Figures

Figure 2.1. Map of the Upper Columbia River.

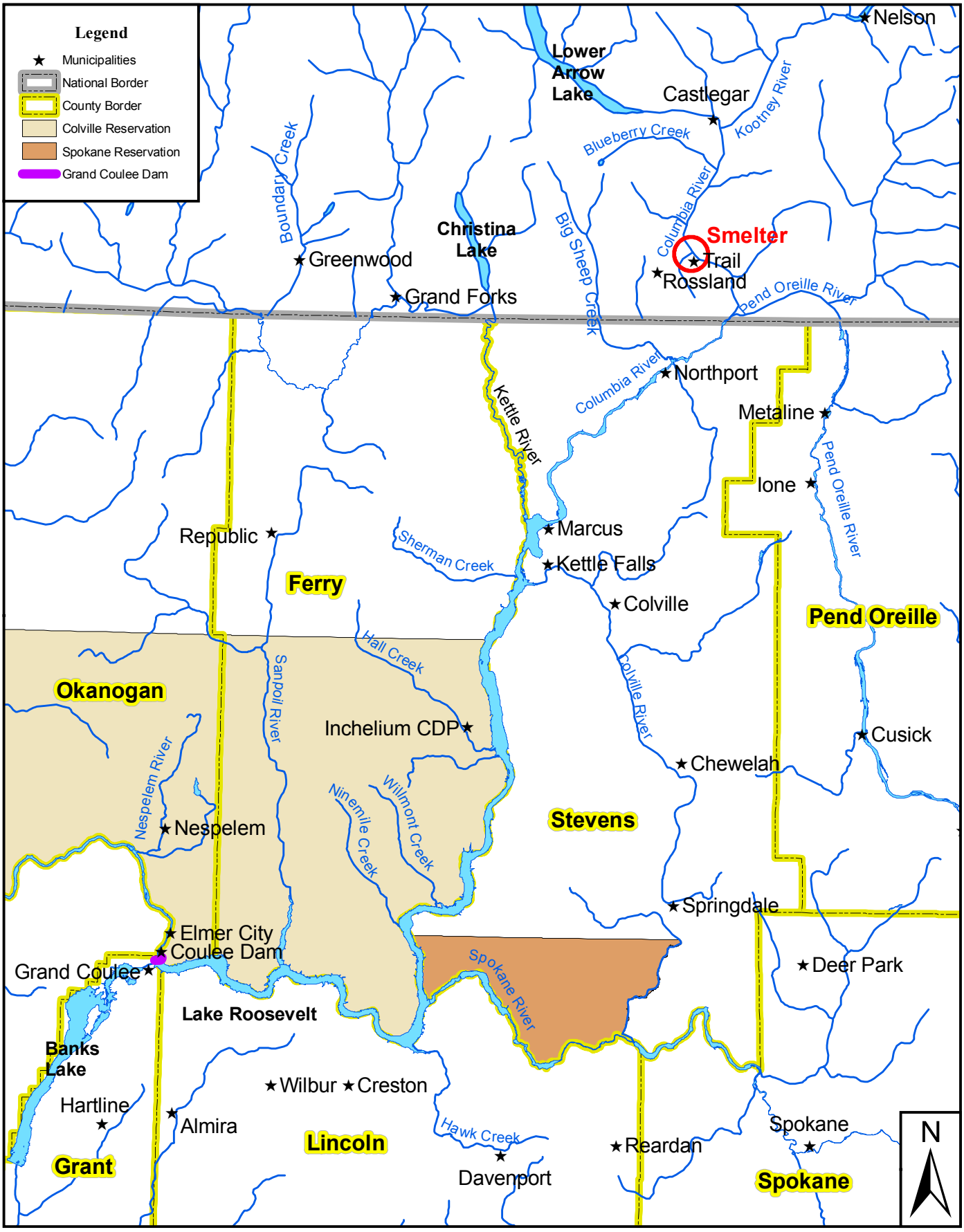


Figure 2.2. Map of the Upper Columbia River region, showing the six reaches.

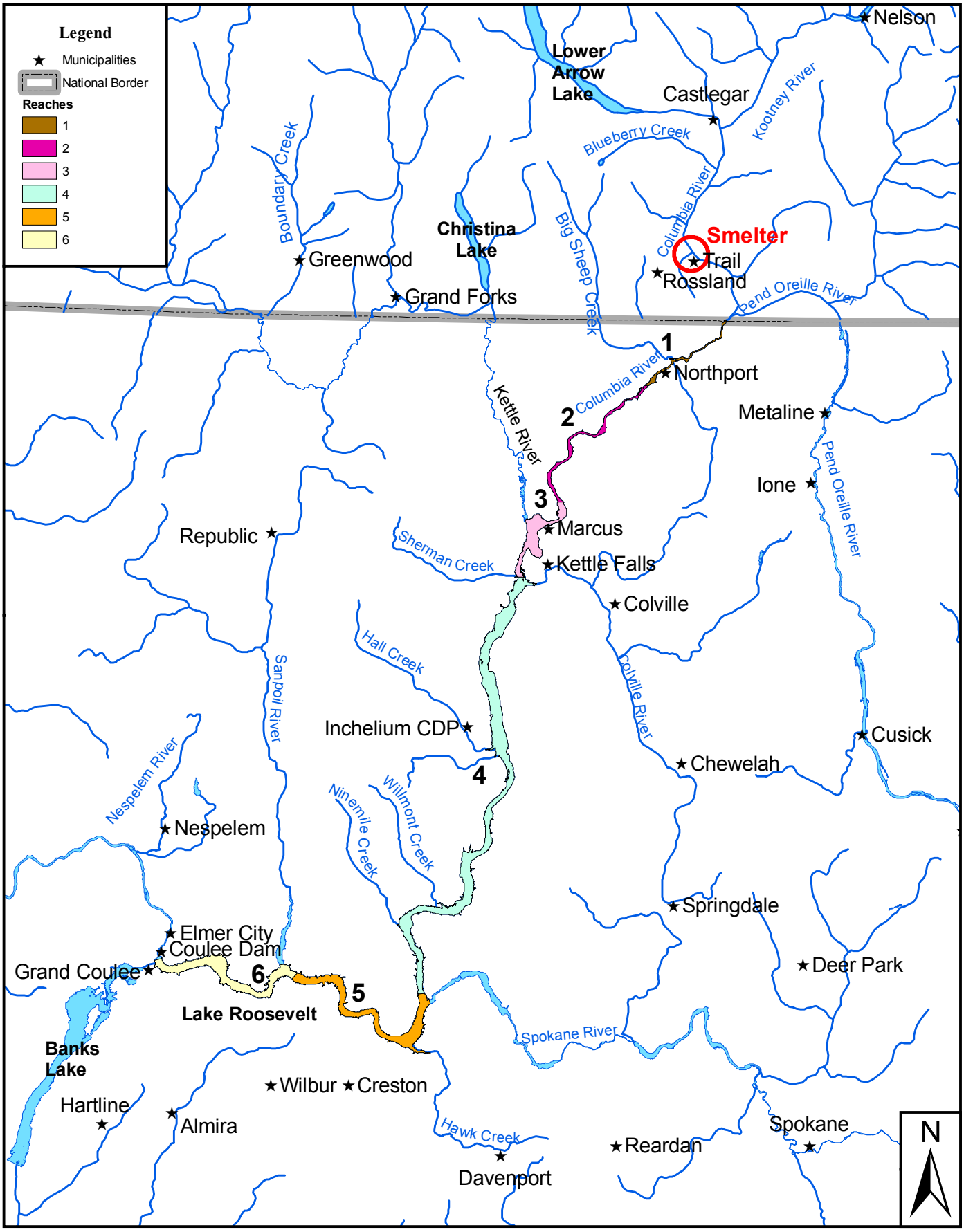


Figure 4.1. Map of the Upper Columbia River displaying sediment sampling stations for whole-sediment chemistry and/or other indicators.

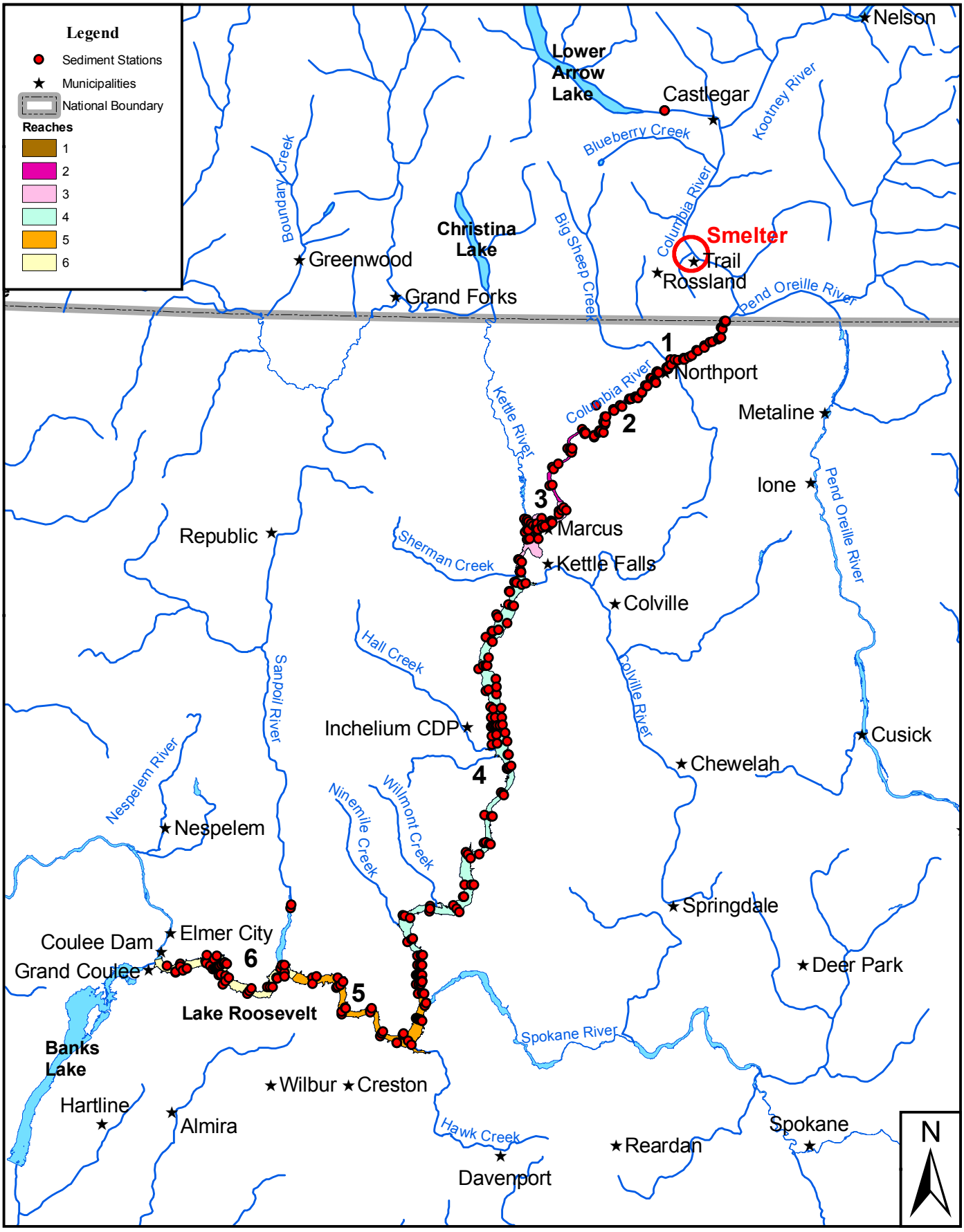


Figure 4.2. Map of the Upper Columbia River displaying Phase 1 sediment sampling stations for whole-sediment toxicity.

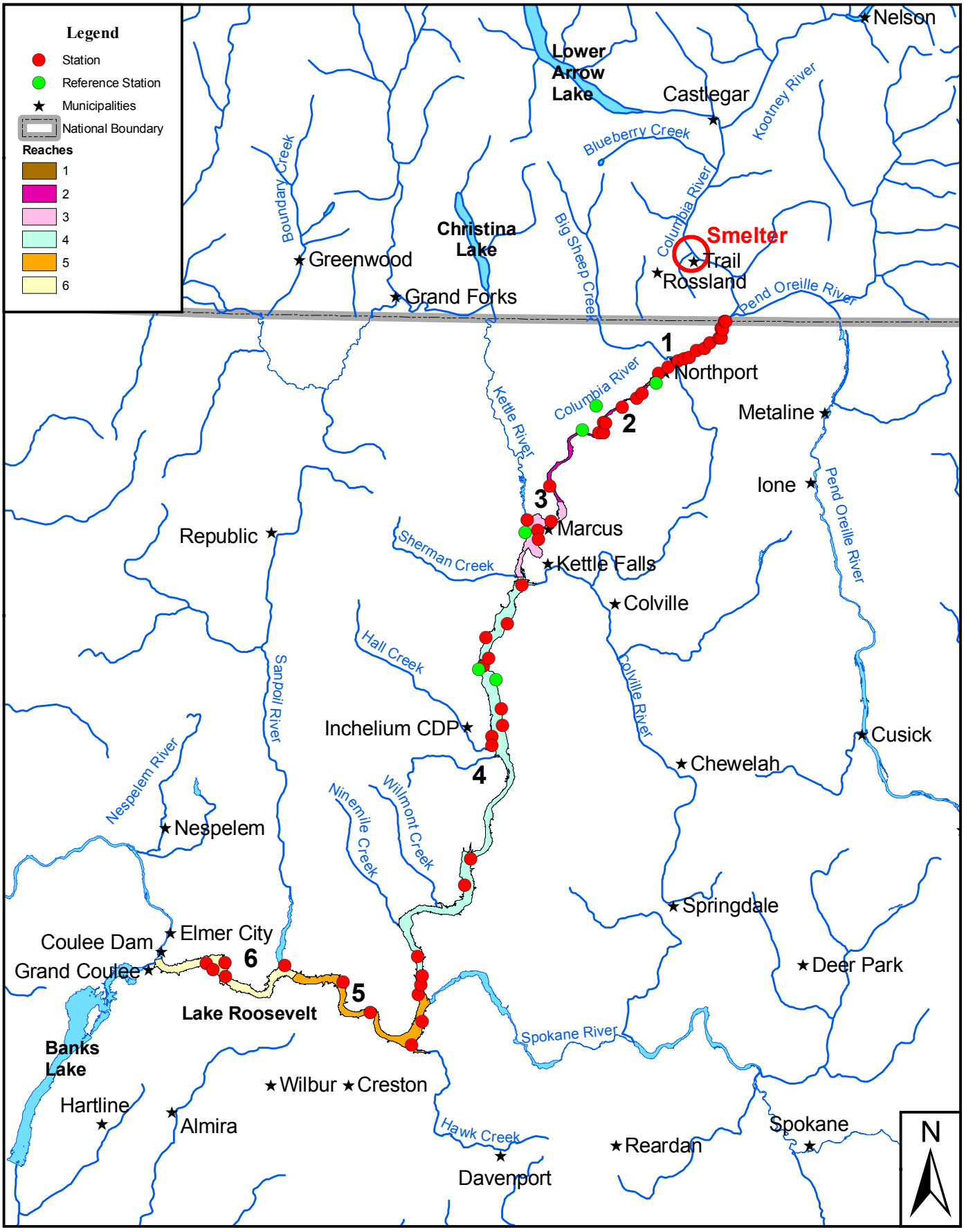
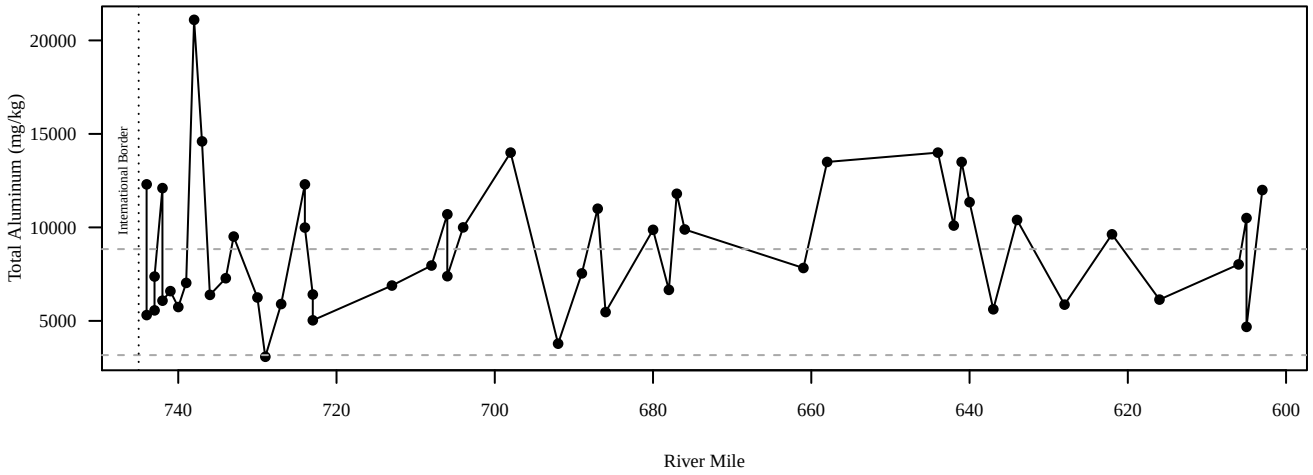
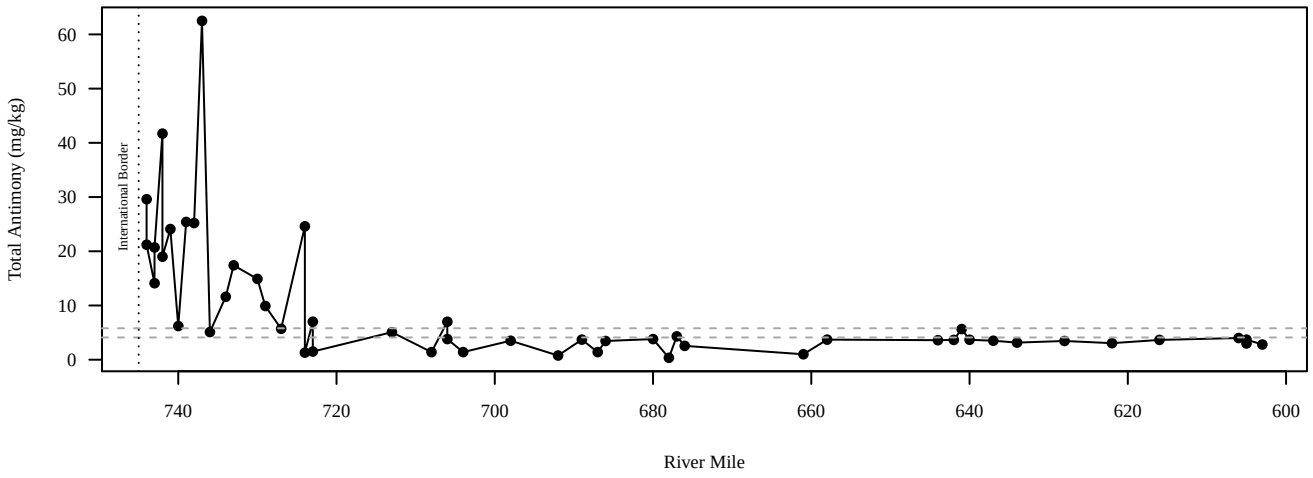


Figure 5.1. Concentrations of aluminum, antimony, and vanadium in the sediments of the Upper Columbia River from the international border to the Grand Coulee Dam. Dashed lines represent the range of concentrations at the reference stations.





