

Equipment Selection



Purchasing Equipment

- What model do I choose?
- See “Buyer’s Guide” on electrofishing.net for a list of criteria.
- The most involved part, and often one of the most important considerations, is estimating the water conductivity range that can be effectively sampled (Power Analysis)



Choosing a control box: Power Analysis

You have a boat electrofisher with 2 booms, each having a 28 cm diameter sphere, and the hull is wired as the cathode. The total electrode resistance is 45 Ohms at 100 $\mu\text{S}/\text{cm}$. The generator size is 7.5 kilowatts. There are two models to choose from:

Control box "A": 6500 W, 1100V/10A, 600V/20A, 300V/35A

Control box "B": 5600 W, 600V/45A, 300V/72A

You have three situations to analyze separately. Your sample sites have water conductivity in the range of:

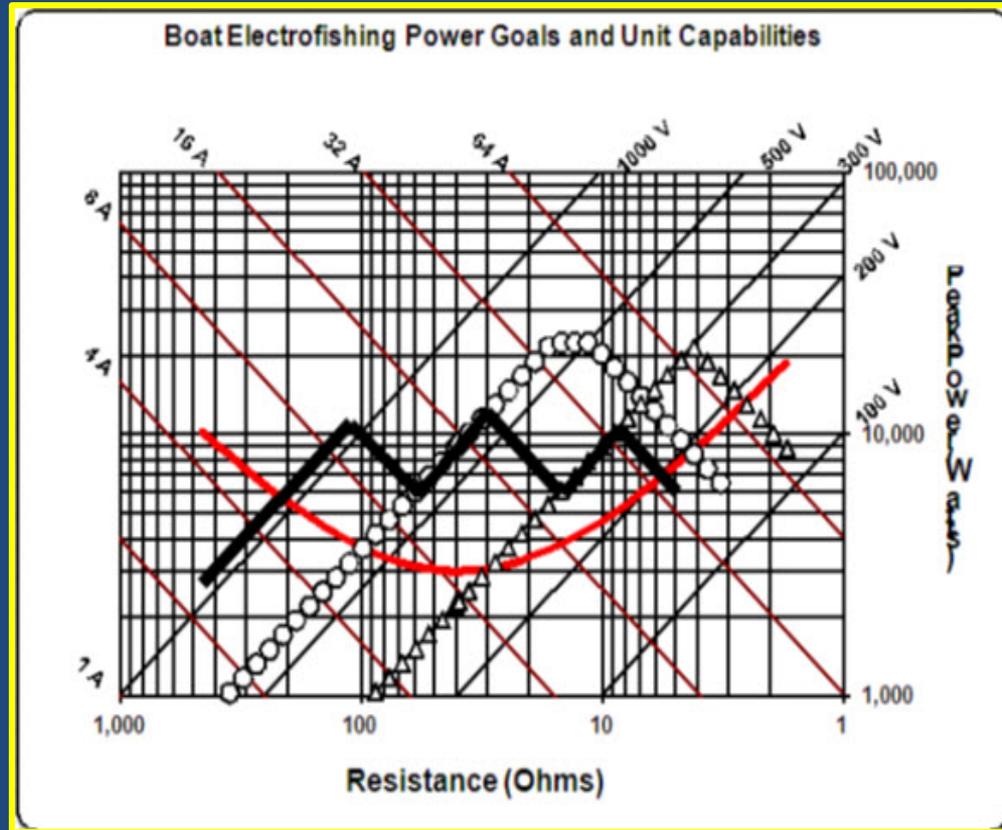
A. 20 – 50 $\mu\text{S}/\text{cm}$

B. 150 – 500 $\mu\text{S}/\text{cm}$

C. 700 – 1,200 $\mu\text{S}/\text{cm}$

For your sampling program, you have found that a PDC waveform of 60 pps, 20% duty cycle, 3,000 W peak is needed for successful electrofishing at matched conditions (115 $\mu\text{S}/\text{cm}$).

Choosing a control box: Power Analysis



- This is a composite graph with control box “A” output represented by the black line and control box “B; output at the open symbols.

