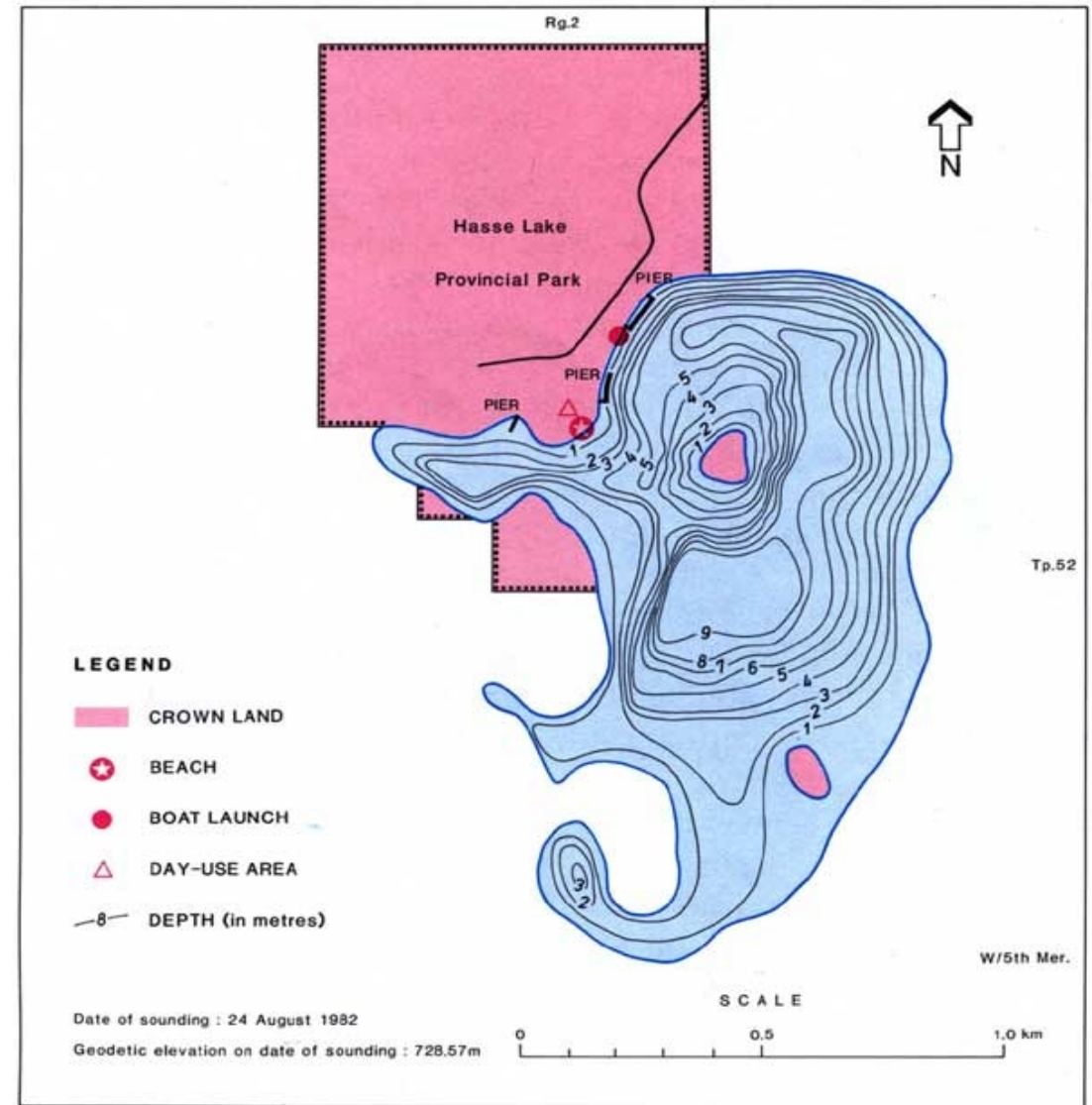


Alberta Conservation
Association

Conserving Alberta's Wild Side

Hasse Lake

- 90 Ha; 9 m deep
- Has pretty good volume of deeper water compared to nearby lakes → potential fish habitat
- Provincial Park; day-use
- Close to urban centers



