Copper (Cu): Heavy metal that does not biodegrade in environment
Can cause altered growth & development in amphibian larval stage
Radioesium (137Cs):
Radionuclide, emits gamma radiation
Can be an immunosuppresor in radiation
Radionuclide, emits gamma radiation
Can be an immunosuppresor in radiation
Can cause mass die-offs of amphibian populations
Amphibians have variable responses to exposure

Objectives
Examine the sublethal effects of Cu and 137Cs on growth, development, and ranavirus susceptibility of Anaxyrus terrestris (Southern toad)
Smaller size at metamorphosis may limit energy available for immune defenses

Introduction
Amphibian populations declining globally due to:
• habitat loss
• anthropogenic stressors including contaminants
• natural stressors including disease
Amphibians impacted by these stressors during larval stages in aquatic habitats
U.S. Department of Energy’s Savannah River Site (SRS) has numerous wetlands with and without heavy metals, radionuclides, and disease

Hypothesis
Toads exposed to Cu and 137Cs will have slower growth and development and higher ranavirus susceptibility

Materials & Methods
Southern toad tadpoles were reared at 4 different wetlands on the SRS for two weeks
Tadpoles were reared in plastic bins, each with 6 small containers that housed one tadpole
Each site had 12 bins for a total of 72 tadpoles per site

Results
Southern toad tadpoles were reared at 4 different wetlands on the SRS for two weeks

Figure 6. The impact of contaminants on growth of Southern toad tadpoles in the field.

Figure 7. The impact of contaminants on development of Southern toad tadpoles by day 14 in the field.

Figure 8. The impact of contaminants on ranavirus susceptibility of Southern toad metamorphs after exposure to contaminants in larval environments.

Conclusions
Site significantly affected growth
Driven by H-02 (Cu), hypothesis not supported
Site significantly affected development
Driven by Fire Pond (reference), hypothesis partially supported
Site did not significantly affect ranavirus susceptibility but there was a trend
Driven by H-02 (Cu), hypothesis partially supported

Future Directions
Isolate the effects of larval exposure to Cu by rearing animals in mesocosms
Determine how developmental stage affects ranavirus susceptibility
Examine interactions between contaminants and ranavirus

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Literature Cited