Title: FORAGING ECOLOGY OF NONNATIVE TROUT IN THE COLORADO RIVER, GRAND CANYON: PREDATION ON NATIVE FISHES AND THE EFFECTS OF TURBIDITY

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Abstract - Introductions of nonnative salmonids like rainbow trout (*Oncorhynchus mykiss* and *Salmo trutta*) have had unforeseen and undesirable effects to native fishes worldwide. Studies of the effects of nonnative salmonids on native fishes have tended to focus on competition more than predation, given that these singular events are difficult to quantify because abundant fish are rarely piscivorous or if highly piscivorous are often rare and elusive. Therefore few studies have determined the incidence of piscivory by nonnative salmonids and quantified its potential impact on native fish populations. Interactions with nonnative rainbow trout and brown trout, including predation, have been hypothesized as one mechanism contributing to the loss of native fishes of the Colorado River in Grand Canyon, including the recent decline of the endangered humpback chub (*Gila cypha*). During 2003-2004, an extensive fish suppression effort was carried out by removing over 20,000 nonnative fishes from a segment of the Colorado River surrounding the confluence of the Little Colorado River (LCR). We used diet analyses of these fish to quantify trout feeding ecology, including the incidence of piscivory. Sediment discharge from the LCR creates a strong contrast between reaches up and downstream of this tributary, which allowed us to evaluate how turbidity affects prey availability, detection and utilization, including the degree of piscivory, by these

nonnative salmonids. Incidence of piscivory for brown trout was higher (8-46%) than for rainbow trout (0.5-3%), however rainbow were 50 times more abundant. Our modeling efforts estimate that trout consumed nearly 30,000 fish during this study (rainbow trout 16,157; and brown trout 13,205) and on average trout consumed 85% more native than nonnative fish even though native fish were 30% less abundant. Turbidity may mediate piscivory directly by reducing prey detection, yet its influence is uncertain since rainbow and brown trout showed greater piscivory in turbid areas having higher turbidity. Under turbid conditions, increased piscivory might be due to a change in foraging strategy, from drift-feeding to active foraging, and also in response to prey availability due to dispersal of young fish from the LCR. Turbidity has a strong affect on the foraging ecology of rainbow and brown trout, and consequently may influence the level of piscivory on native fishes.