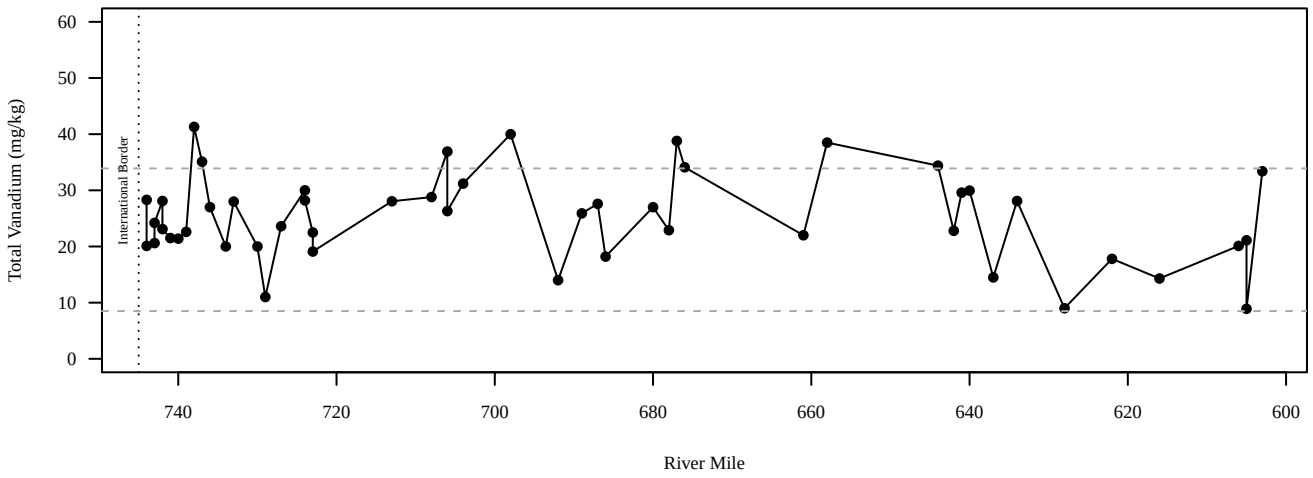


Figure 5.2. Indicator metal to aluminum ratios in sediment of the Upper Columbia River. Dashed lines represent the range of ratios at the reference stations.

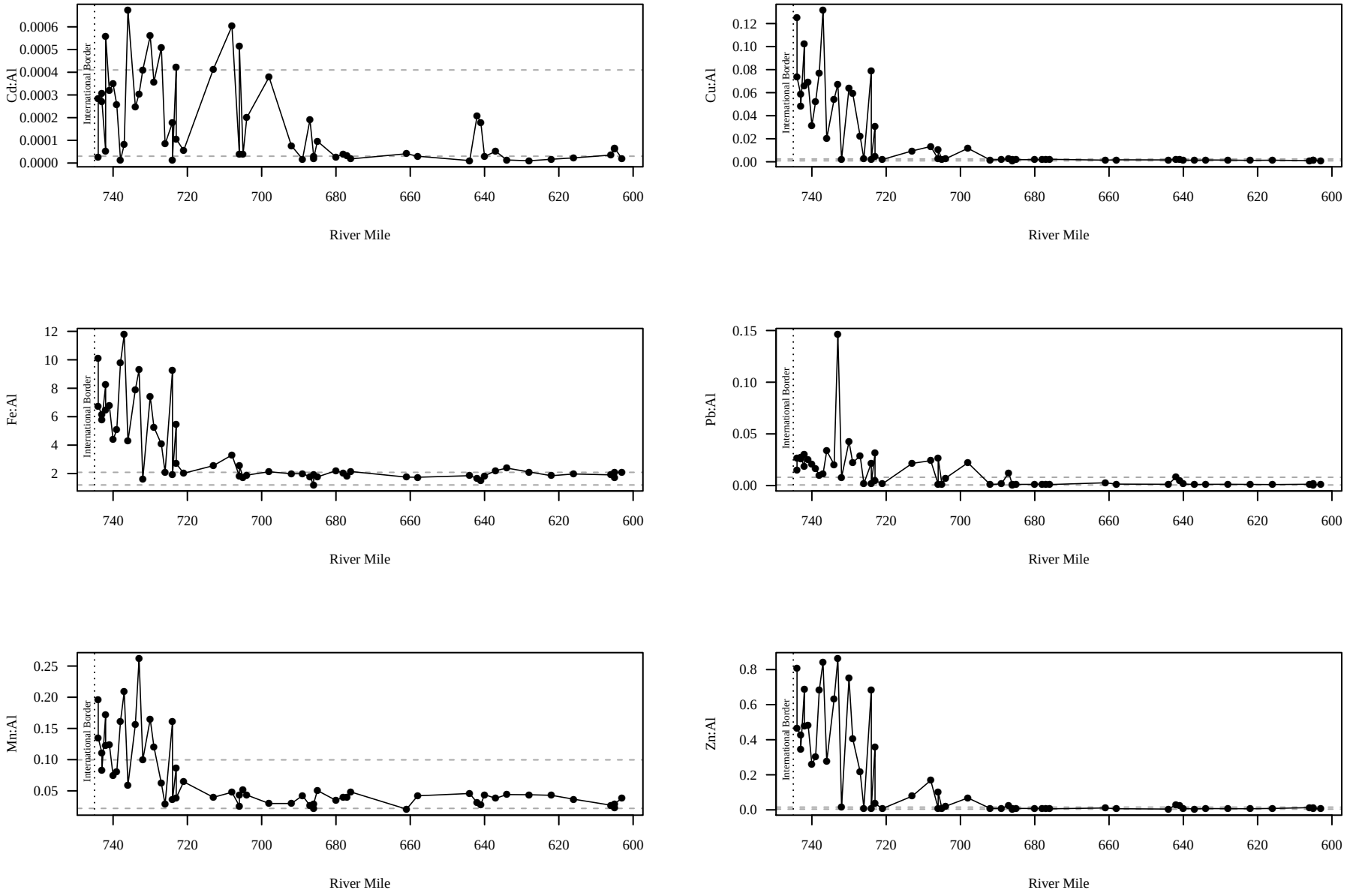


Figure 5.3. Slag classification of sediments in the Upper Columbia River using the Cu:Al model. Dashed lines represent the range of ratios at the reference stations.

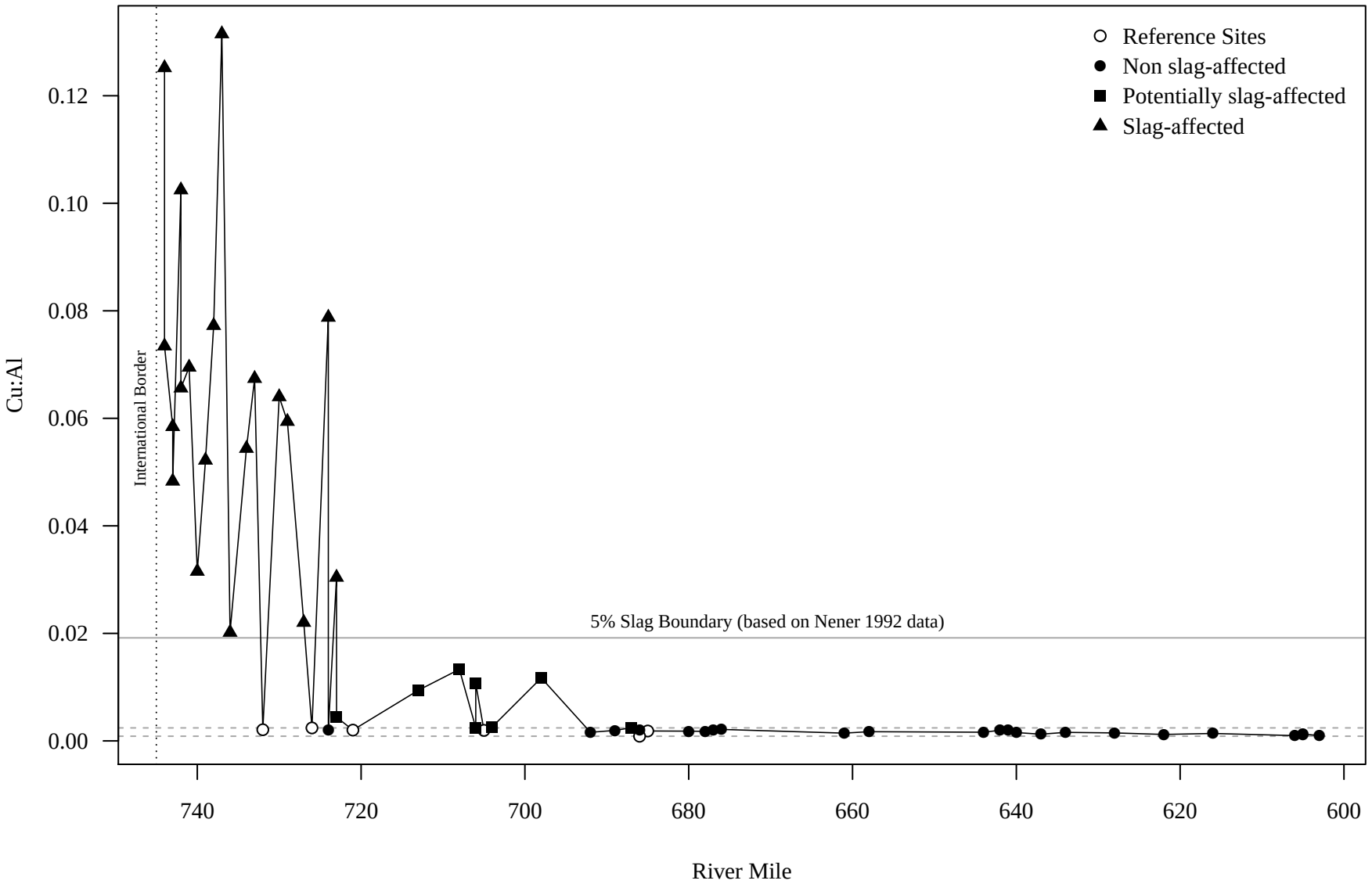


Figure 5.4. Slag classification of sediments in the Upper Columbia River using the Cu:Al and Zn:Cd model.

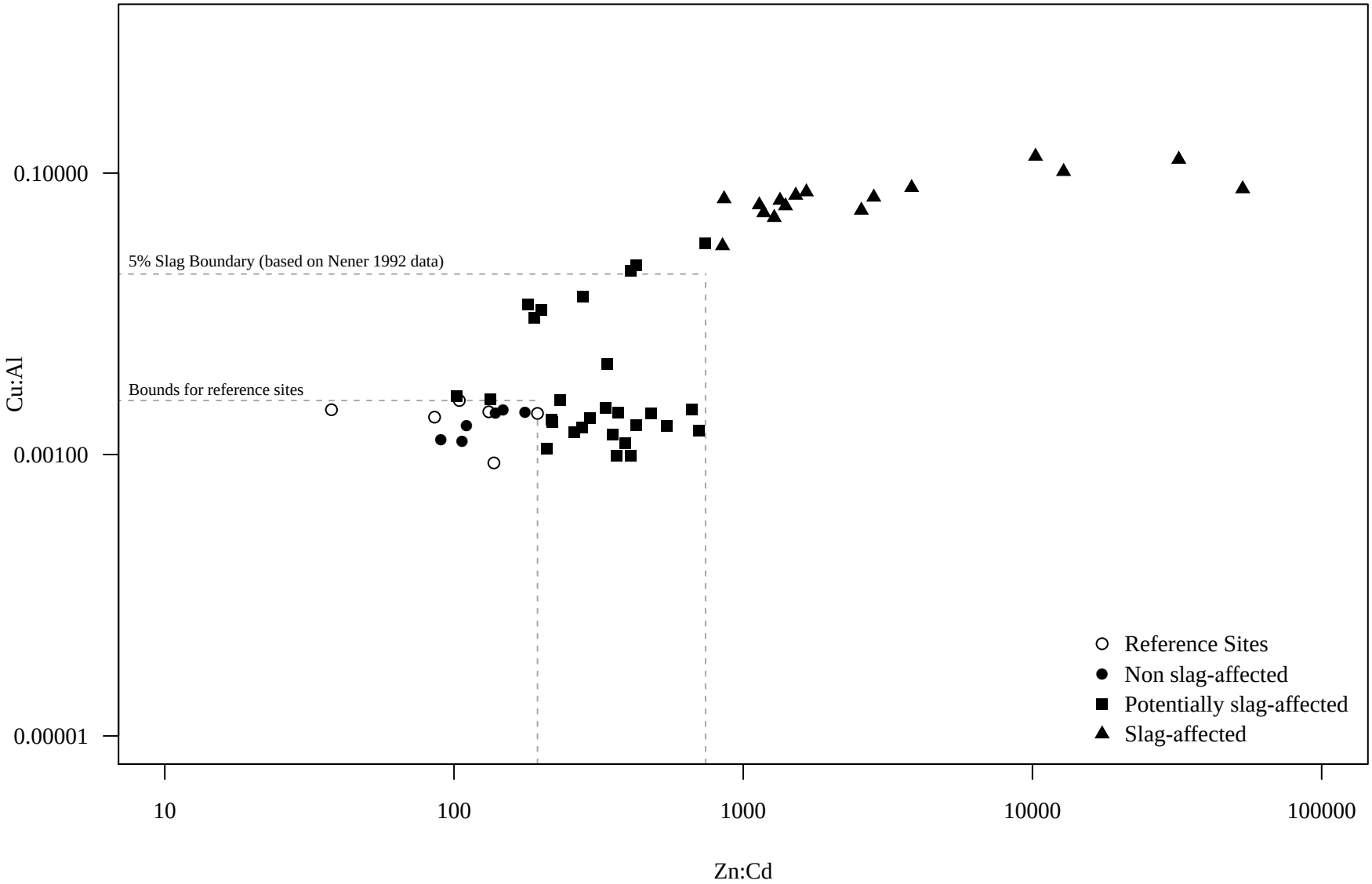


Figure 5.5. Slag classification of sediments in the Upper Columbia River using the Fe:Al and Zn:Cd model.

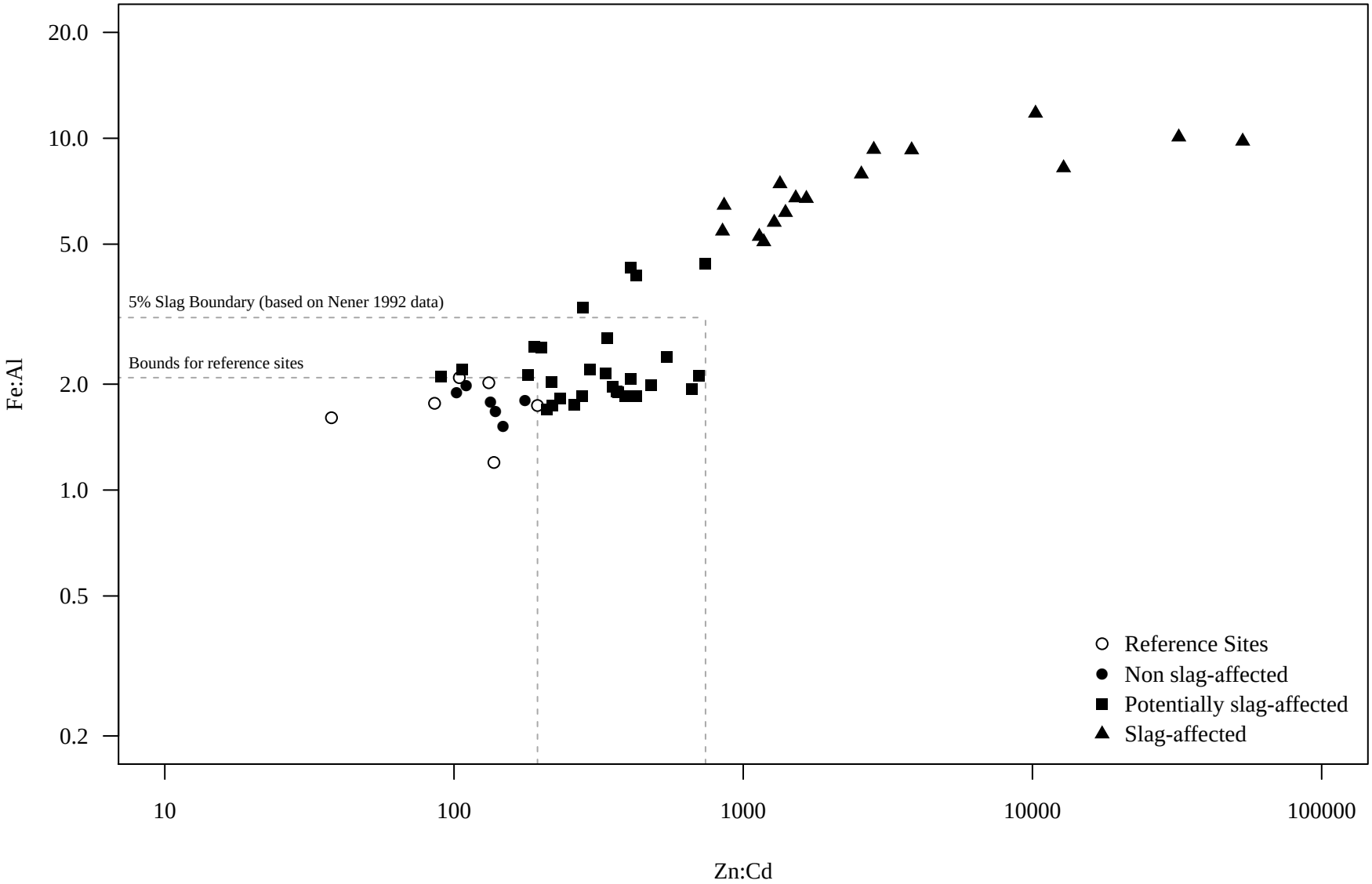


Figure 5.6. Identification of samples affected by slag using the Cu:Al method for samples from the 2005 USEPA sampling program (Stefanoff *et. al.* 2006; Schut and Stefanoff 2007).

