

Ecology of Eared Grebes
(*Podiceps nigricollis*) on
the Great Salt Lake, Utah

Final Report to the Utah
Division of Wildlife Resources,
Salt Lake City, Utah

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Presentation by
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DATA REQUIREMENTS

ENERGY OBTAINED FROM ONE BRINE SHRIMP

ENERGETIC COST OF OBTAINING ONE SHRIMP

COST OF DIVING

COST OF SWIMMING

ENERGY NEEDS PER DAY

NUMBER OF SHRIMP TO MEET THIS

REQUIRED SHRIMP DENSITY TO MAINTAIN BODY MASS

ENERGY NEEDS TO MIGRATE

TOTAL NUMBER OF SHRIMP NEEDED TO MEET THIS

NUMBER OF SHRIMP/DAY TO MEET THIS

REQUIRED SHRIMP DENSITY



One shrimp

Weight	0.002 g
Dry weight	0.00025 g
Energy	5.46 J
Digestible energy	4.77 J

DATA REQUIREMENTS

ENERGY OBTAINED FROM ONE BRINE SHRIMP = **4.77 J/shrimp**

ENERGETIC COST OF OBTAINING ONE SHRIMP

COST OF DIVING

COST OF SWIMMING

ENERGY NEEDS PER DAY

NUMBER OF SHRIMP TO MEET THIS

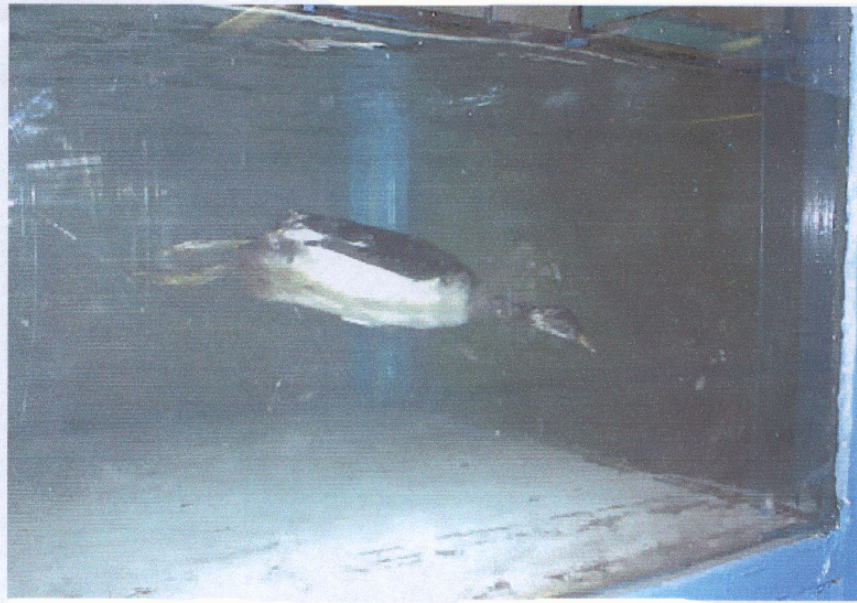
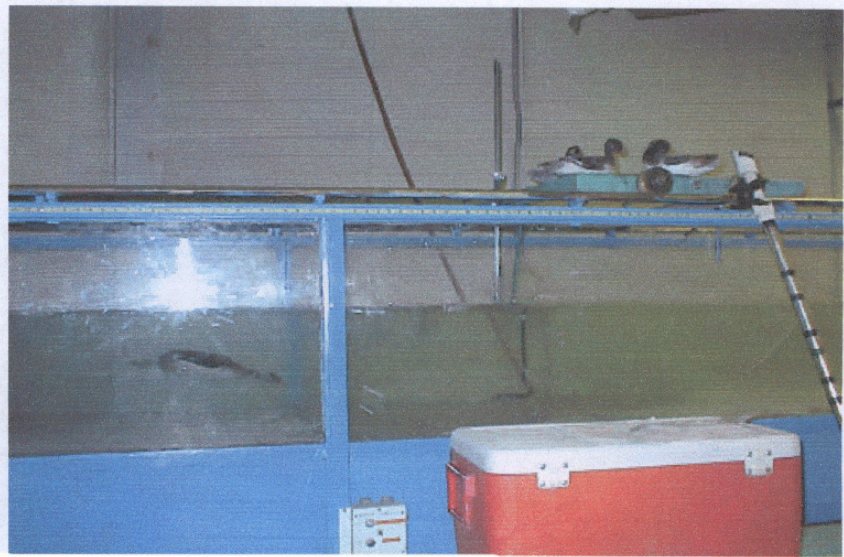
REQUIRED SHRIMP DENSITY TO MAINTAIN BODY MASS

