Potomac Sculpin (*Cottus girardi*)

As a surrogate species for:

Blue Ridge Sculpin (*Cottus caeruleomentum)*

The Blue Ridge sculpin is a recently described species of sculpin (Kinziger et al., 2000) found in several major basins within the Chesapeake Bay watershed. Due to the relatively recent description of the species, there is a paucity of published research on the Blue Ridge sculpin's ecological attributes, habitat requirements, and potential stressors. To develop meaningful management actions based on sound science, a literature review on its congener, the Potomac sculpin (*C. girardi*), was conducted as the ecology of the two species is thought to be similar.

In addition to tolerating both warm- and cold-water streams (Jenkins & Burkhead, 1994), the Potomac sculpin is tolerant of a wide variety of habitat types. It is found in the Appalachian and Piedmont streams draining into the Potomac River (WV, VA, MD) and from an isolated population in the James River (VA) drainage (Page & Burr, 1991). Preferred habitat appears to be rocky runs and pools of creeks and small to medium sized rivers (Page & Burr, 1991) though apparently low in abundance in the mainstem Potomac River (Jenkins & Burkhead, 1994). Potomac sculpin tend to favor stream reaches with a swift current rather than pools (Jenkins & Burkhead, 1994), so alterations to sediment loads or the intentional damming of streams can reduce the preferred habitat. Similarly, dredging of in-stream gravel deposits (typically found in swift current riffles) has a large impact on those species that inhabit this environment (Freedman & Stauffer, 2013). In addition, Potomac sculpin are known to frequent submerged vegetation habitat (Matheson & Brooks, 1983), so stressors that reduce vegetation abundance will likely have negative impacts on Potomac sculpin population resilience. Potomac sculpin are typically sedentary benthic fish that show low dispersal (Jenkins & Burkhead, 1994) distances. However, recent research (Hudy & Shiflet, 2009) demonstrated that a small contingent of the population will disperse greater distances (> 250m), likely a strategy to exploit potential resources and colonize (or escape) new areas (Secor, 1999). In this context, stressors to long-term population resilience would be increased habitat fragmentation and loss of habitat connectivity (Stoll et al., 2013).

Literature Cited

Freedman, J. A., & Stauffer, J. R. (2013). Gravel dredging alters diversity and structure of riverine fish assemblages. *Freshwater Biology, 58*(2), 261-274.

Hudy, M., & Shiflet, J. (2009). Movement and recolonization of Potomac sculpin in a Virginia stream. *North American Journal of Fisheries Management, 29*(1), 196-204.

Jenkins, R. E., & Burkhead, N. M. (1994). *Freshwater fishes of Virginia*. Bethesda, MD: American Fisheries Society.

Kinziger, A. P., Raesly, R. L., & Neely, D. A. (2000). New species of Cottus (Teleostei : Cottidae) from the middle Atlantic eastern United States. *Copeia*(4), 1007-1018.

Matheson, R. E. J., & Brooks, G. R. J. (1983). Habitat segregation between Cottus bairi and Cottus girardi: an example of complex inter- and intraspecific resource partioning. *American Midland Naturalist, 110*(1), 165-176.

Page, L. M., & Burr, B. M. (1991). *A field guide to freshwater fishes: North America north of Mexico*. Boston, MA: Houghton Mifflin.

Secor, D. H. (1999). Specifying divergent migrations in the concept of stock: the contingent hypothesis. *Fisheries Research, 43*, 13-34.

Stoll, S., Sundermann, A., Lorenz, A. W., Kail, J., & Haase, P. (2013). Small and impoverished regional species pools constrain colonisation of restored river reaches by fishes. *Freshwater Biology, 58*(4), 664-674.