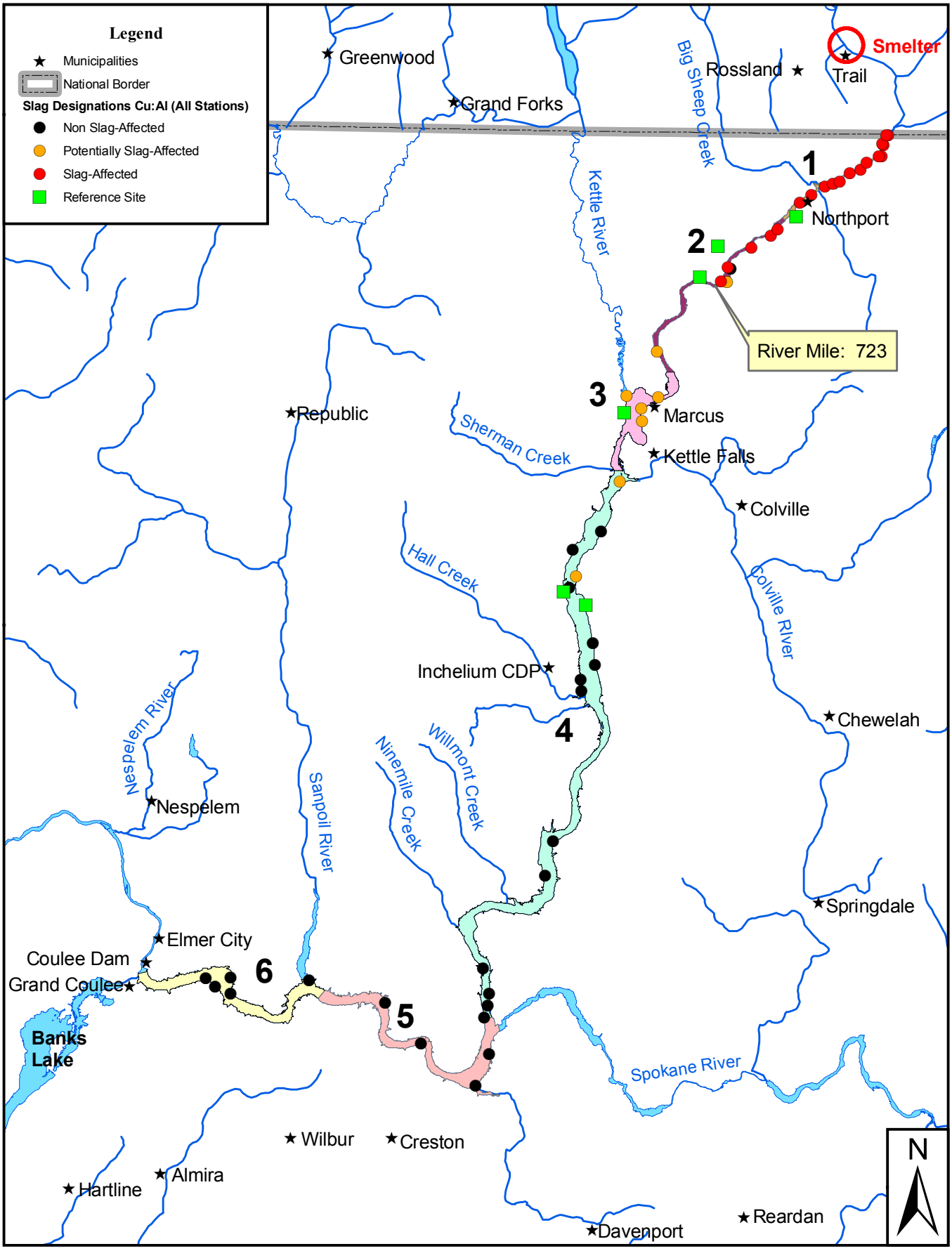


Figure 5.7. Identification of samples affected by slag using the Cu:Al and Zn:Cd method for samples from the 2005 USEPA sampling program (Stefanoff *et. al.* 2006; Schut and Stefanoff 2007).

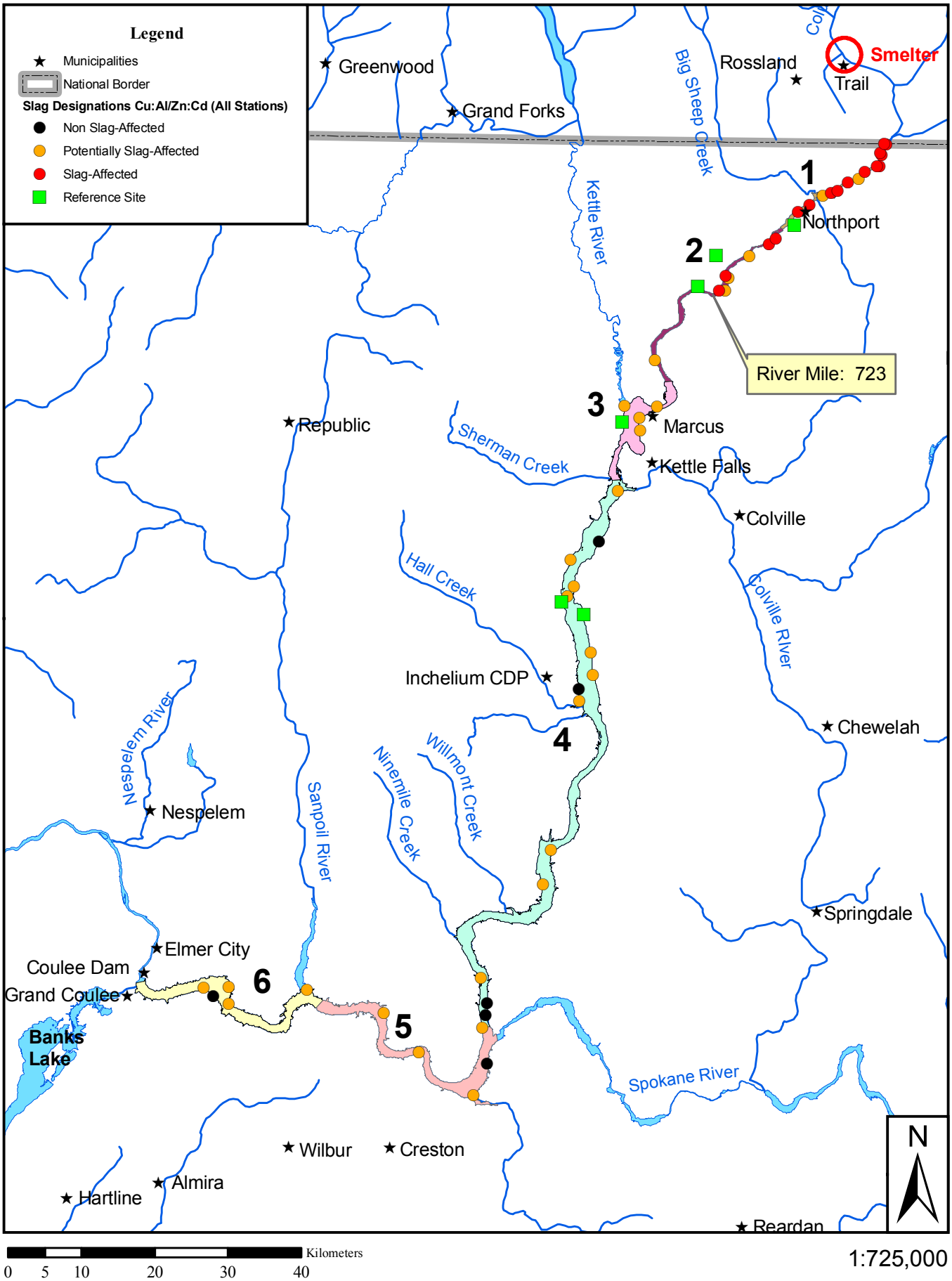


Figure 5.8. Identification of samples affected by slag using the Fe:Al and Zn:Cd method for samples from the 2005 USEPA sampling program (Stefanoff *et. al.* 2006; Schut and Stefanoff 2007).

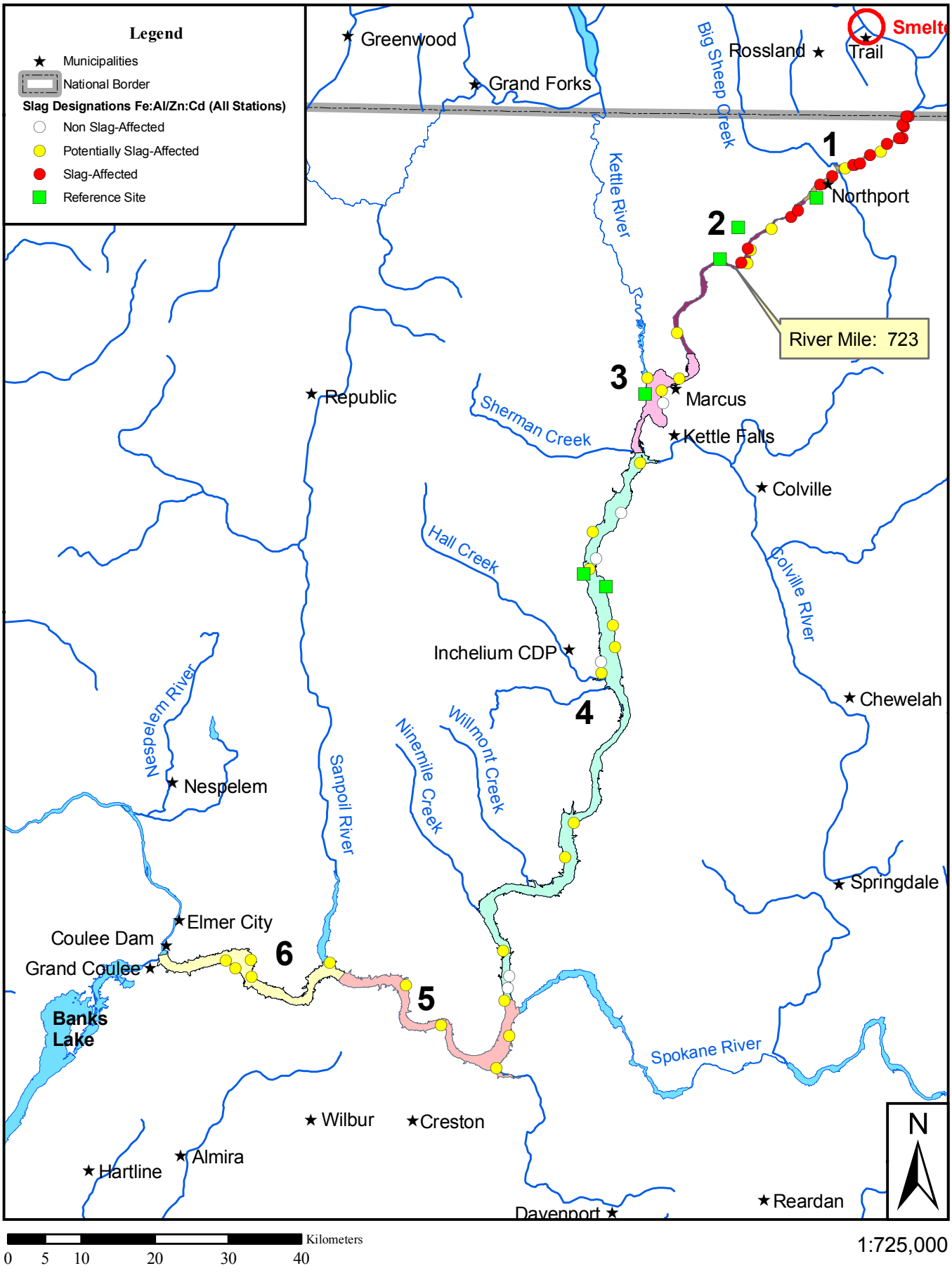


Figure 6.1. Comparison of physical characteristics of sediments at reference and test stations in the Upper Columbia River collected during the 2005 USEPA sampling program (Stefanoff *et al.* 2006; Schut and Stefanoff 2007).

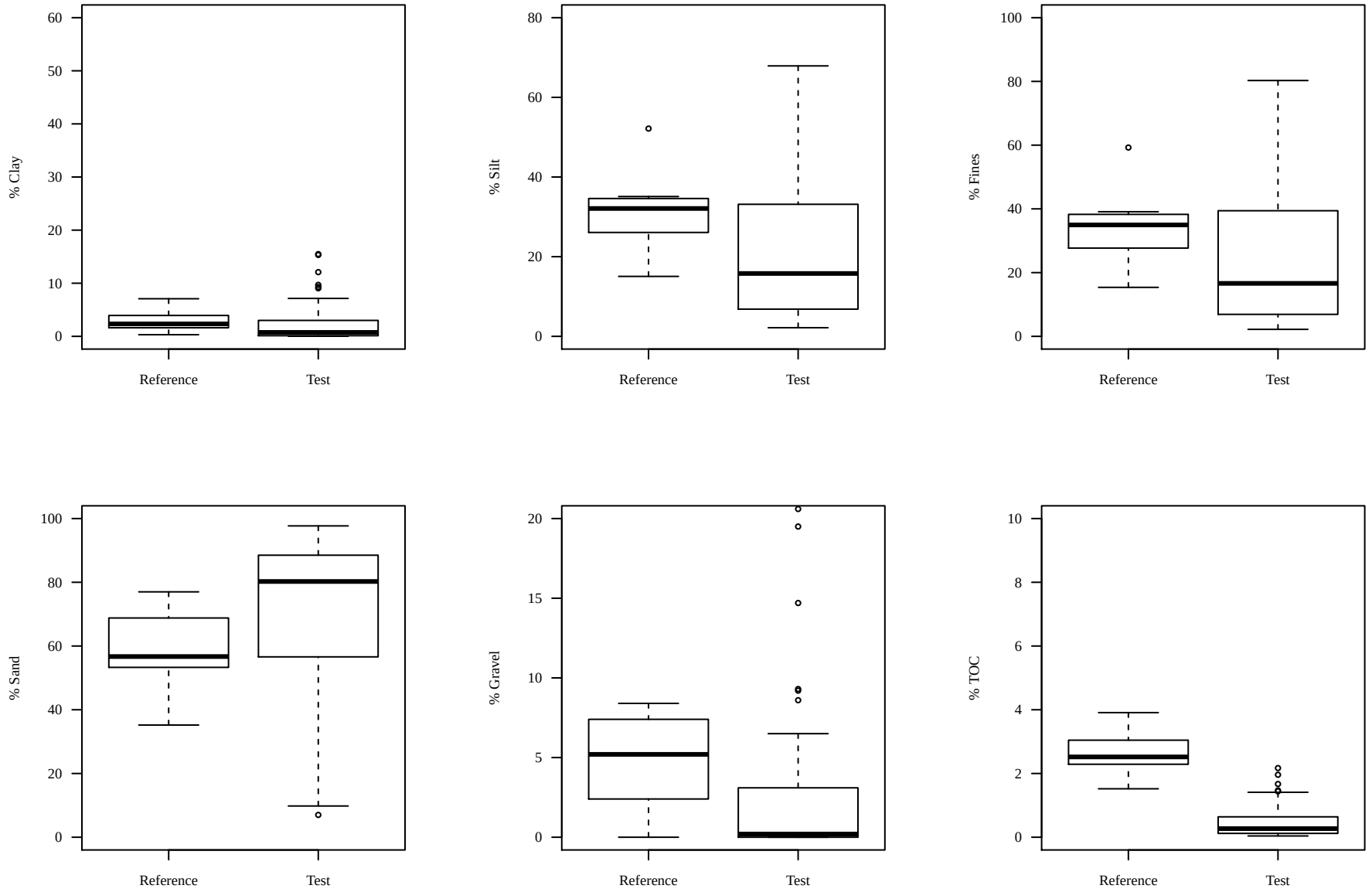


Figure 6.2. Comparison of physical characteristics of sediments at reference and test stations in the Upper Columbia River collected by Besser *et al.* (2008).