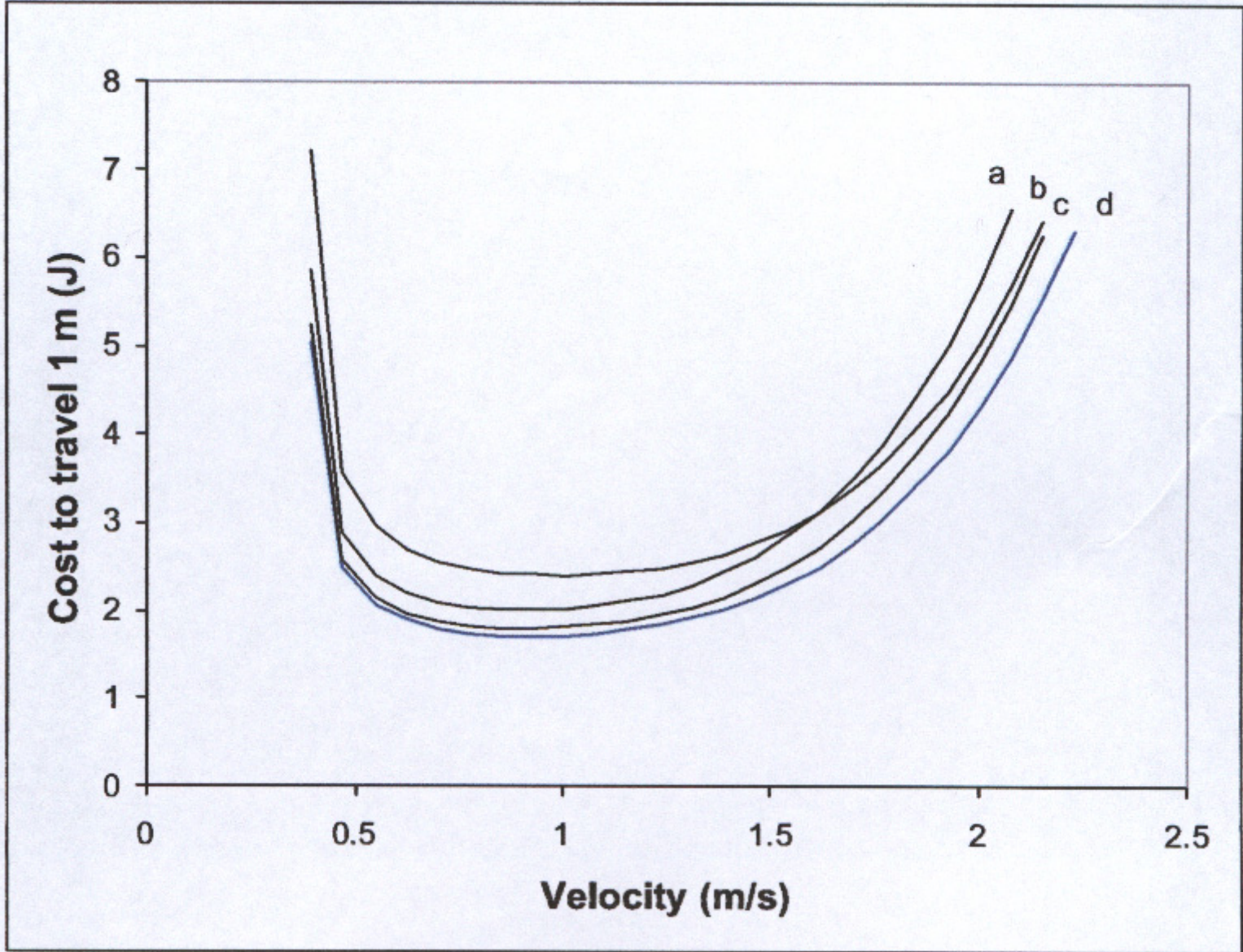
ENERGY NEEDS TO MIGRATE

TOTAL NUMBER OF SHRIMP NEEDED TO MEET THIS

NUMBER OF SHRIMP/DAY TO MEET THIS

REQUIRED SHRIMP DENSITY





DATA REQUIREMENTS

ENERGY OBTAINED FROM ONE BRINE SHRIMP = **4.77 J/shrimp**

ENERGETIC COST OF OBTAINING ONE SHRIMP

COST OF DIVING = **1.72 J/m**

COST OF SWIMMING = **0.25 J/m**

ENERGY NEEDS PER DAY

NUMBER OF SHRIMP TO MEET THIS

REQUIRED SHRIMP DENSITY TO MAINTAIN BODY MASS

ENERGY NEEDS TO MIGRATE

TOTAL NUMBER OF SHRIMP NEEDED TO MEET THIS

NUMBER OF SHRIMP/DAY TO MEET THIS

REQUIRED SHRIMP DENSITY

METABOLIC RATES (J/g/hr)

