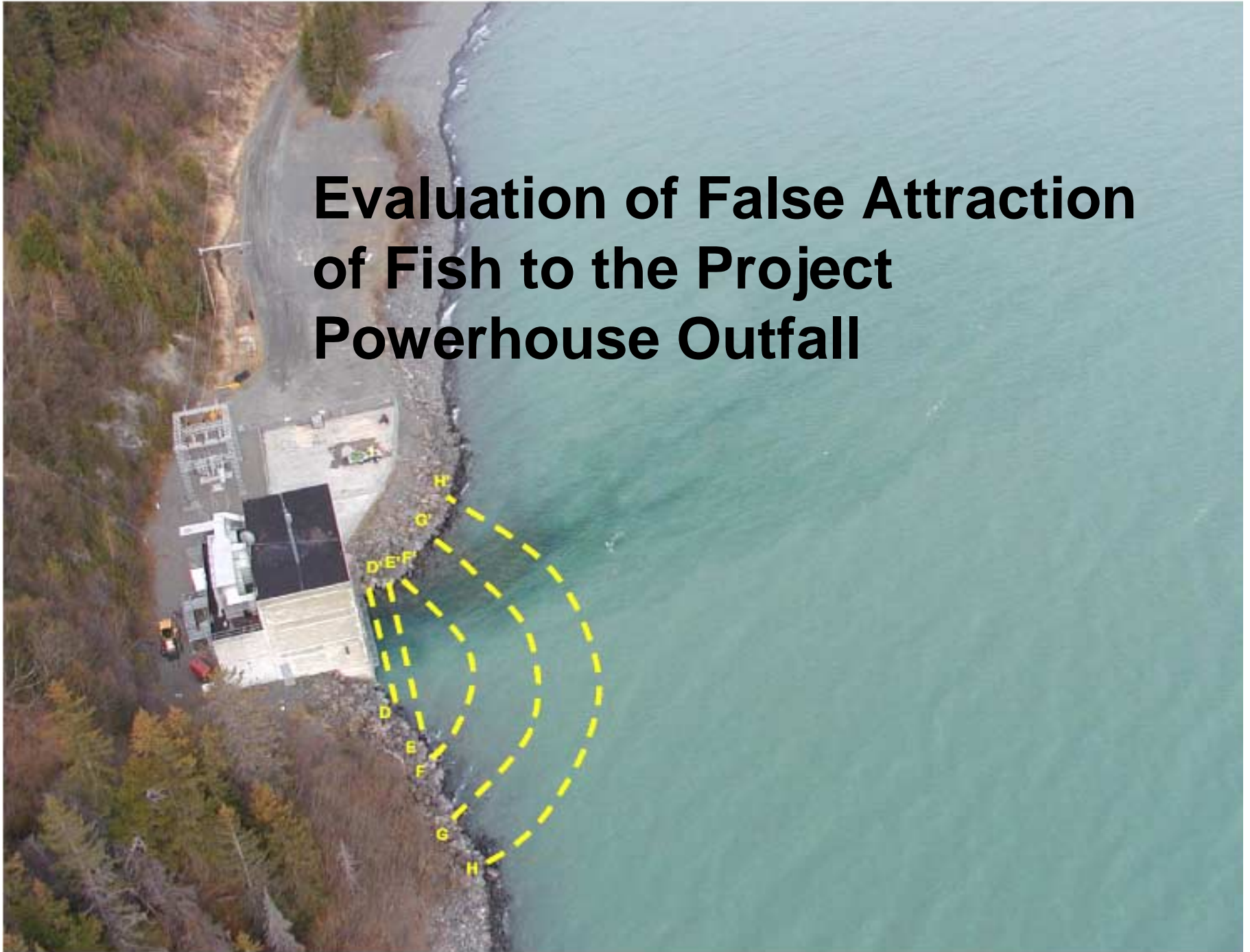


Evaluation of False Attraction of Fish to the Project Powerhouse Outfall



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- Purpose and Objectives
 - Gain insight into the potential for migrating fish to be attracted to the powerhouse outfall

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- Approach
 - Describe typical powerhouse operations characteristics relative to daily powerhouse discharge
 - Measure outfall plume velocity within Kenai Lake using an Acoustic Doppler Current Profiler to define the size and nature of the plume

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Results

Typical Operational Day for the Cooper Lake Hydroelectric Project

| Time | Load Condition | Approximate Output (MW) | Approximate Discharge (cfs) |
|------------------------|----------------------------------|--------------------------------|------------------------------------|
| 6:00 a.m. to 9:00 a.m. | Fully loaded – morning peak | 19.6 | 380 |
| 9:00 a.m. to 4:00 p.m. | Partially loaded –carrying spin | 4 | 75 |
| 4:00 p.m. to 7:00 p.m. | Fully loaded – evening peak | 19.6 | 380 |
| 7:00 p.m. to midnight | Partially loaded – carrying spin | 4 | 75 |
| Midnight to 6:00 a.m. | Shut Down | 0 | 0 |

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- Results

- ADCP Studies

- Water emerges from the powerhouse as two identifiable streams (one for each turbine) which eventually merge into one
 - At low flow, plume velocity approaches background velocity at 50-100 ft. from the powerhouse
 - At high flow, significant velocity detectable at the outermost transect at 130 ft.
 - Width of the plume about 250 ft.
 - Clear water of plume visible in aerial photos about 300 ft. out from powerhouse



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- Conclusions

- The outfall discharge creates an identifiable plume of Cooper Lake water that extends into Kenai Lake up to 300 ft. with an approximate width of 250 ft.
- Fish moving along the south shore of Kenai Lake may be initially distracted by the plume
- The intermittent discharge and lack of a home stream chemical signature suggest that any attraction will be temporary