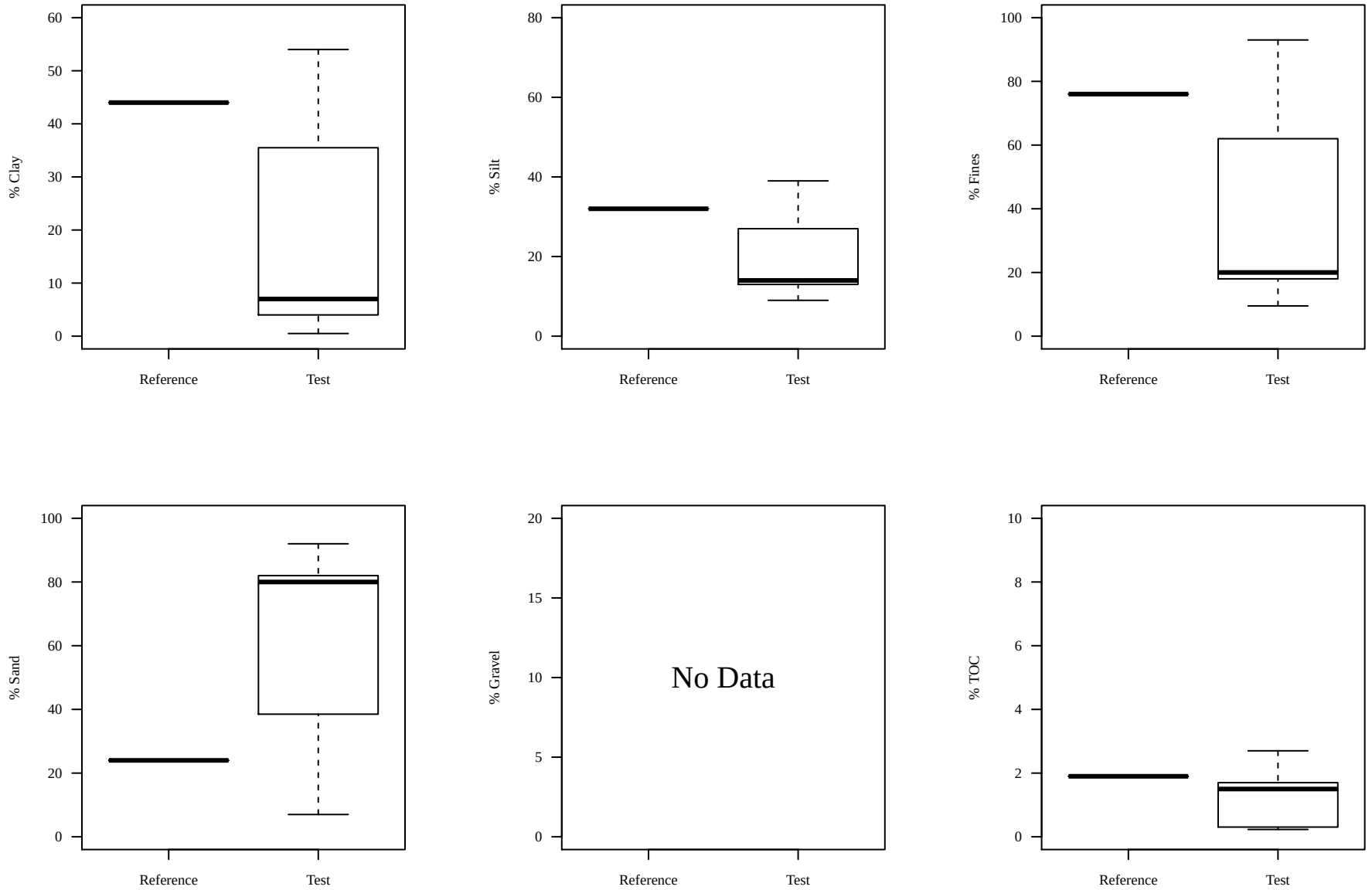


Figure 6.3. Comparison of physical characteristics of sediments at reference and test stations in the Upper Columbia River collected by Bortleson *et al.* (1994).

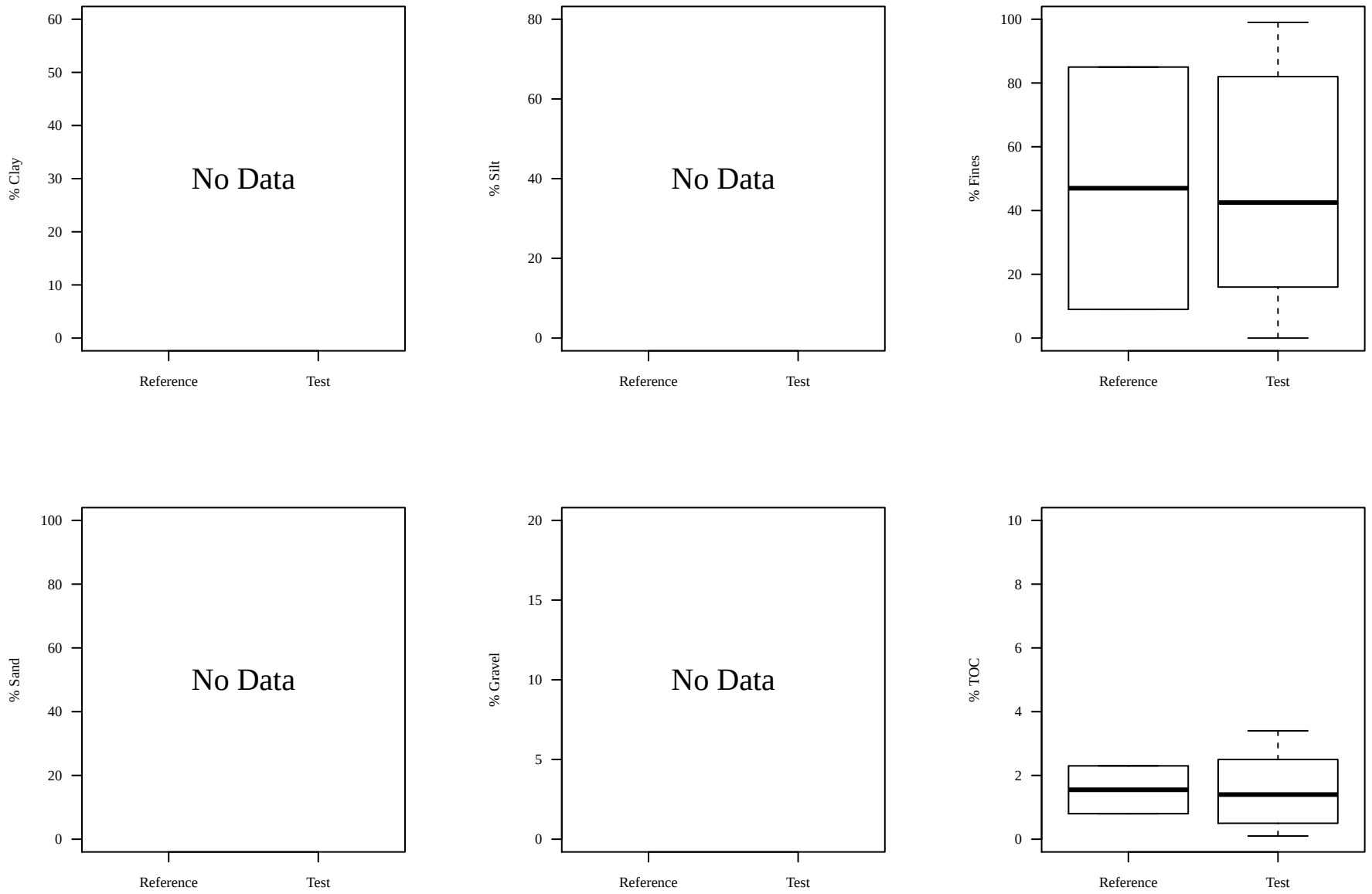


Figure 6.4. Comparison of *Chironomus dilutus* control−adjusted survival and physical characteristics of surficial sediments at reference stations in the Upper Columbia River (Stefanoff *et al.* 2006; Schut and Stefanoff 2007).

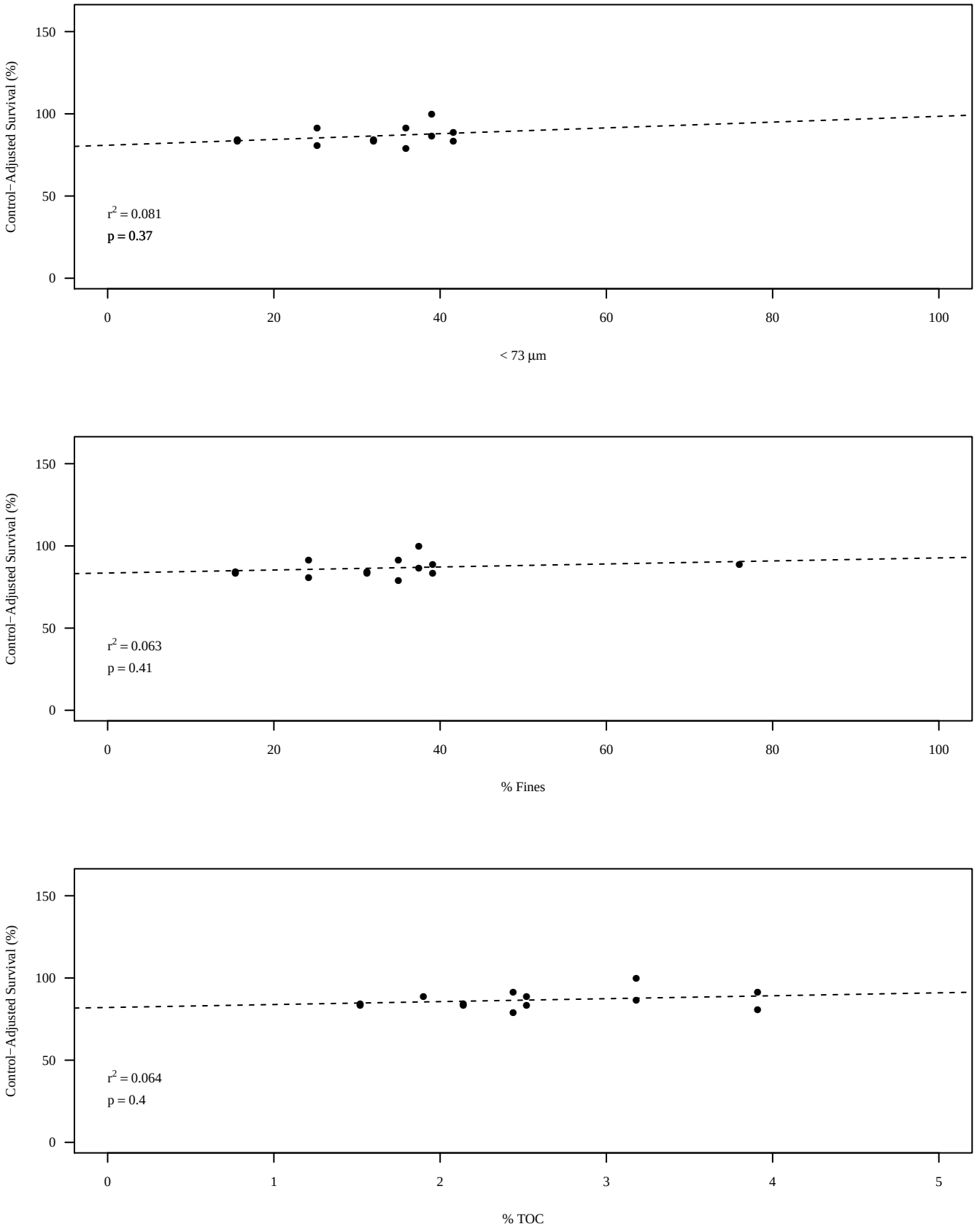


Figure 6.5. Comparison of *Chironomus dilutus* control−adjusted growth and physical characteristics of surficial sediments at reference stations in the Upper Columbia River (Stefanoff *et al.* 2006; Schut and Stefanoff 2007).

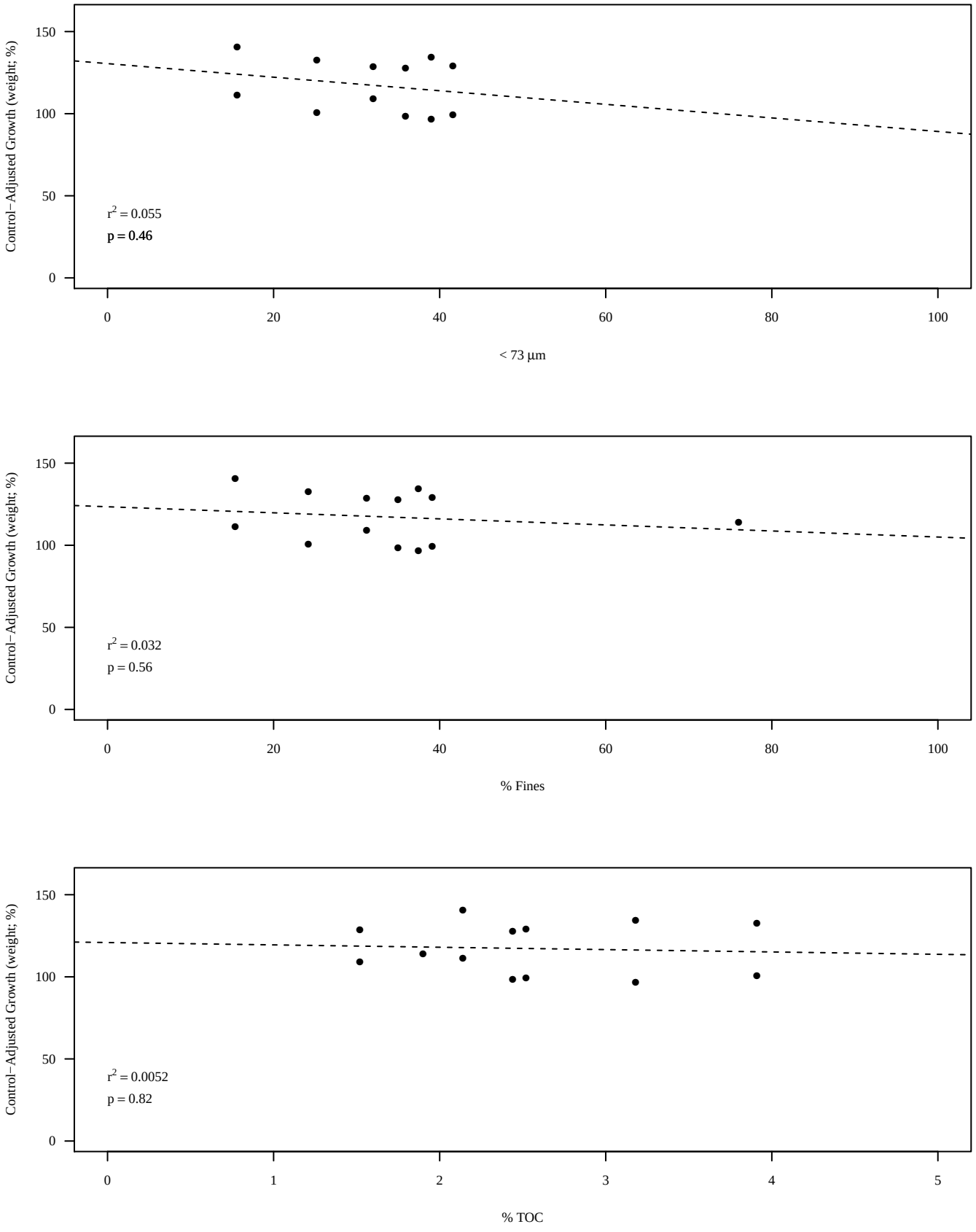


Figure 6.6. Comparison of *Chironomus dilutus* control−adjusted biomass and physical characteristics of surficial sediments at reference stations in the Upper Columbia River (Stefanoff *et al.* 2006; Schut and Stefanoff 2007).

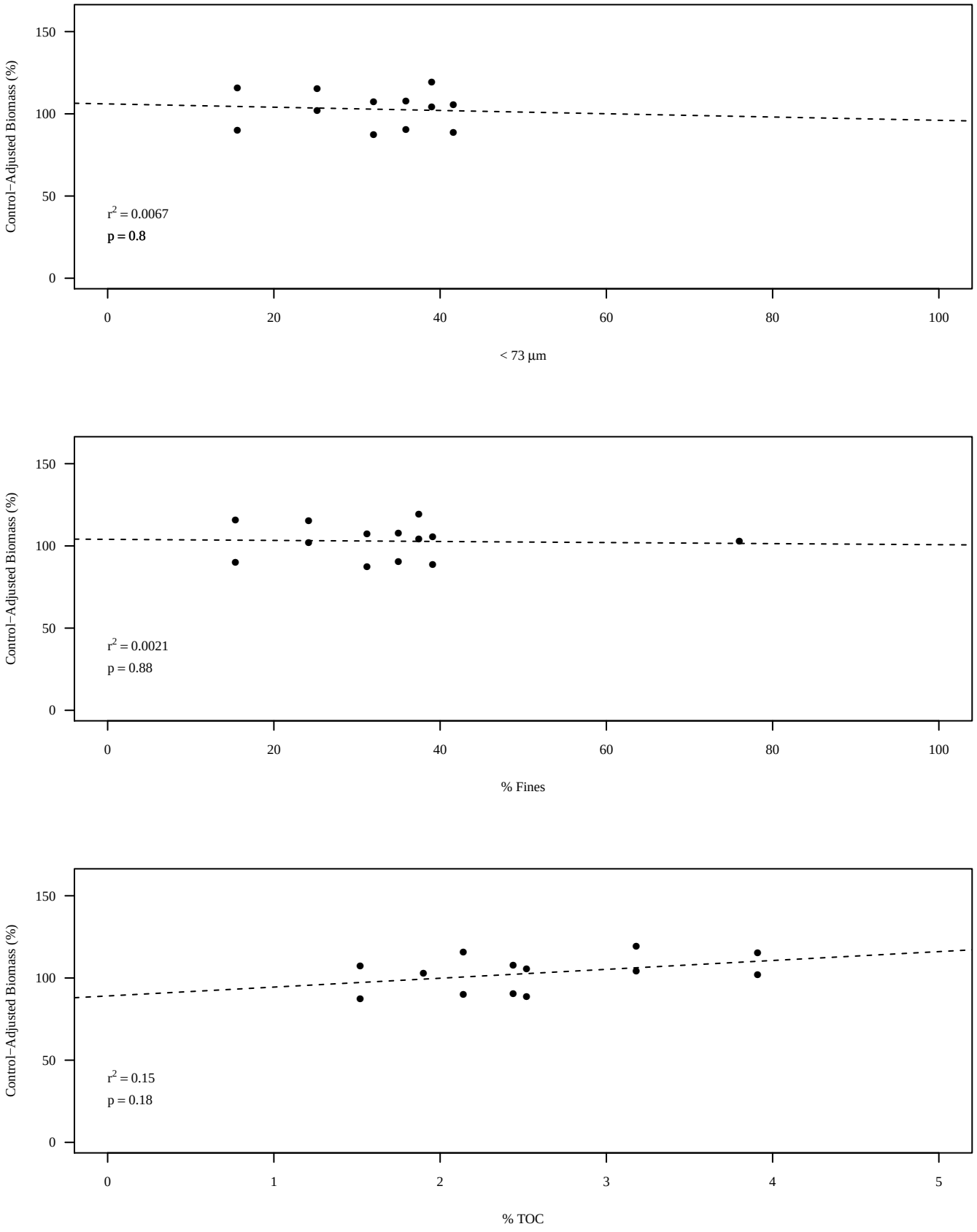


Figure 6.7. Comparison of *Hyalella azteca* control−adjusted survival and physical characteristics of surficial sediments at reference stations in the Upper Columbia River (Stefanoff *et al.* 2006; Schut and Stefanoff 2007).