BASAL = 22.6

RESTING = 26.4

DIVING = 31.6



DATA REQUIREMENTS

ENERGY OBTAINED FROM ONE BRINE SHRIMP = **4.77 J/shrimp**

ENERGETIC COST OF OBTAINING ONE SHRIMP

COST OF DIVING = **1.72 J/m**

COST OF SWIMMING = **0.25 J/m**

ENERGY NEEDS PER DAY

NUMBER OF SHRIMP TO MEET THIS = **10,000**

REQUIRED SHRIMP DENSITY TO MAINTAIN BODY MASS

ENERGY NEEDS TO MIGRATE

TOTAL NUMBER OF SHRIMP NEEDED TO MEET THIS

NUMBER OF SHRIMP/DAY TO MEET THIS

REQUIRED SHRIMP DENSITY

MAXIMUM STRIKE RANGE (10 cm neck) = **314 cm²**

REALISTIC STRIKE RANGE (45 degree angle) = **157 cm²**

DATA REQUIREMENTS

ENERGY OBTAINED FROM ONE BRINE SHRIMP = **4.77 J/shrimp**

ENERGETIC COST OF OBTAINING ONE SHRIMP

COST OF DIVING = **1.72 J/m**

COST OF SWIMMING = **0.25 J/m**

ENERGY NEEDS PER DAY

NUMBER OF SHRIMP TO MEET THIS = **10,000**

REQUIRED SHRIMP DENSITY TO MAINTAIN BODY MASS = **1.0 shrimp/L**

ENERGY NEEDS TO MIGRATE

TOTAL NUMBER OF SHRIMP NEEDED TO MEET THIS

NUMBER OF SHRIMP/DAY TO MEET THIS

REQUIRED SHRIMP DENSITY

COST OF FLIGHT = 115,000 --280,000 J/hr

DISTANCE TO SALTON SEA = 1,000 km

FAT REQUIREMENTS = 49--119 g