Background

- Used to have a vibrant and popular recreational fishery
- High nutrient levels, frequent noxious algal blooms, poor oxygen conditions, led to recurring summer and winter fish kills
- No recreational fishery since 2012
- AHS frequently issued public advisory for *E. coli* contamination that discouraged recreational use



Goal

- In summer 2015, ACA initiated project to work with local community groups and landowners in watershed to reduce nutrient loading to the lake, improve water quality, and restore recreational fishery
- Key partners include: AFGA, Parkland County, the Parkland County Alternative Landuse Services Program (ALUS), North Saskatchewan Watershed Alliance, & Northern Lights



1. Riparian zone protection

- Over 70% of riparian zone (shoreline) protected through on-the-ground restorative activities and landowner agreements under the ALUS program; remainder protected by provincial park



2. Described fish community in the summer of 2015

- Fish community consists predominantly of fathead minnows and a few brook sticklebacks
- We found no large-bodied fish species in the lake



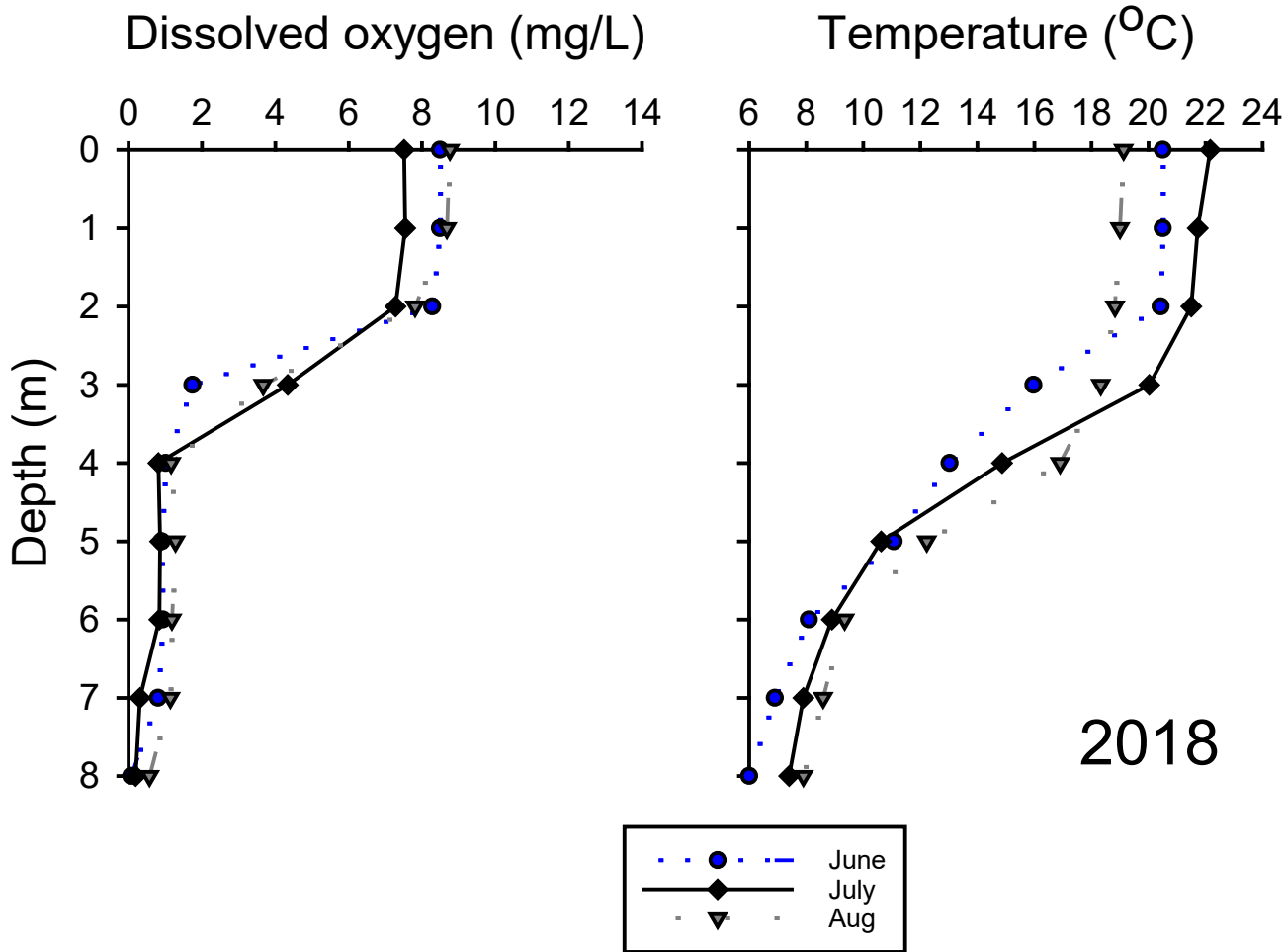
3. Fecal coliform advisory lifted

- Our work helped determine that the lake *E. coli* originates primarily from avian rather than human sources, posing little risk to humans
- As a result, AHS no longer issues *E. coli* advisory for the lake



4. Monitored winter and summer water quality conditions beginning 2015

- Nutrient levels were high and algal bloom were prevalent
- Summer → lake typically hypoxic below 3 m; surface temperature sub-optimal for trout
- Winter → lake anoxic under the ice by mid February



Summer, DO typically low below 3 m (<3 mg/L) & temperature sub-optimal for trout



Restoration techniques explored



Dr. Ken Ashley - BCIT

Restoration techniques explored

1. Hypolimnetic oxygenation – *Amisk Lake, AB*
 - a. Speece cone → approx. \$400K
 - b. Line diffuser
2. Hypolimnetic aeration – Full airlift
3. Alum treatment → approx. \$1 million
4. **Surface aeration**



Surface aeration infrastructure development

Item	Cost (\$)
Powerline extension	54,000
Electrical & storage shed	34,000
Aerators – 7 units	28,000
Other material	8,000
Power	6,000
	130,000