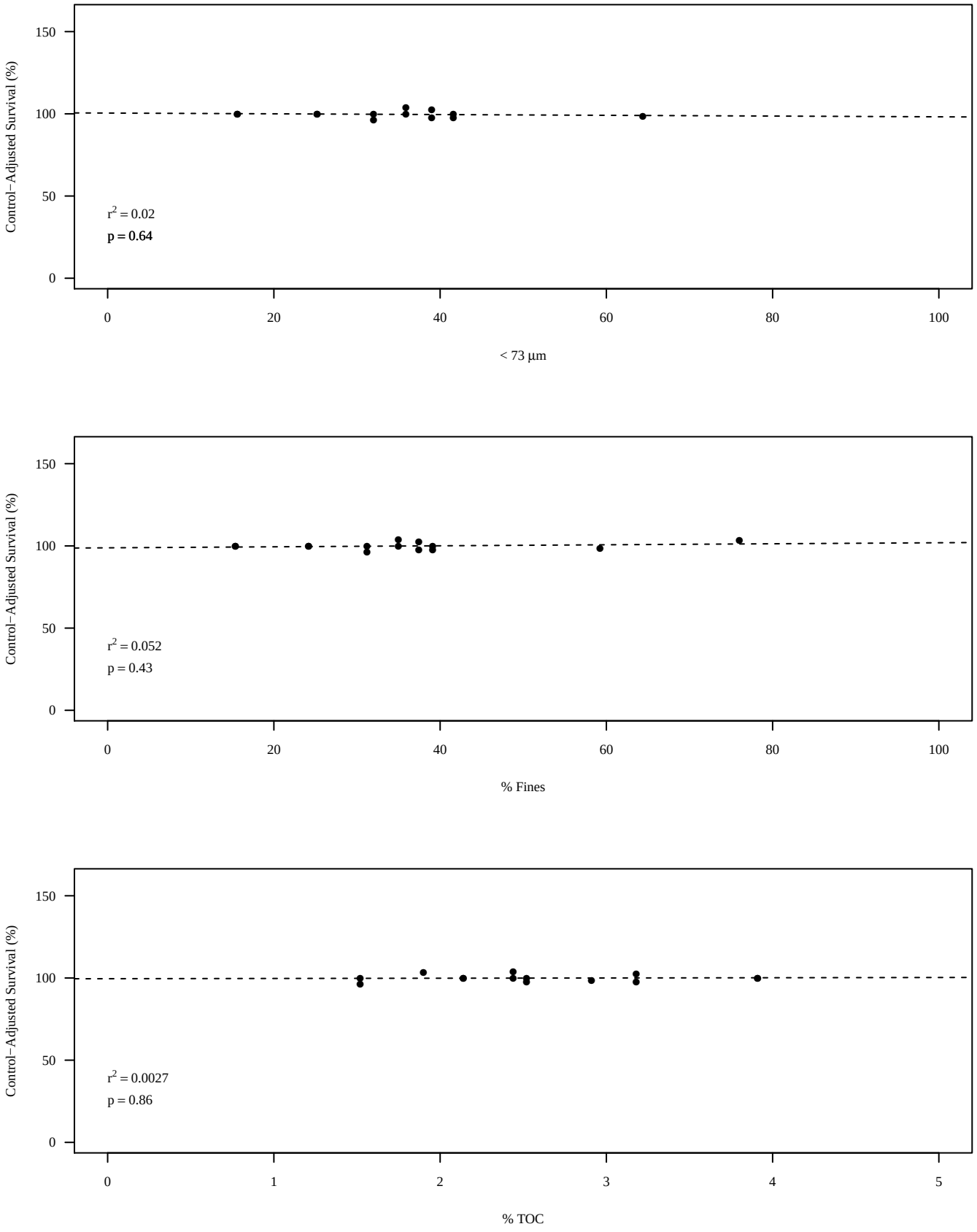


Figure 6.8. Comparison of *Hyalella azteca* control−adjusted growth and physical characteristics of surficial sediments at reference stations in the Upper Columbia River (Stefanoff *et al.* 2006; Schut and Stefanoff 2007).

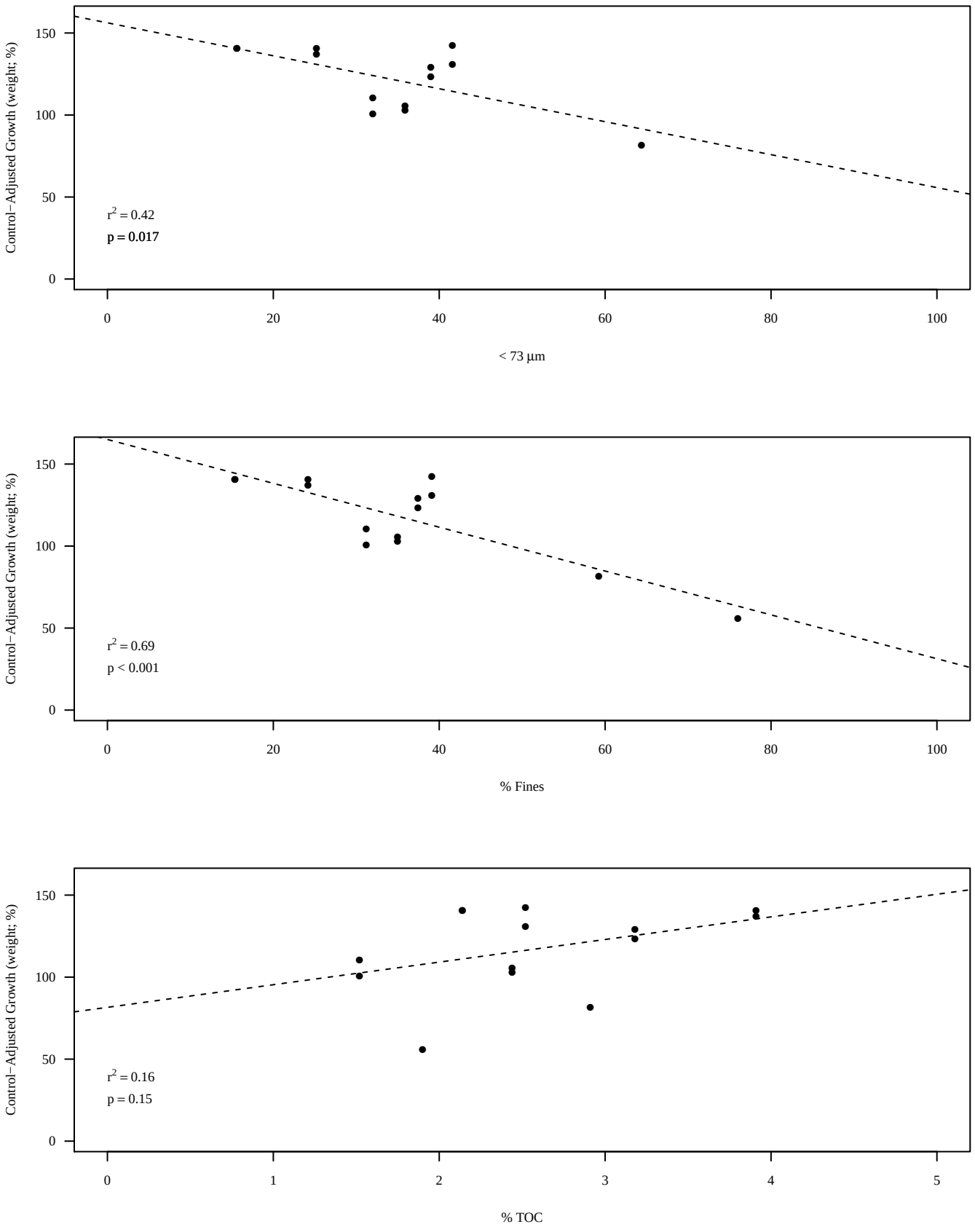


Figure 6.9. Comparison of *Hyalella azteca* control−adjusted biomass and physical characteristics of surficial sediments at reference stations in the Upper Columbia River (Stefanoff *et al.* 2006; Schut and Stefanoff 2007).

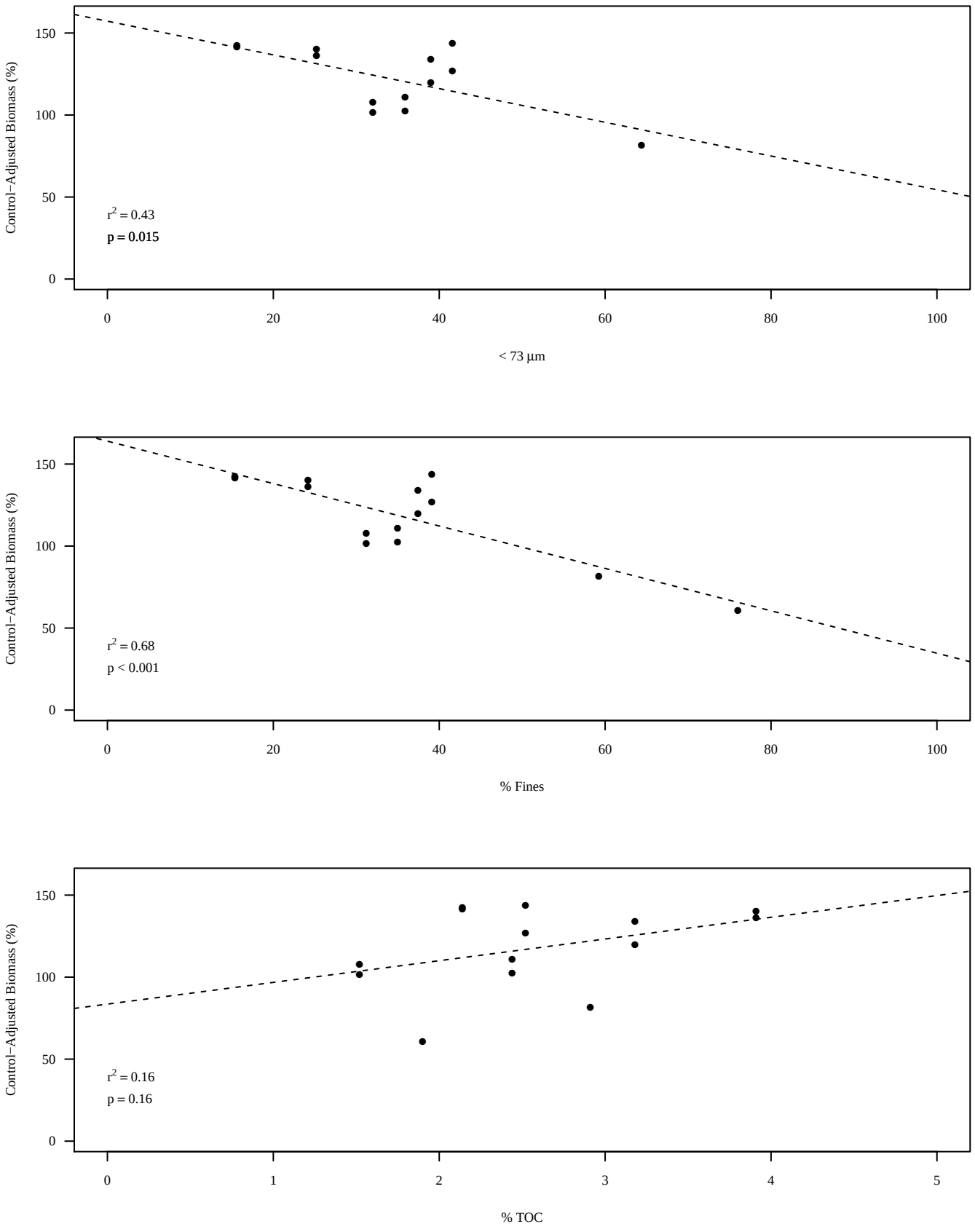


Figure 6.10. Map of the Upper Columbia River showing toxic and not toxic stations for toxicity of all species, inclusive of all endpoints. (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

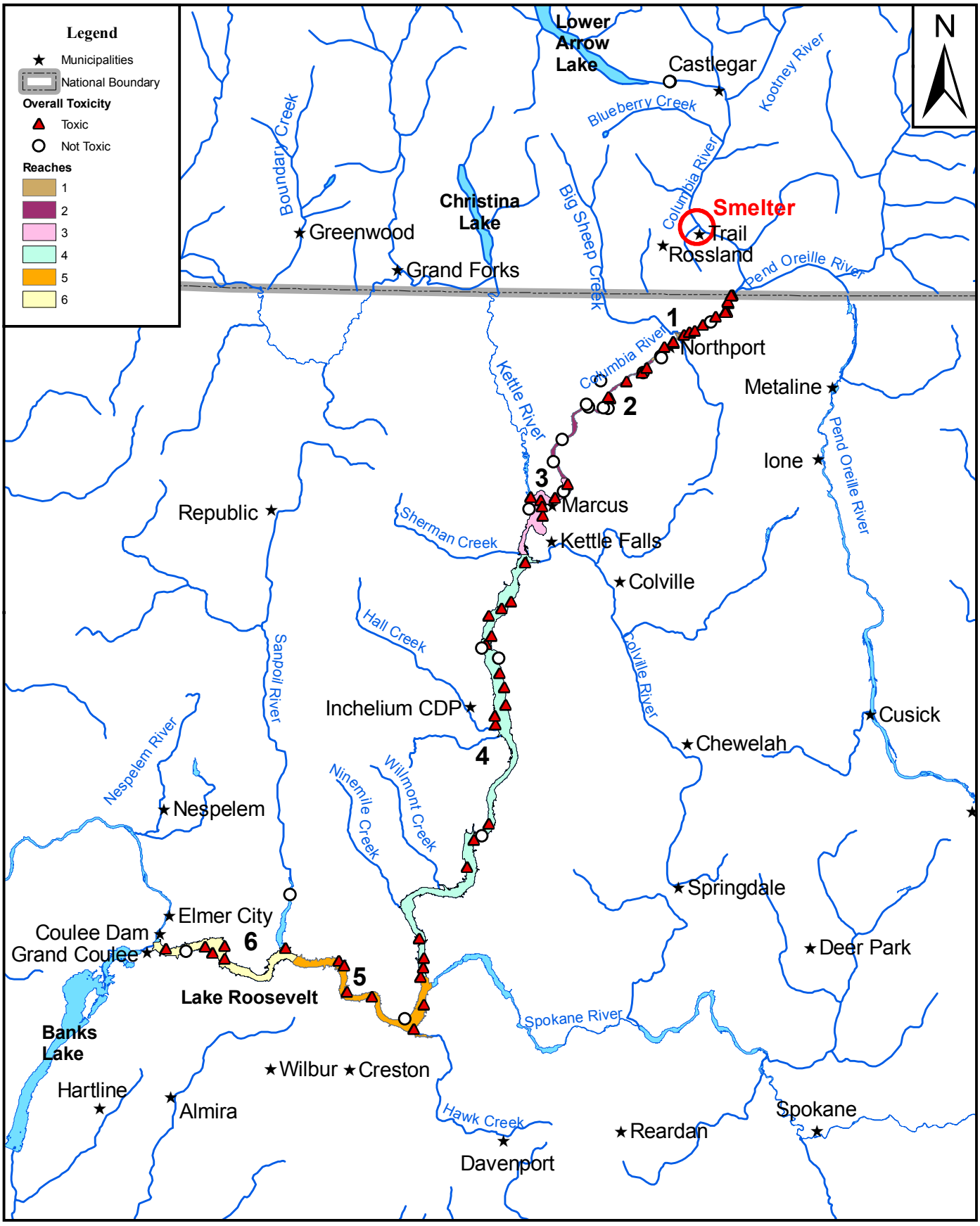


Figure 6.11. Pie symbology categorization for toxic stations for all species and endpoints.

