

LIFE HISTORY AND THE COSTS OF REPRODUCTION IN YELLOWSTONE-SAKAKAWEA PADDLEFISH STOCK

Dennis Scarnecchia, Department of Fish and Wildlife Resources, University of Idaho,
Moscow, ID 83844-1136, scar@uidaho.edu

L. Fred Ryckman, ryckman@state.nd.us

Brad Schmitz, Montana Fish, Wildlife and Parks, P. O. Box 1630, Miles City, MT 59301,
Brschmitz@mt.gov

Investigations on the Yellowstone-Sakakawea stock of paddlefish (*Polyodon spathula*) in eastern Montana and western North Dakota conducted during 1991-2004 have provided information on fish size, population age structure, age-at-maturity, longevity, growth rates, reproductive periodicity, fecundity, energy reserves, migration patterns, mortality rates, and senescence to characterize the life history in relation to the costs of reproduction. Life histories of males and females diverge between age-5 and age-10 as males divert energy and production away from somatic growth into sexual maturation. Females of the same brood year grow more rapidly than their male counterparts until age-13 or age-14, when they begin to divert energy and production away from somatic growth and into sexual maturation. At the time of their first upstream spawning migration, both sexes have mature gonads with attached gonadal fat bodies, which function in energy storage much like a capacitor. Increases in fecundity among young adults of both sexes are concurrent with decreases in the weight of gonadal fat bodies. Males typically spawn every 1 or 2 years and deplete gonadal fat reserves gradually over several spawning cycles. Females typically spawn every 2 or 3 years and deplete fat over two to three spawning cycles, largely exhausting it by age-25. Energetic and migration results conform with the idea that middle-age and older paddlefish are the most effective spawners. The general life history pattern of growth and energy accumulation early in life, followed by maturation, reproduction, energy depletion and senescence appears to exist widely among Chondrosteian fishes, and may exist in many other fishes as well.