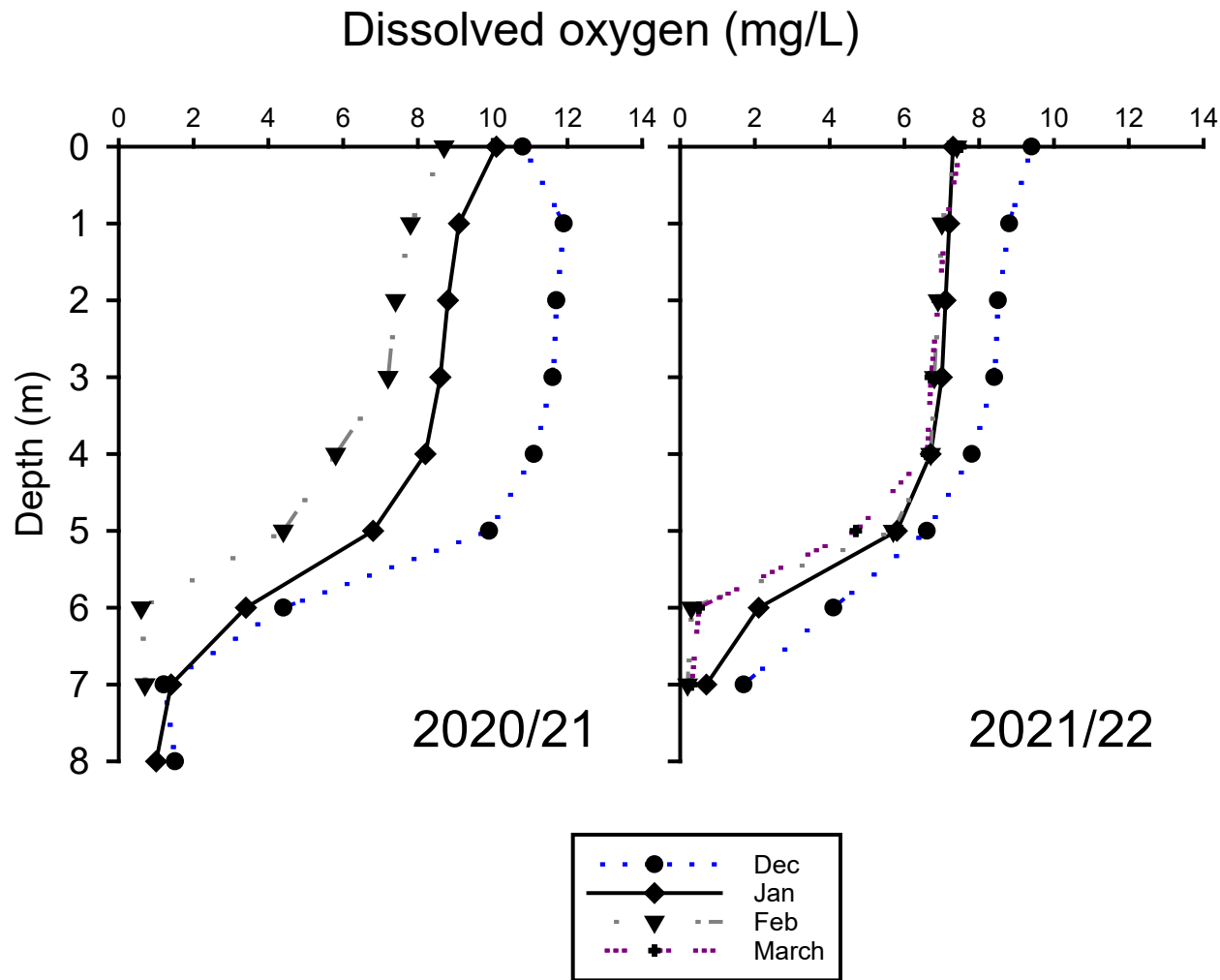
Northern Lights funded purchase of 5 aerators



Fish stocking and winter aeration

- Started aeration in fall 2020
- AEP conducted experimental stocking in May with 5,000 rainbows; fall stocking with 2,500 each of rainbow and tiger trout → 10,000 fish total
- 2021: 17,000 fish → 15,000 rainbows, 2,000 tigers
- 2022: 11,500 fish → 10,000 rainbows, 1,500 tigers





During aeration, winter DO remained >4mg/L above 5 m.

Fish stocking and winter aeration

- No fish kills were reported during winter months, indicating that aeration enabled the lake to successfully overwinter fish
- In 1st year, stocked trout grew very fast, doubling in size from 20 cm in the spring to 40 cm by fall