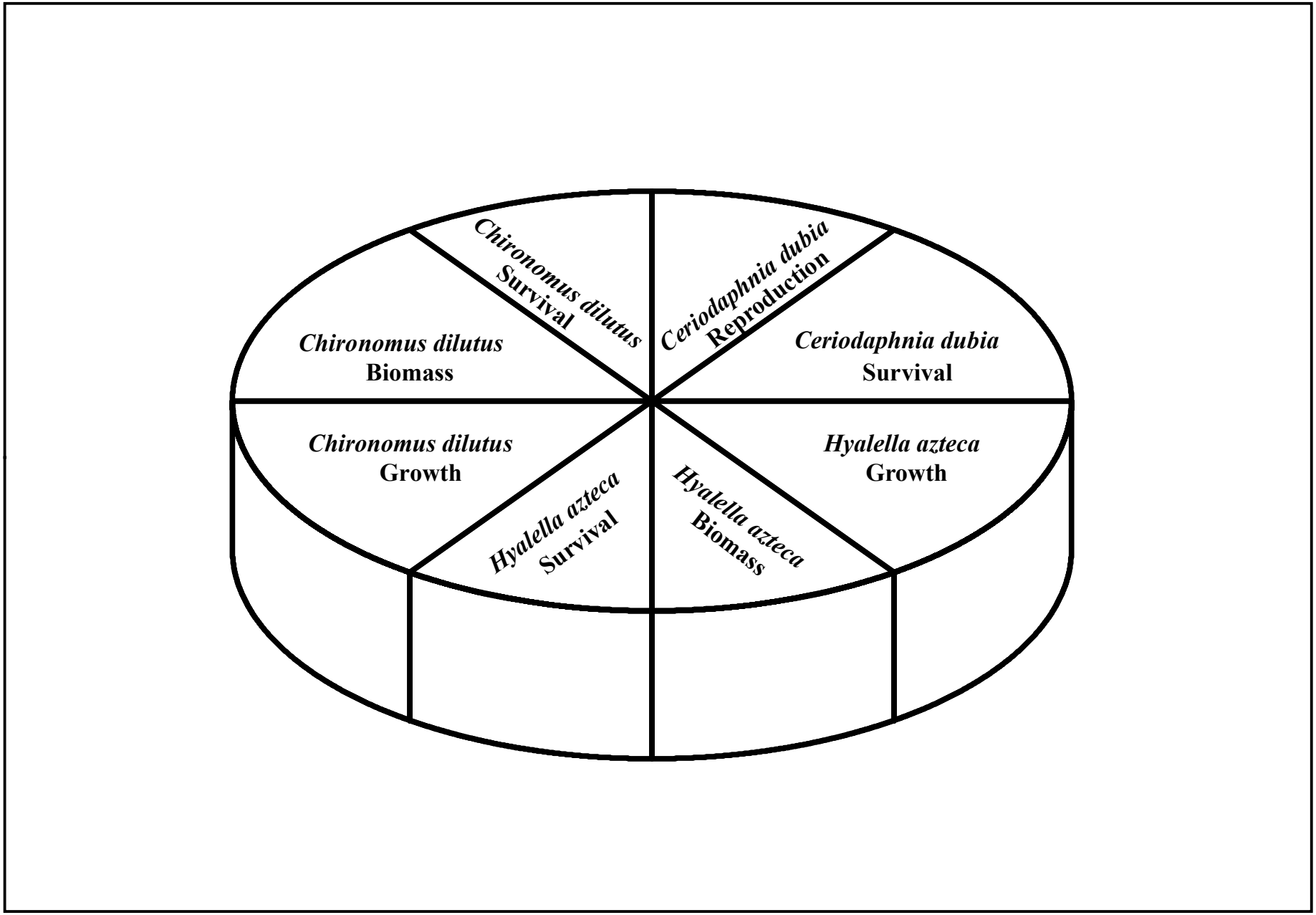


Figure 6.12. Map showing the results of toxicity tests conducted with all three species using sediment samples from Reach 1 of the Upper Columbia River. (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

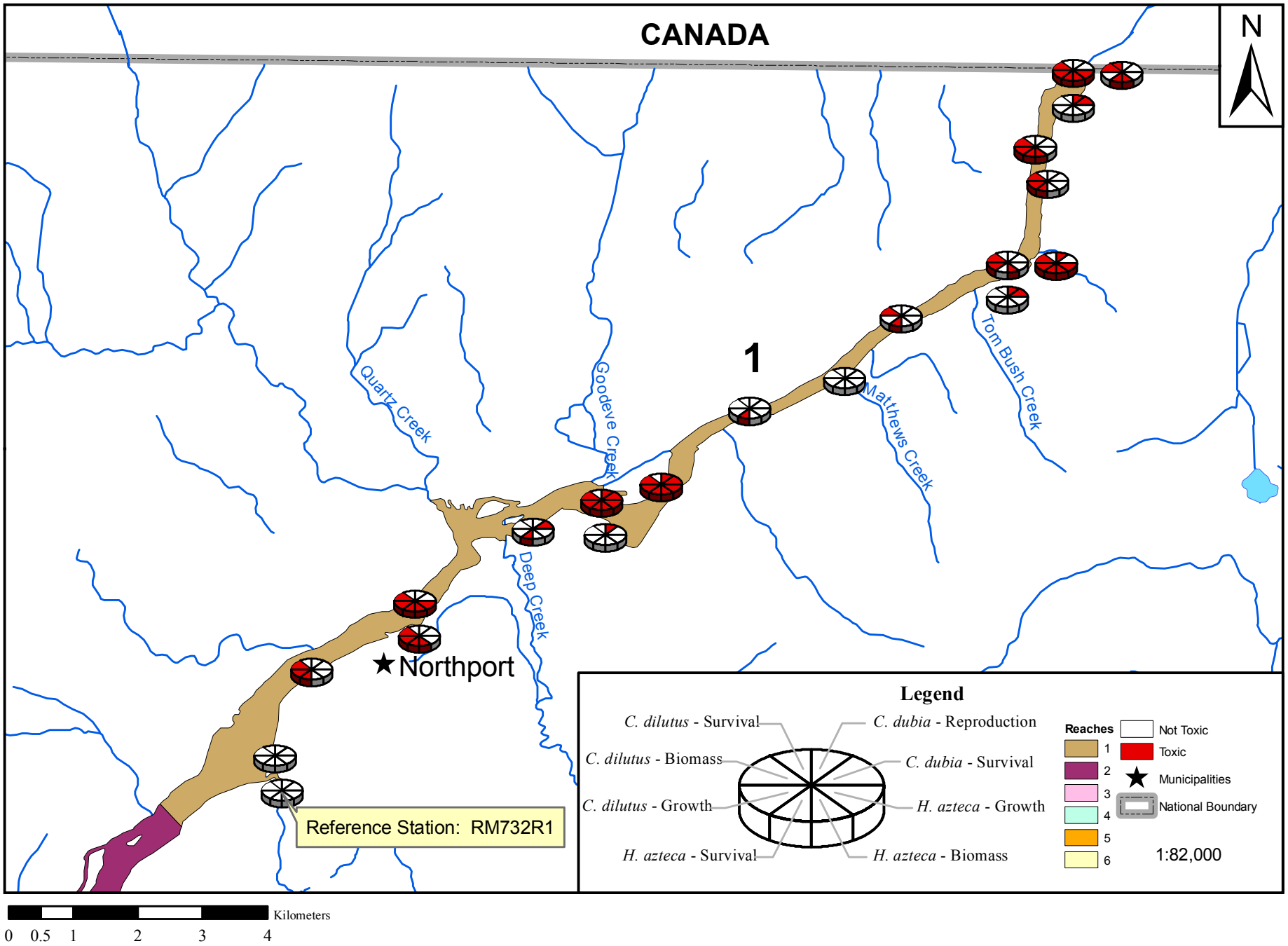


Figure 6.13. Map showing the results of toxicity tests conducted with all three species using sediment samples from Reach 2 of the Upper Columbia River. (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

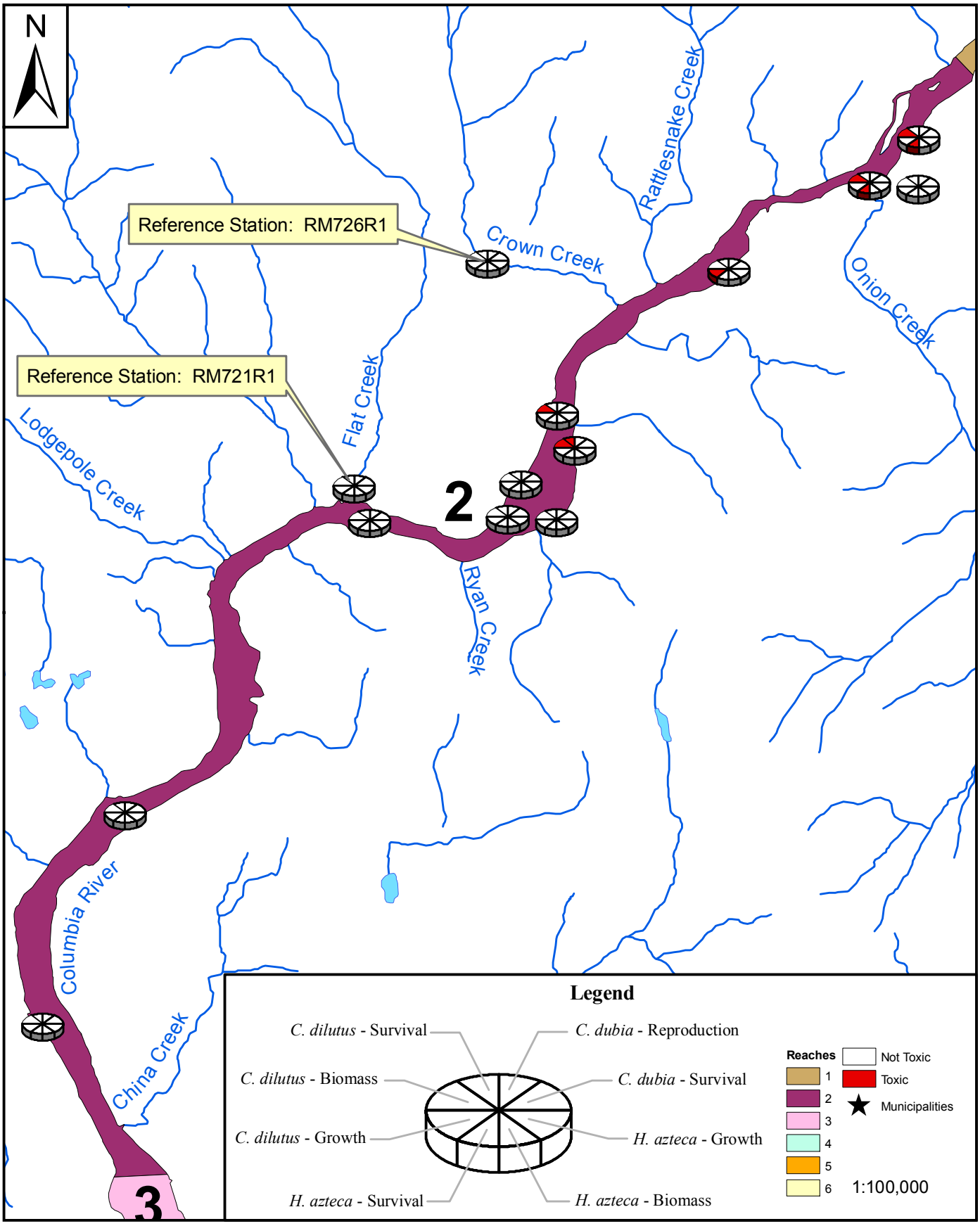


Figure 6.14. Map showing the results of toxicity tests conducted with all three species using sediment samples from Reach 3 of the Upper Columbia River. (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

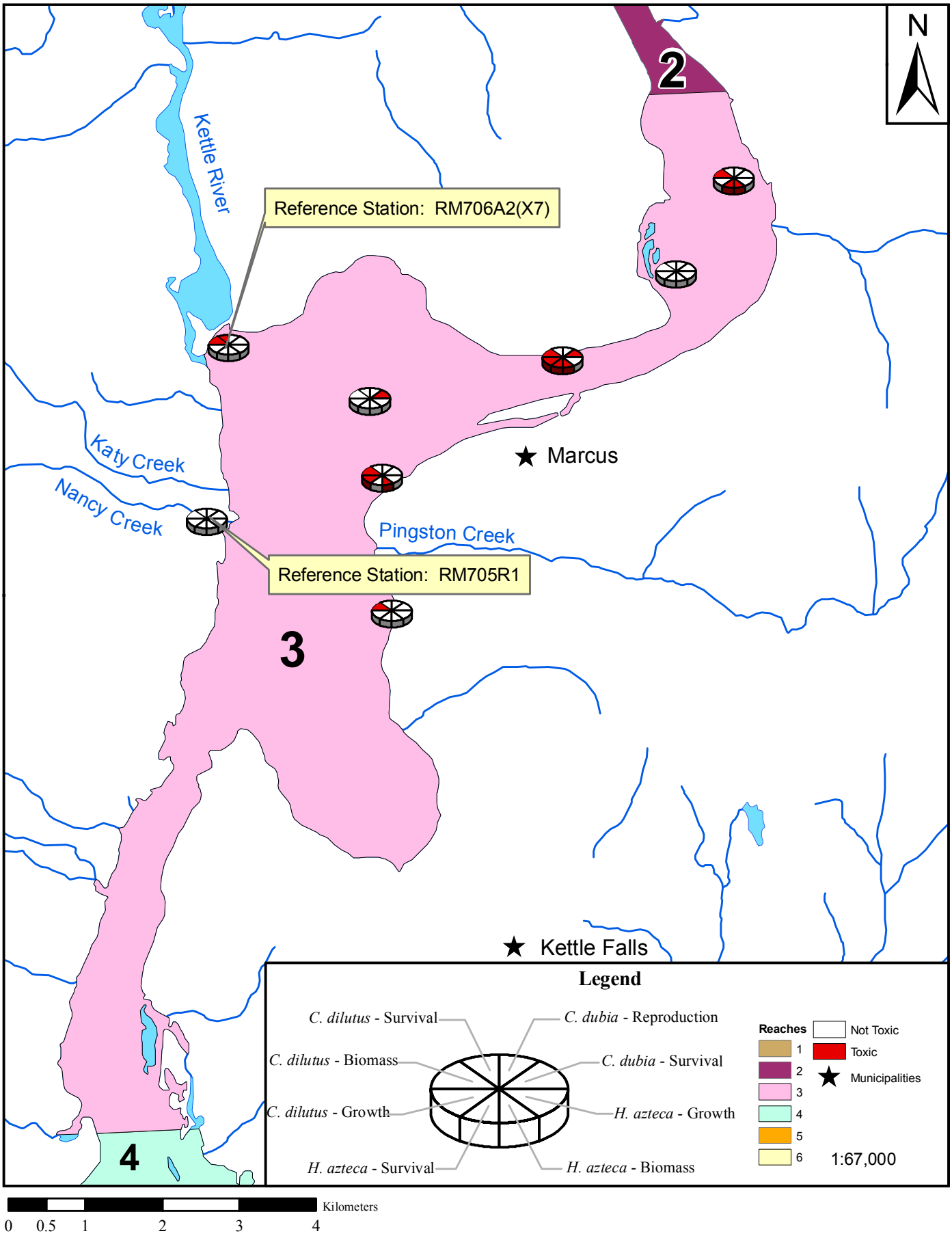


Figure 6.15. Map showing the results of toxicity tests conducted with all three species using sediment samples from Reach 4 of the Upper Columbia River. (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

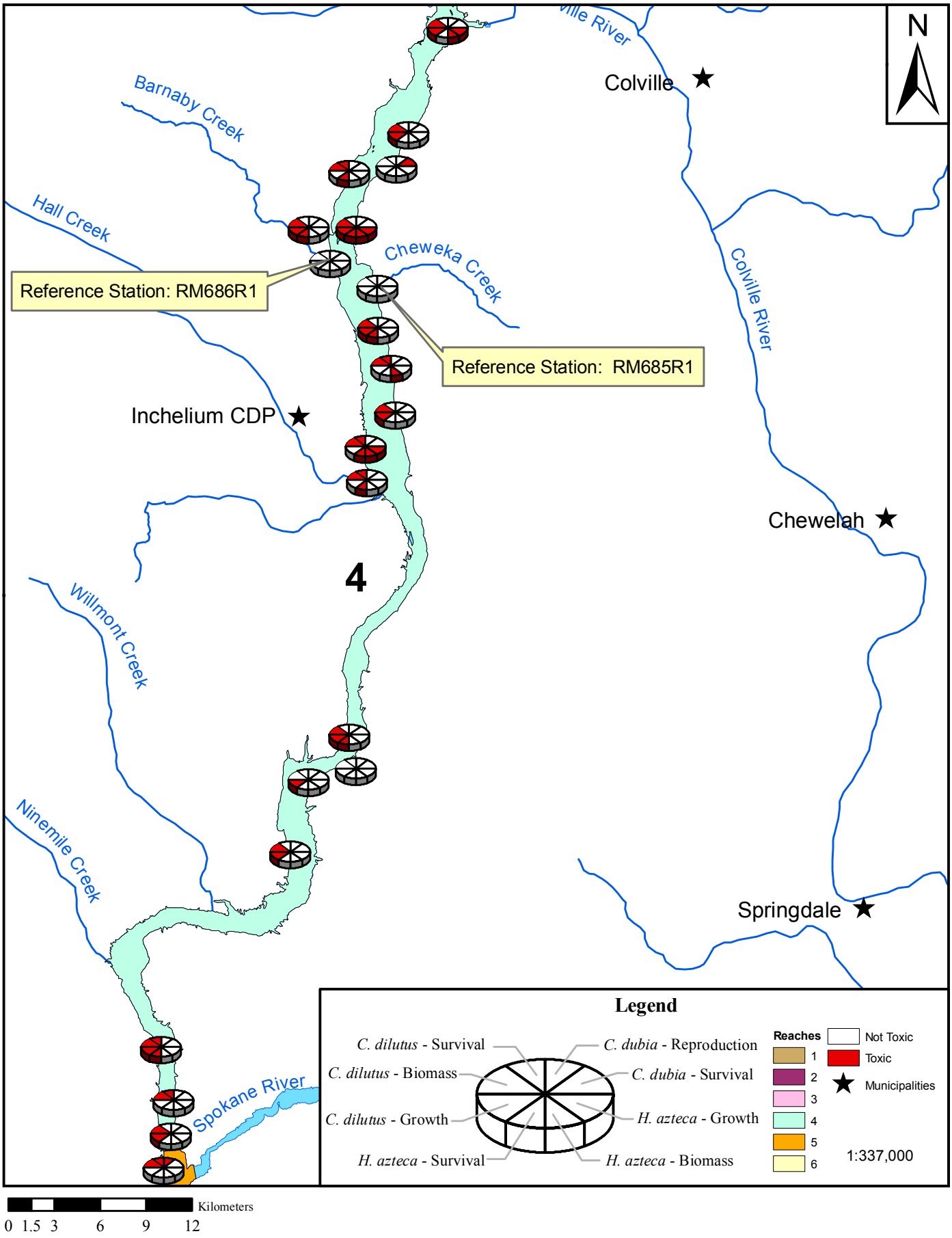


Figure 6.16. Map showing the results of toxicity tests conducted with all three species using sediment samples from Reach 5 of the Upper Columbia River. (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

