

Understanding Big Sand Lake's Past to Protect Its Future

A Paleolimnology Study Funded (primarily)
by a Wisconsin DNR Surface Water Grant

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About Me

Retired Boeing Associate Technical Fellow

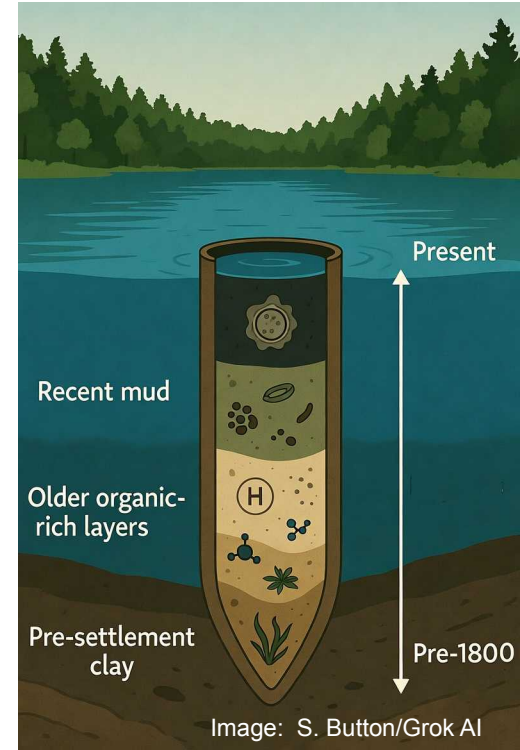
- Live near Everett, WA.
- D. Eng, Engineering Management; MSME, MSEM, P.E.
- BSLA Surface Water Grant Coordinator
- Don Button's son (#2 of 4; 5 total)



Image: S. Button

What Is Paleolimnology?

- “Paleo” = ancient / past;
- Limnology = study of lakes
- Studies lake sediments as a natural archive
- Year-by-year record of the lake’s history
- Reconstructs water quality, algae, nutrients, and land-use changes

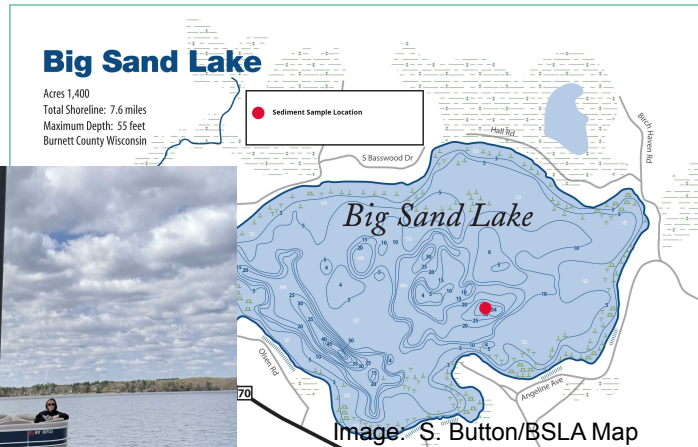


Why a Paleo Study for Big Sand Lake?

- Provides pre-settlement (pre-1860) baseline conditions
- Shows how the lake responded to watershed changes
- Separates natural variability from human impacts
- Helps set realistic, science-based management goals
- Funded by Wisconsin DNR Surface Water Grant and St. Croix Chippewa Indians of Wisconsin Partnership Contribution

Core Collection – May 2026

- 1.78 m core from a deep basin (~34' deep)
- Piston coring method preserves the soft surface sediment
- Dr. Mark Edlund, SCWRS; Jackalyn (l) and Zoe (r)