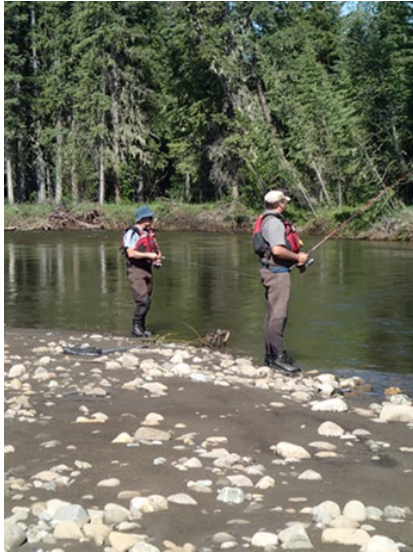
Fish stocking and winter aeration

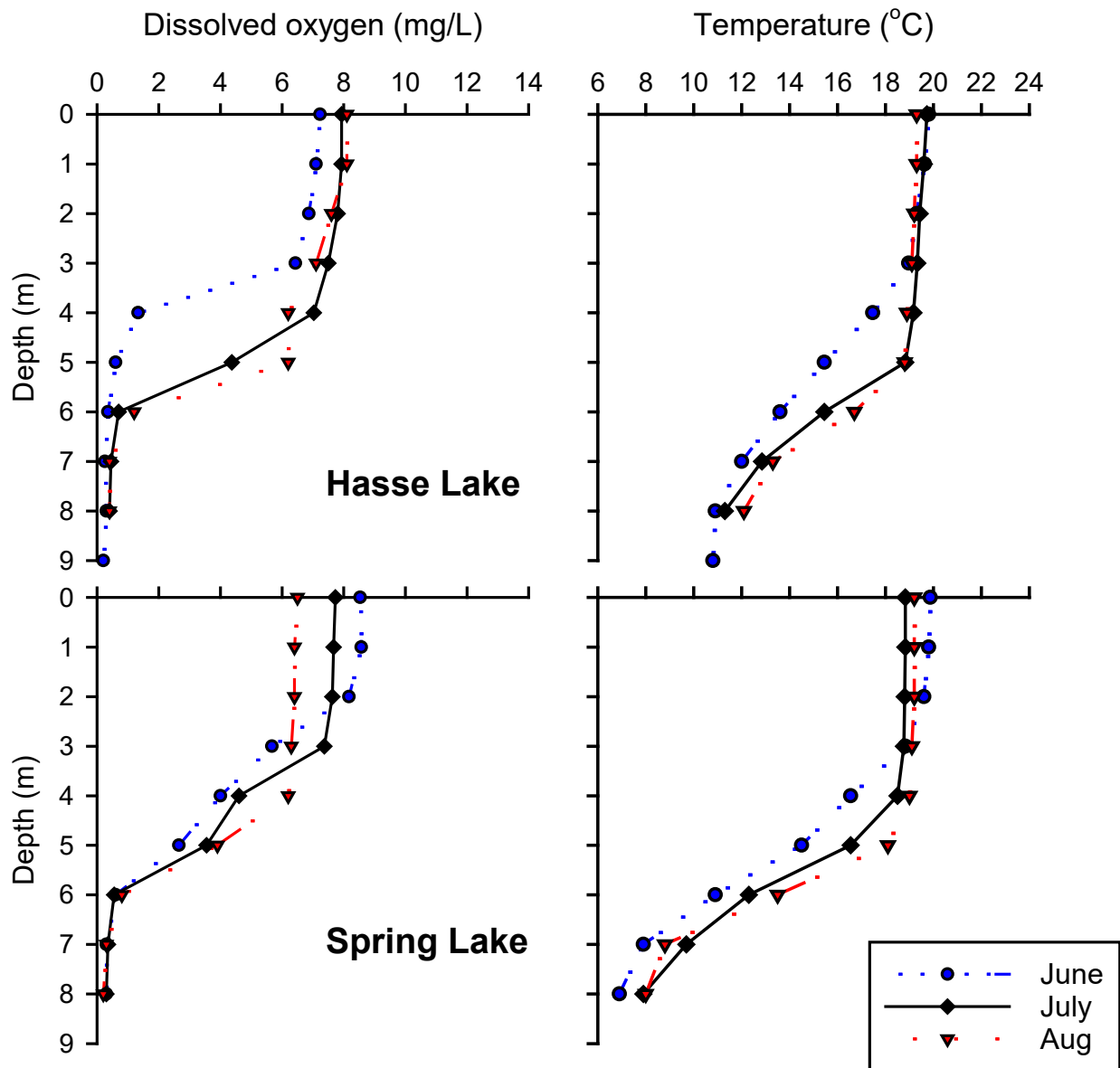


Winter Lake Aeration Challenges



Thank you

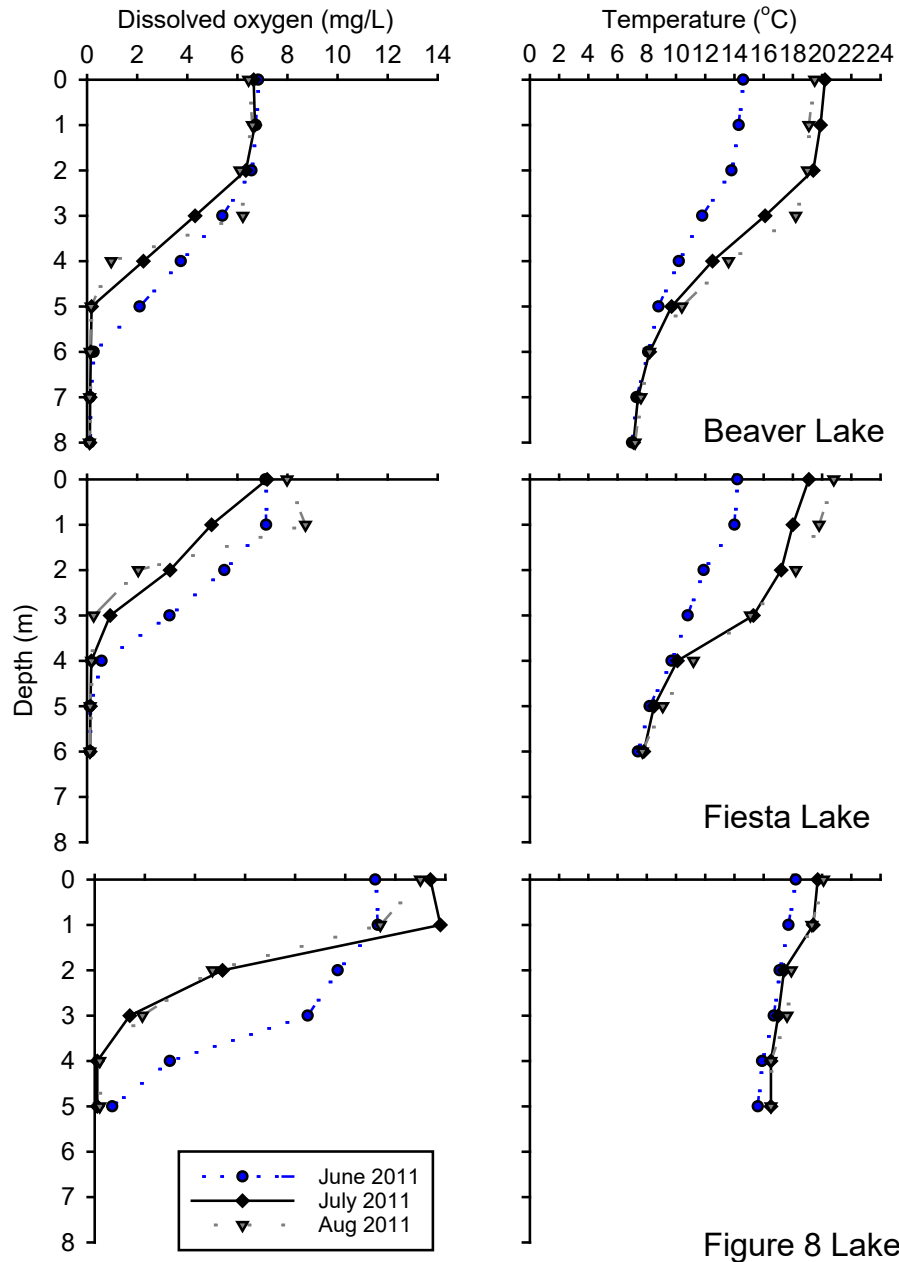




Summer 2020

During aeration years, summer temperature and DO remain marginal for trout but similar to those of other aerated lakes





Summer similar to those of other aerated lakes.