SHRIMP REQUIRED FOR MIGRATION = 124,000--301,000

DAYS STAGING = 90

REQUIRED SHRIMP HARVEST/DAY TO MIGRATE = 3,344

DATA REQUIREMENTS

ENERGY OBTAINED FROM ONE BRINE SHRIMP = **4.77 J/shrimp**

ENERGETIC COST OF OBTAINING ONE SHRIMP

COST OF DIVING = **1.72 J/m**

COST OF SWIMMING = **0.25 J/m**

ENERGY NEEDS PER DAY

NUMBER OF SHRIMP TO MEET THIS = **10,000**

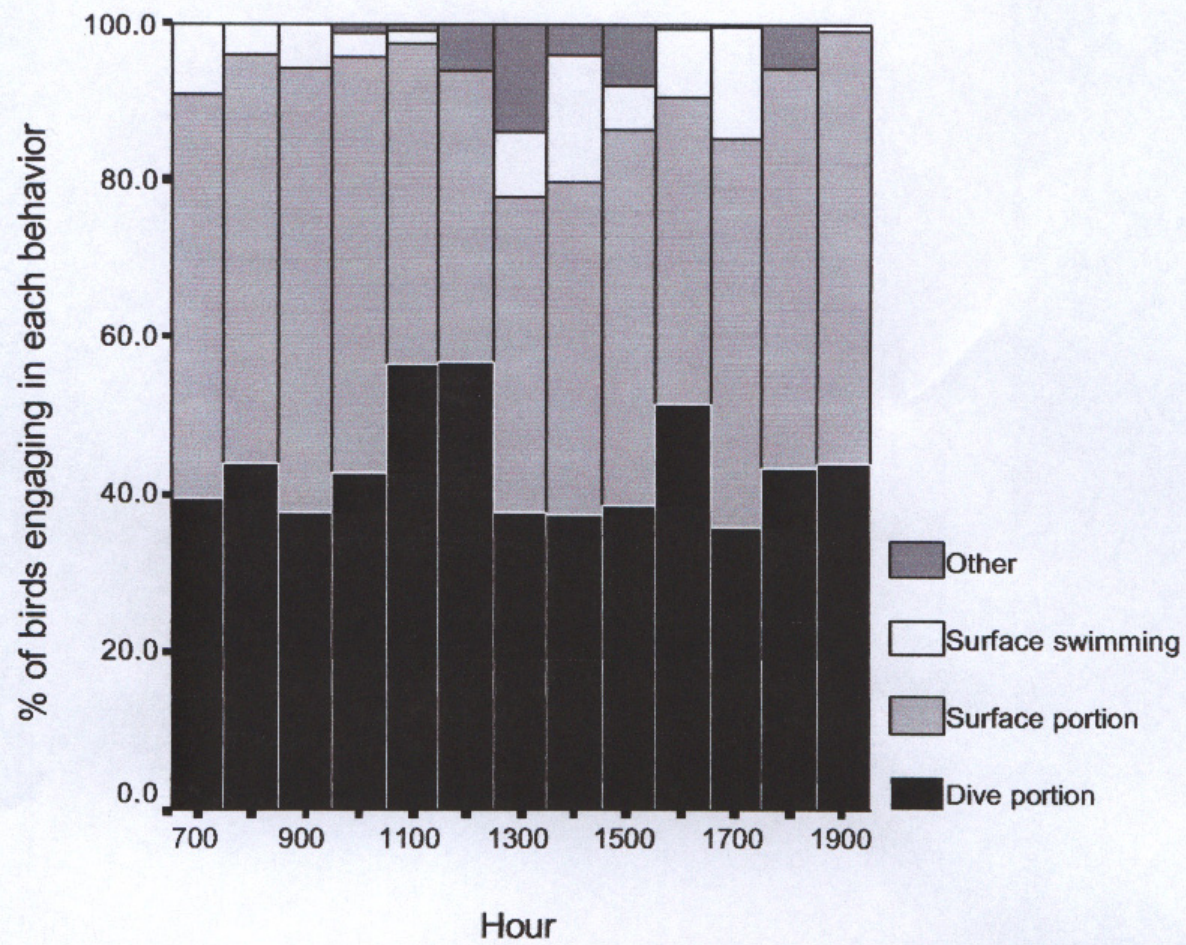
REQUIRED SHRIMP DENSITY TO MAINTAIN BODY MASS = **1.0 shrimp/L**

ENERGY NEEDS TO MIGRATE

TOTAL NUMBER OF SHRIMP NEEDED TO MEET THIS = **124,000--301,000**

NUMBER OF SHRIMP/DAY TO MEET THIS = **3,344**

REQUIRED SHRIMP DENSITY



DATA REQUIREMENTS

ENERGY OBTAINED FROM ONE BRINE SHRIMP = **4.77 J/shrimp**

ENERGETIC COST OF OBTAINING ONE SHRIMP

COST OF DIVING = **1.72 J/m**

COST OF SWIMMING = **0.25 J/m**

ENERGY NEEDS PER DAY

NUMBER OF SHRIMP TO MEET THIS = **10,000**

REQUIRED SHRIMP DENSITY TO MAINTAIN BODY MASS = **1.0 shrimp/L**

ENERGY NEEDS TO MIGRATE

TOTAL NUMBER OF SHRIMP NEEDED TO MEET THIS = **124,000--301,000**

NUMBER OF SHRIMP/DAY TO MEET THIS = **3,344**

REQUIRED SHRIMP DENSITY = **1.35 shrimp/liter**