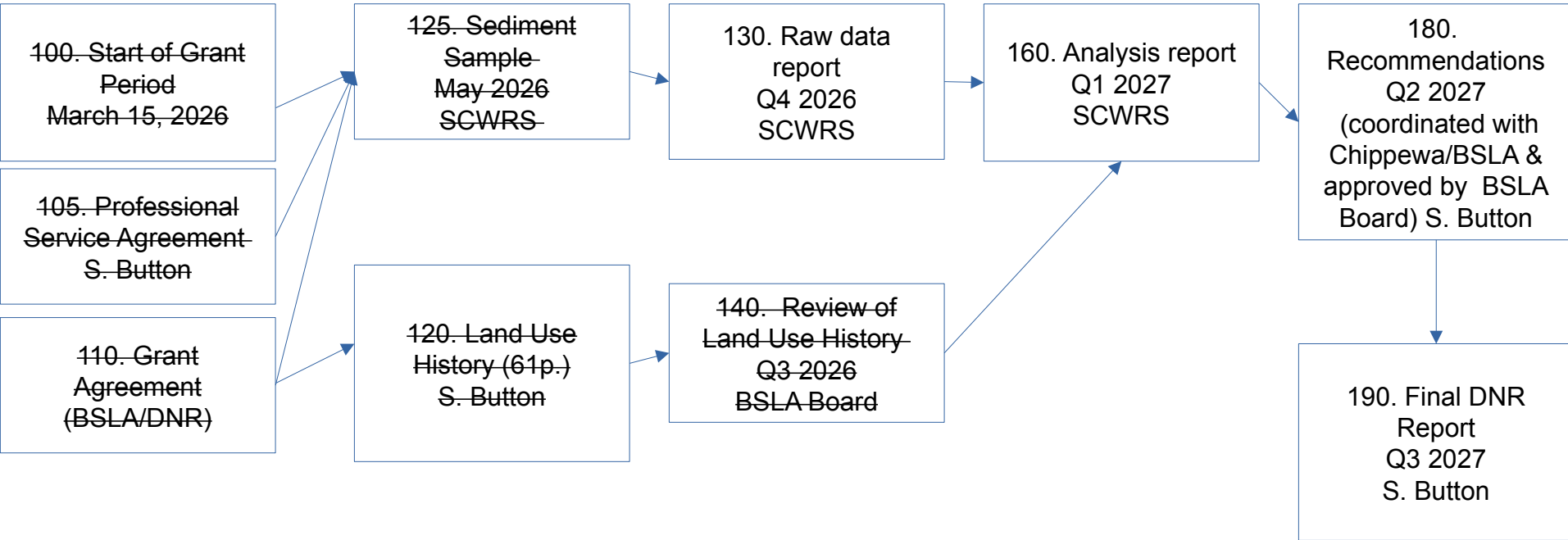


Laboratory Analyses

What We Analyze in the Core

- **^{210}Pb & ^{137}Cs dating** – exact timeline (past 150+ years)
- **Loss-on-ignition** – organic matter, carbonates, dry density
- **Diatoms** – past phosphorus levels & water quality
- **Sediment phosphorus fractions** – internal loading risk
- **Biogenic silica & algal pigments** – productivity & cyanobacteria history

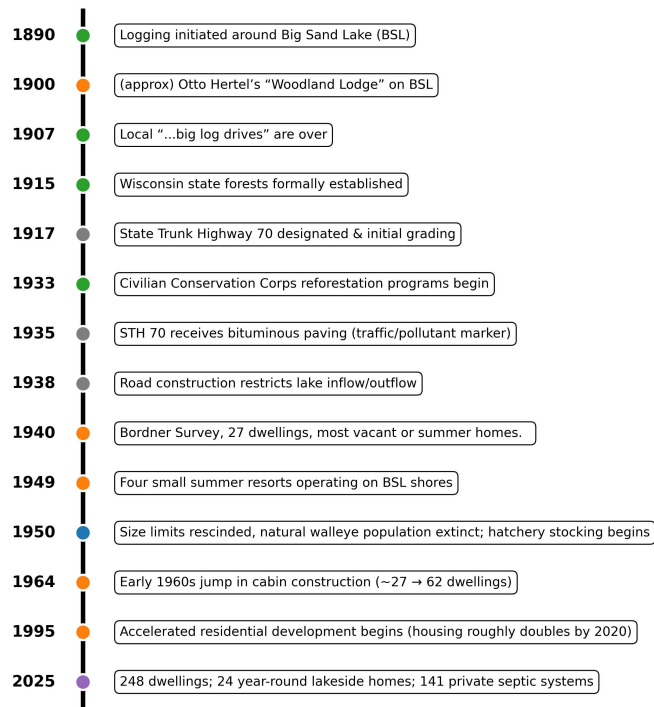
Paleolimnology Study Major Events



Expected Findings

- **Pre-1860:** Clear-water, low-nutrient conditions
- **Late 1800s–early 1900s:** First rise in sedimentation and nutrients
- **Mid-20th century:** Peak agricultural impacts
- **Recent decades:** Shifts in algal communities and internal phosphorus loading
- **Today:** Comparison to pre-settlement reference conditions

Big Sand Lake Land-Use Timeline
Key Events for Paleolimnological Interpretation
(Not To Scale)



Conclusions and Management Implications

- Big Sand Lake has changed significantly since pre-settlement
- Data will help prioritize watershed and in-lake actions
- This historical record + continued monitoring = best path forward

Thank you to:

Big Sand Lake Association, Wisconsin DNR, Tribe, SCWRS

Thank You

Questions?

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