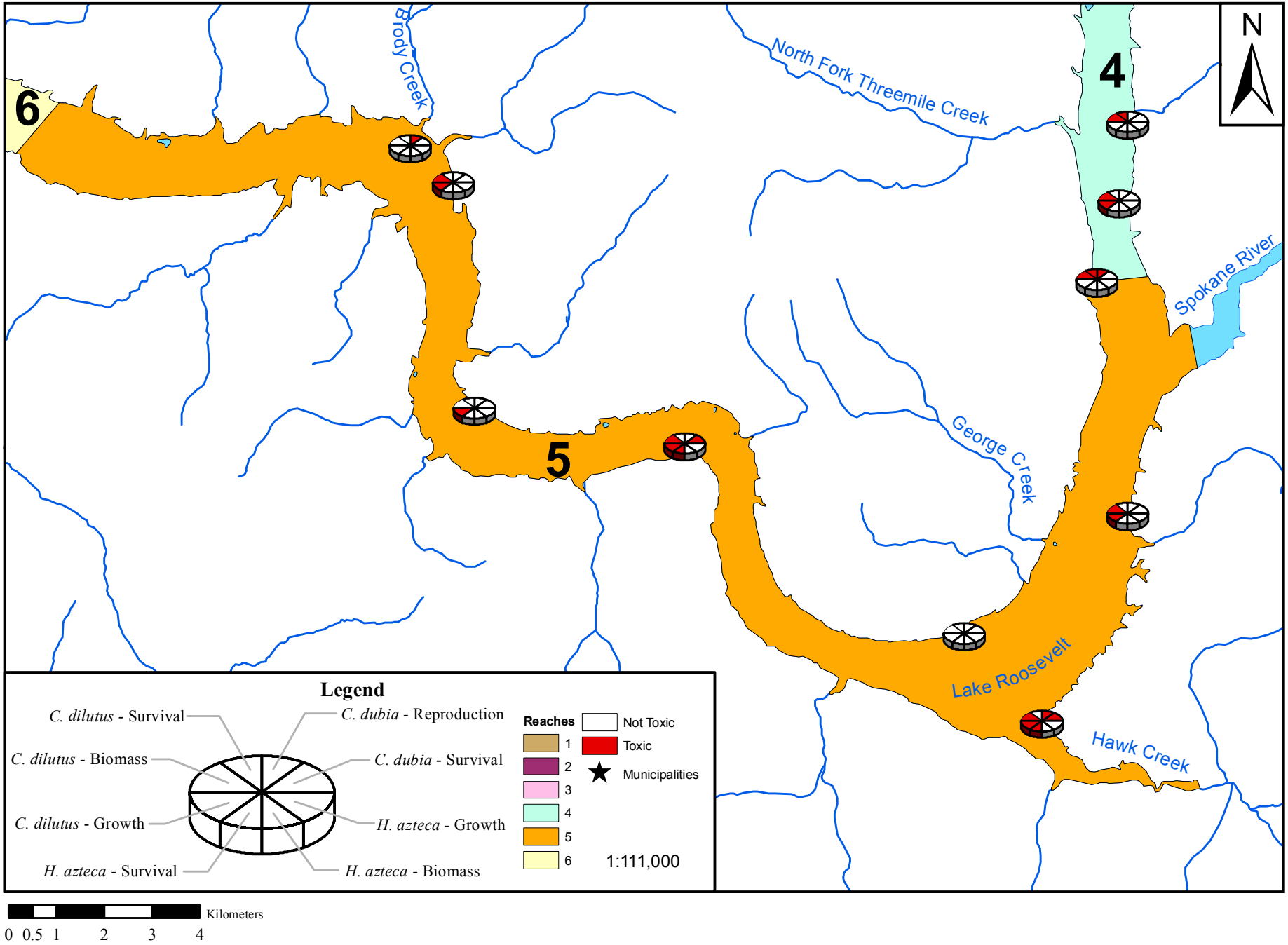


Figure 6.17. Map showing the results of toxicity tests conducted with all three species using sediment samples from Reach 6 of the Upper Columbia River. (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

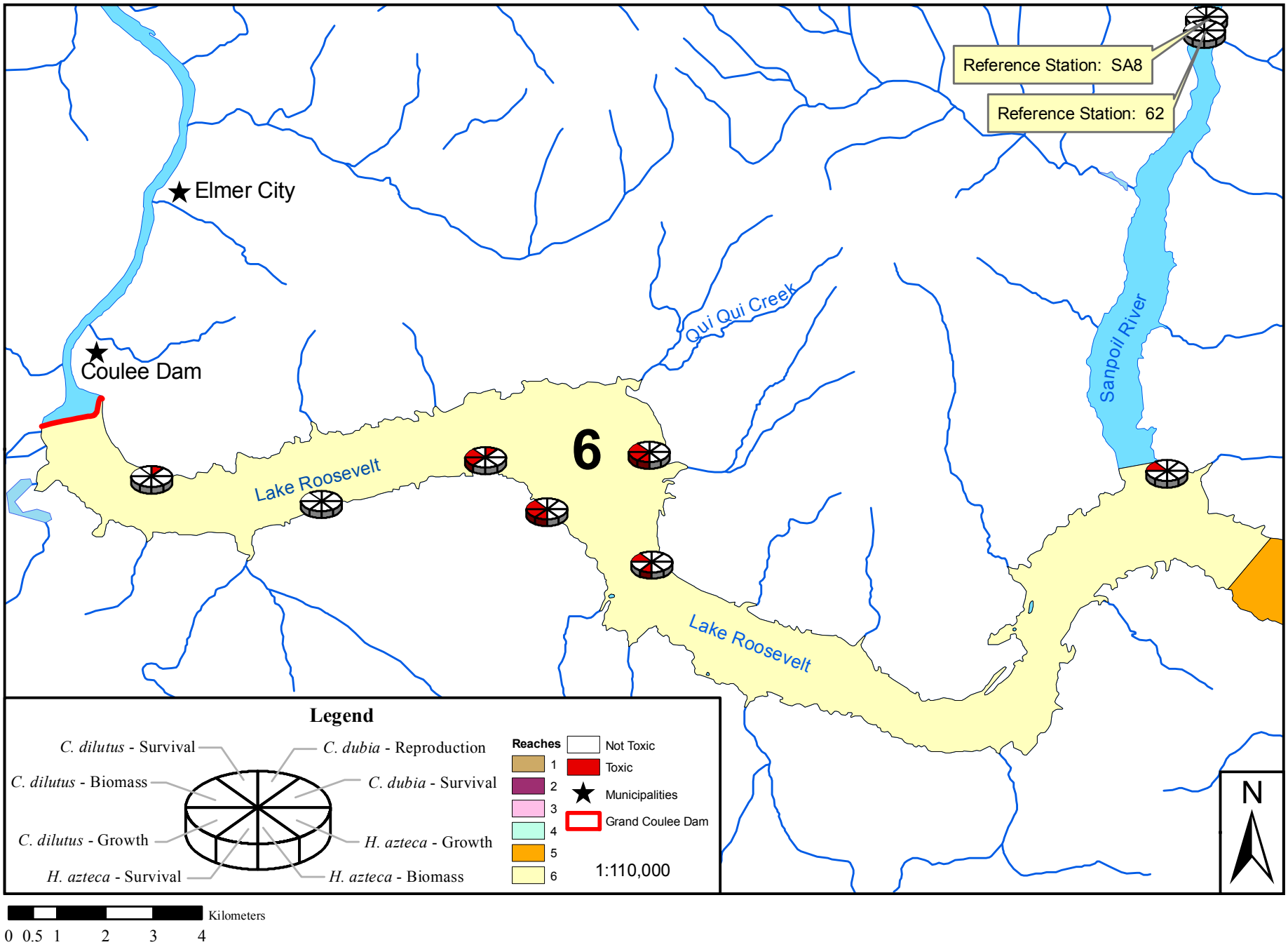


Figure 6.18. Map of the Upper Columbia River showing the results of toxicity tests conducted with the amphipod, *Hyalella azteca* (Survival, Growth, and Biomass). (Note: Each sediment sample was designated as not toxic, moderately impacted, or highly impacted using the reference envelope approach, as described in Section 6.7).

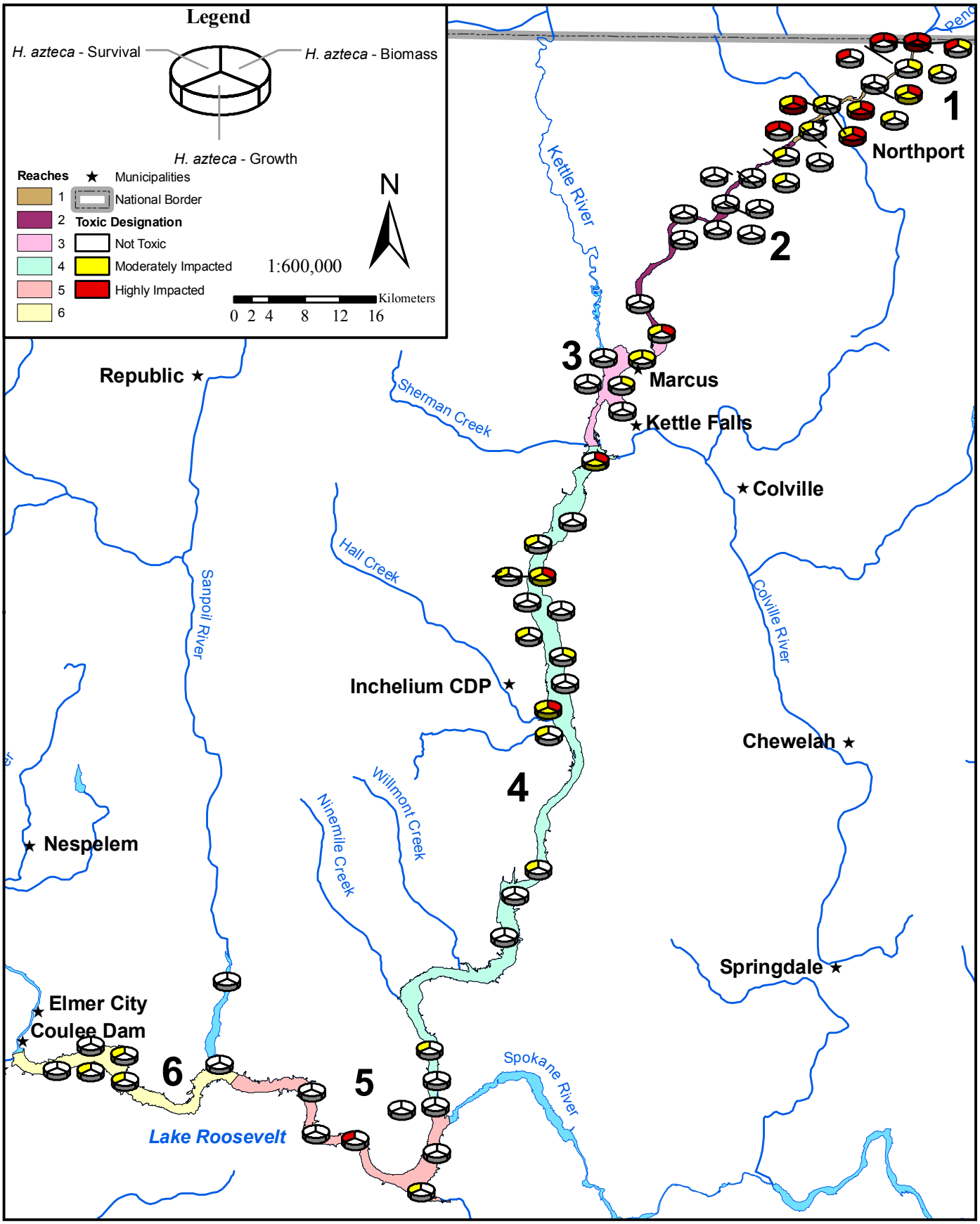


Figure 6.19. Map of the Upper Columbia River showing toxic and not toxic stations for *Hyalella azteca* (Survival). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

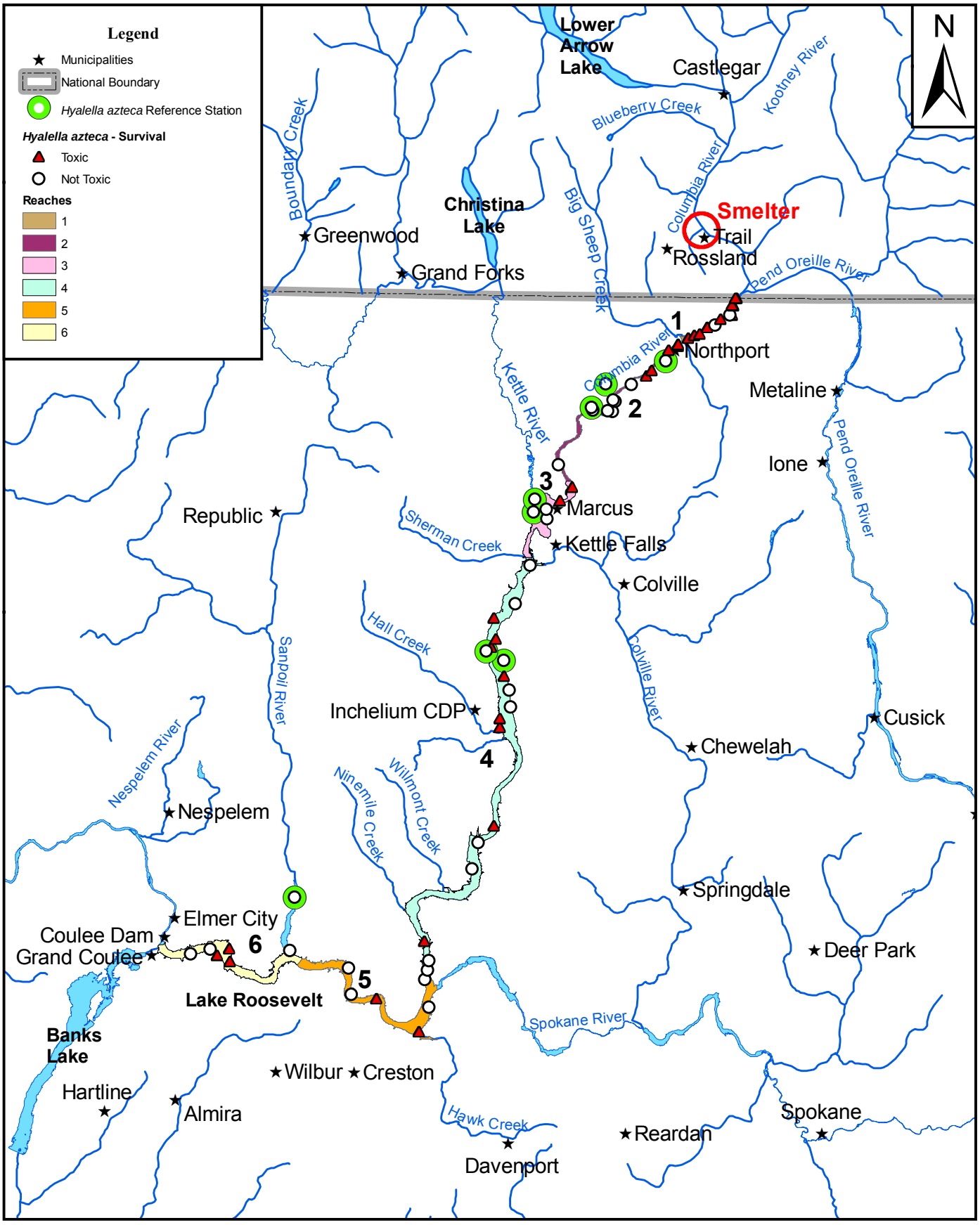


Figure 6.20. Map of the Upper Columbia River showing toxic and not toxic stations for *Hyalella azteca* (Growth). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