Choosing a control box: Power Analysis

The approach used here is the same- follow the output line down to the power goal curve. Conductivity range results are:

Control box "A": 21 – 750 $\mu\text{S}/\text{cm}$

Control box "B": 46 – 1607 $\mu\text{S}/\text{cm}$

Choosing a control box: Power Analysis

Thus, the choices are:

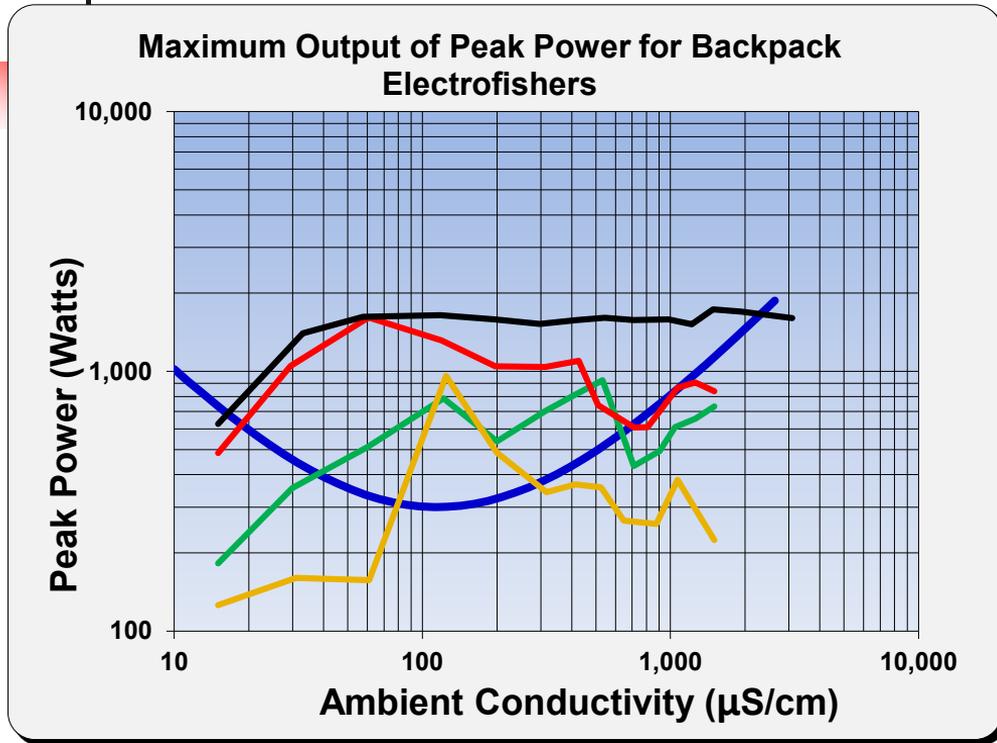
- A. Control box “A” (low conductivity)
- B. Either control box “A” or “B”, although control box “B” has more excess power that might be useful (intermediate conductivity)
- C. Control box “B” (high conductivity)

Backpack Electrofishers

- Use the same process but at a different scale
- Software is Backpack Power Excel file.
- Some results from
 - Dean, J.C., Temple, A.J. and Smith, J.W. 2019. Output Performance of U.S.-Built Backpack Electrofishers. NA Journal of Fisheries Management 39(6): 1321-1328.

Results

Determine effective conductivity ranges and compare to published technical specifications



25% Duty Cycle

- MLES Xstream
- S-R LR24
- ETS ABP-3
- S-R Model 12

Xstream: Not given

LR-24: 10 – 2150 $\mu\text{S/cm}$

ABP-3: 25 – 1400 $\mu\text{S/cm}$

Model 12: 10 – 1,600 $\mu\text{S/cm}$

Blue curve: power needed for successful EF, based on 300 W threshold at 115 $\mu\text{S/cm}$, using a PDC, 60 pps, 20 – 25% duty cycle, in mid-sized streams

Backpack Power Analysis

- Bring up Backpack Power
- Estimate the effective conductivity range of a hypothetical backpack with these specifications and criteria:
 - maximums: 400W output power, 900 V, 10 A
 - waveform: 60 pps, 25% duty cycle
 - electrode resistance at 100 $\mu\text{S}/\text{cm}$: 285 Ohms
 - threshold data: minimum 282 Watts needed for successful electrofishing in mid-sized stream at a ambient conductivity of 232 $\mu\text{S}/\text{cm}$