**Summary**

Gravel pit lakes constitute novel ecosystems that are highly relevant for fisheries stakeholders and recreational fisheries while also providing novel habitat for colonization by fishes. As they are characterized by steep slopes and a small littoral zone with low complexity, structural enhancements in gravel pits have the potential to alter energy flow and increase production of littoral-reliant fish species. This work takes a comparative space-for-time replication approach using Eurasian perch (*Perca fluviatilis*) as a model system for examining the effects of littoral structure on fish density, size structure, and trophic niche. In order to generalize the effects of lake variables, a regression approach was applied to stable isotope and catch data collected from fourteen gravel pit lakes in Lower Saxony. Perch biomass, abundance, and size structure showed stronger correlations with community variables than with lake morphology, productivity, and littoral structure. Lakes that had high-density perch populations were most likely to have large individuals while competition with cyprinids was associated with lower perch abundance and fewer large individuals. Lake morphology, littoral structure, inter- and intraspecific competition, and predation risk all had distinct effects on individual trophic niche. Increased lake depth and predation risk were both associated with distinct shifts in resource use through ontogeny but lower overall trophic position in perch. In contrast, perch in lakes characterized by higher macrophyte cover and intensity of inter- and intraspecific competition were more likely to show relatively high consumption of littoral resources through ontogeny without distinct diet shifts. Large perch in high-macrophyte lakes had lower trophic positions as their consumption of littoral resources increased while small perch in high-competition lake had higher trophic positions, either from increased consumption of macroinvertebrates or from early piscivory. On a population level, it appeared that interspecific competition was associated with increased homogeneity of resource use between perch while increasing littoral structure resulted in increased individual variation. Overall it appears likely that habitat enhancement through the addition of coarse woody structure and vegetated shallow water zones would increase the littoral reliance and decrease overall trophic position of perch. The resulting effects on perch abundance, biomass, and size structure would likely hinge on how these changes interact with community characteristics and lake morphology.