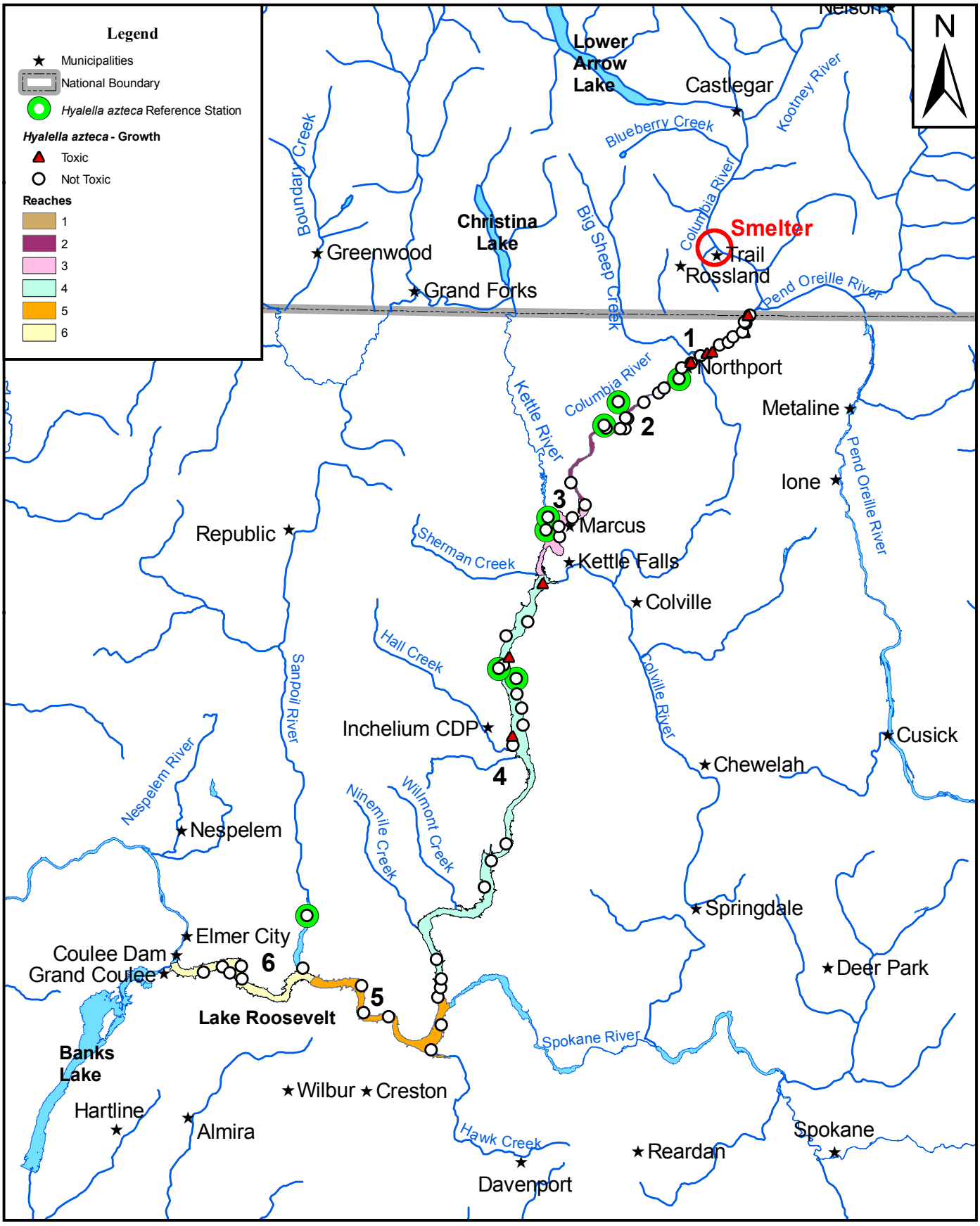


Figure 6.21. Map of the Upper Columbia River showing toxic and not toxic stations for *Hyalella azteca* (Biomass). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

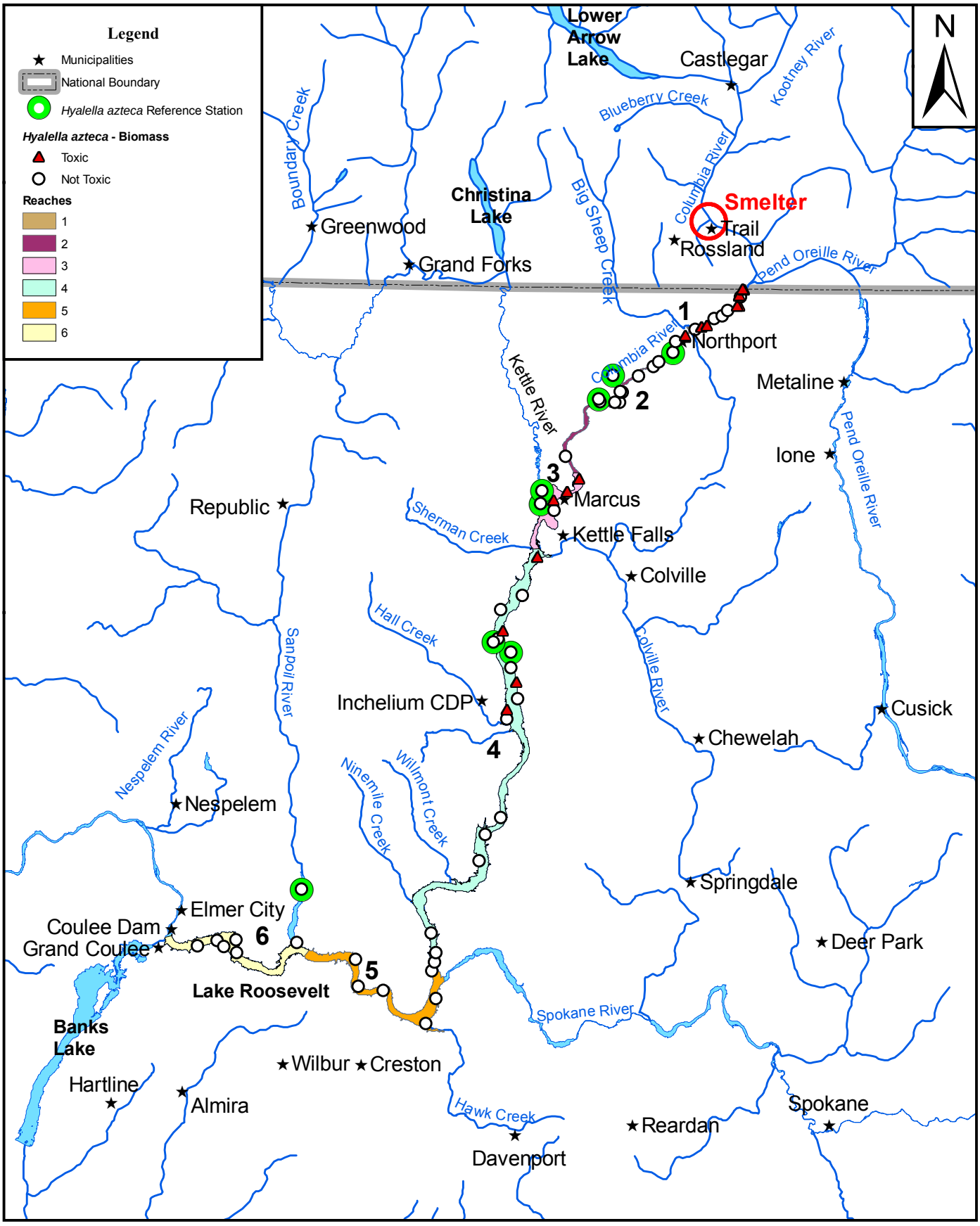


Figure 6.22. Map of the Upper Columbia River showing toxic and not toxic stations for *Hyalella azteca* (Biomass, Survival, or Growth). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

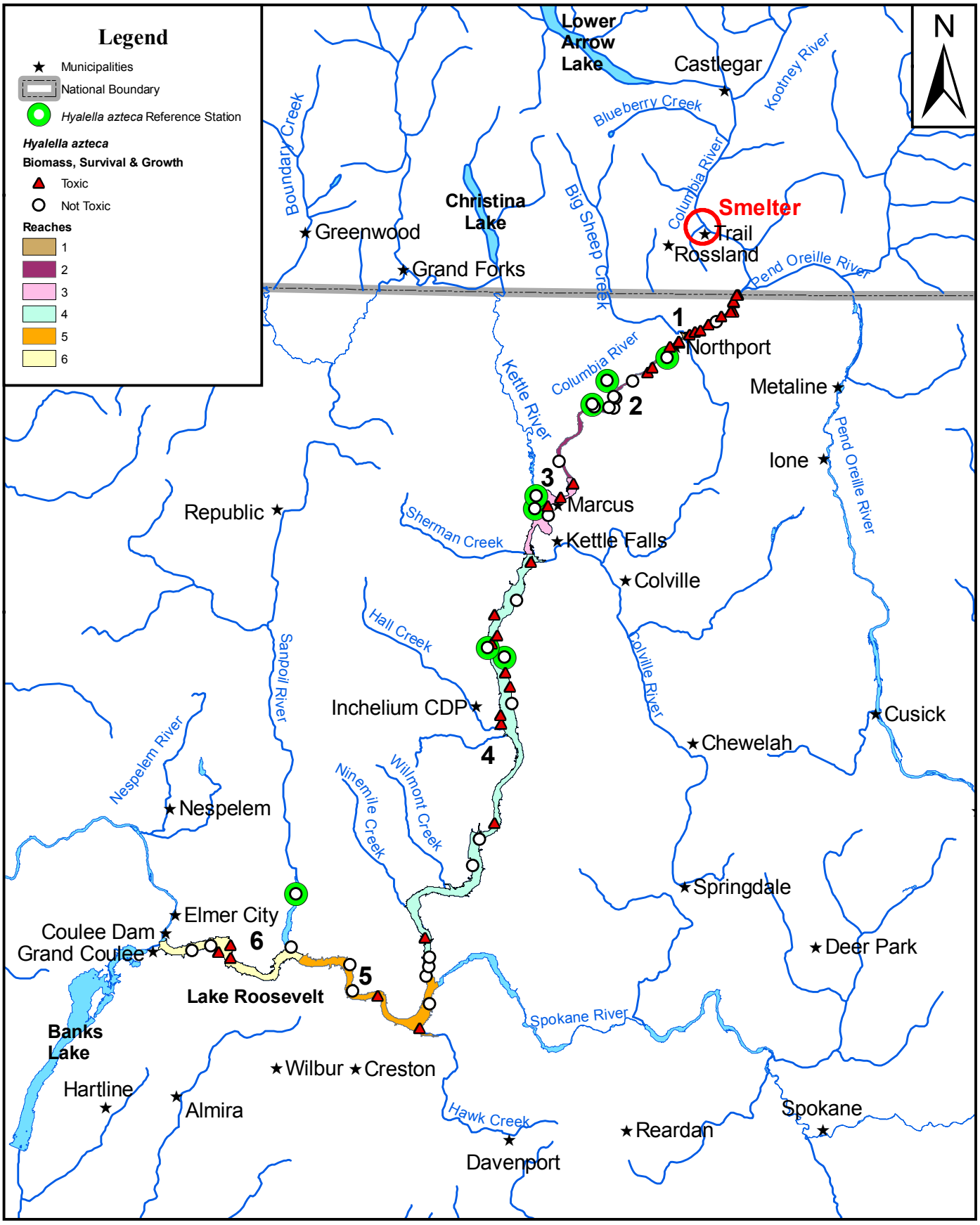


Figure 6.23. Map of the Upper Columbia River showing the results of toxicity tests conducted with the midge, *Chironomus dilutus* (Survival, Growth, and Biomass). (Note: Each sediment sample was designated as not toxic, moderately impacted, or highly impacted using the reference envelope approach, as described in Section 6.7).

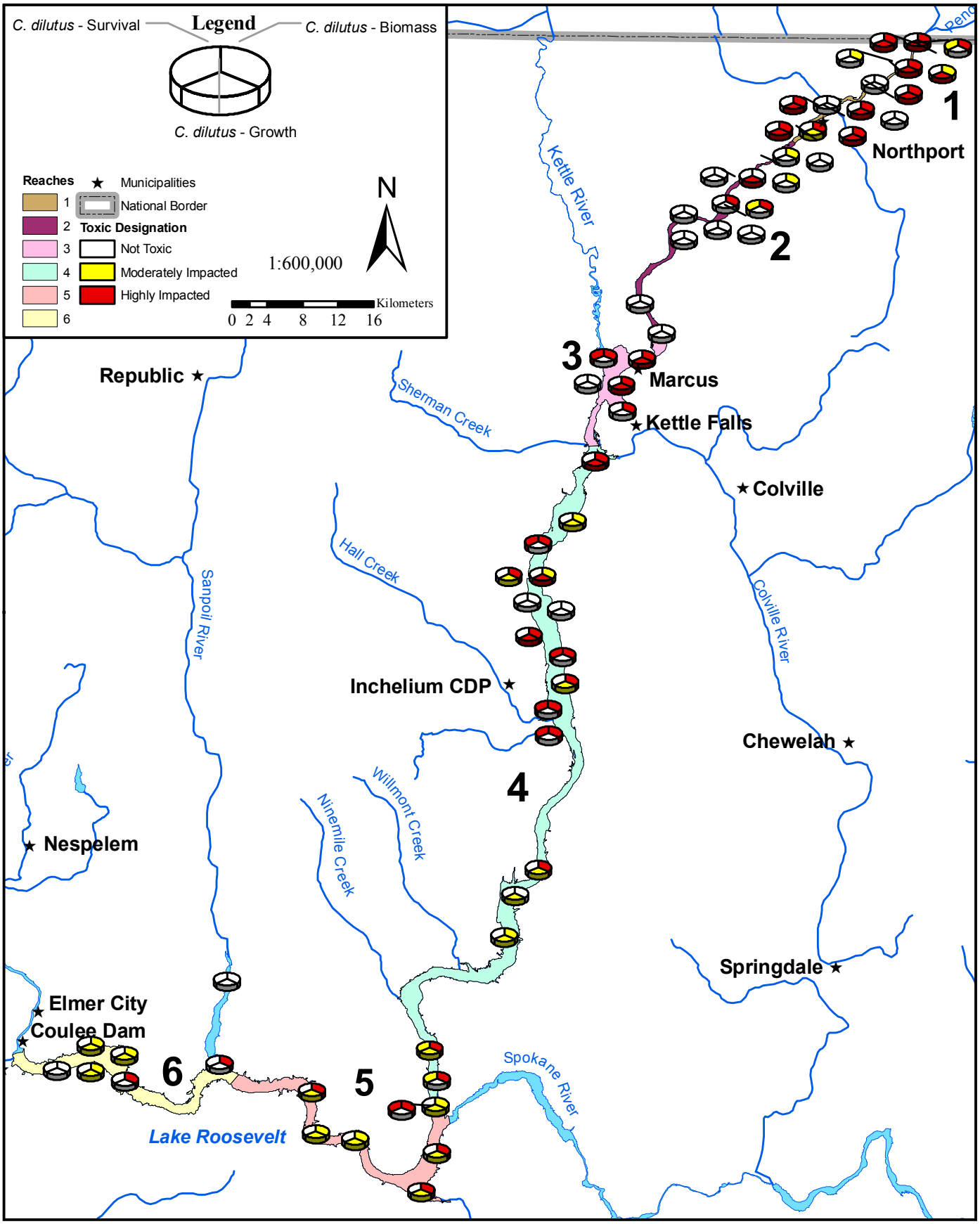


Figure 6.24. Map of the Upper Columbia River showing toxic and not toxic stations for *Chironomus dilutus* (Survival). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

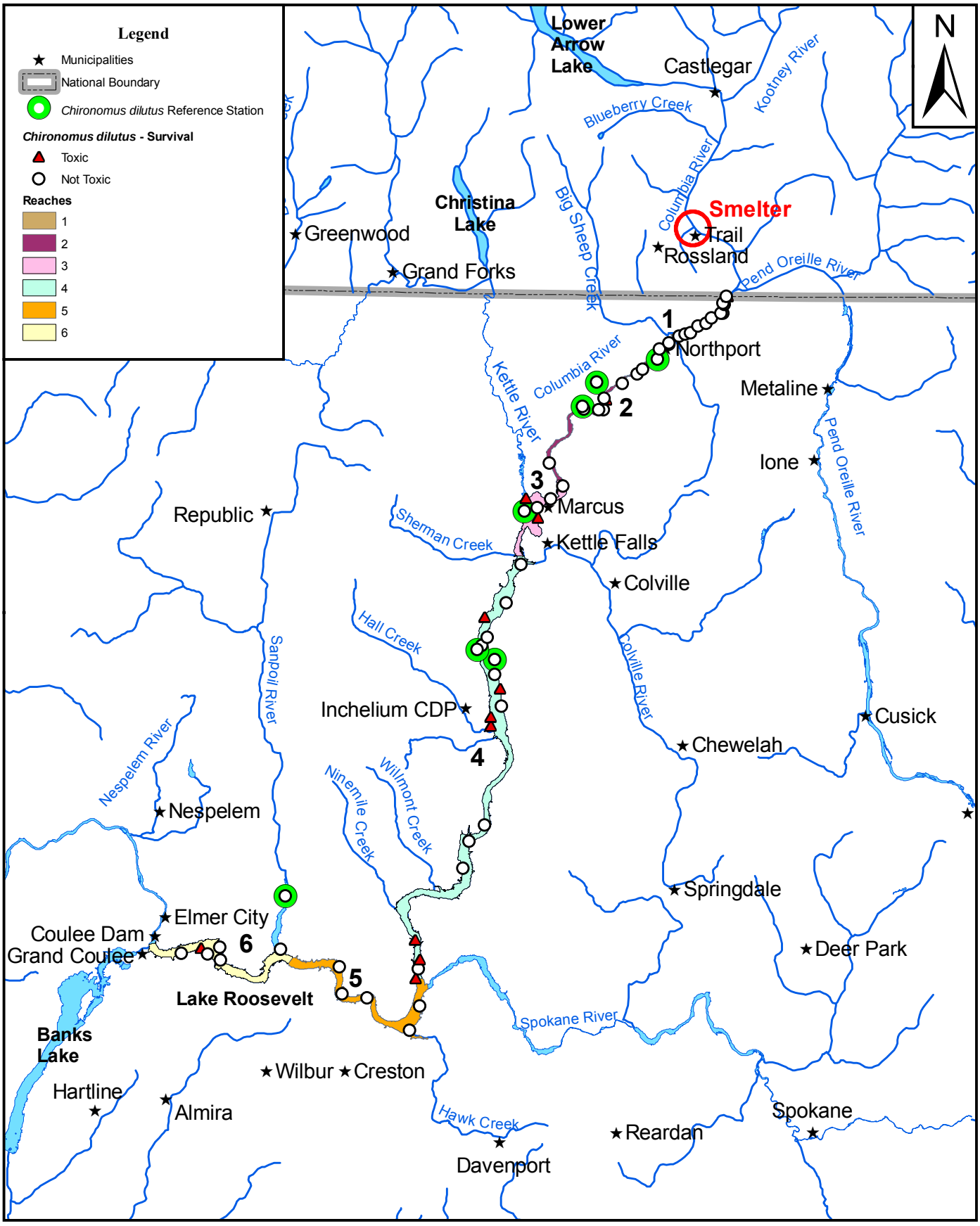


Figure 6.25. Map of the Upper Columbia River showing toxic and not toxic stations for *Chironomus dilutus* (Growth). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

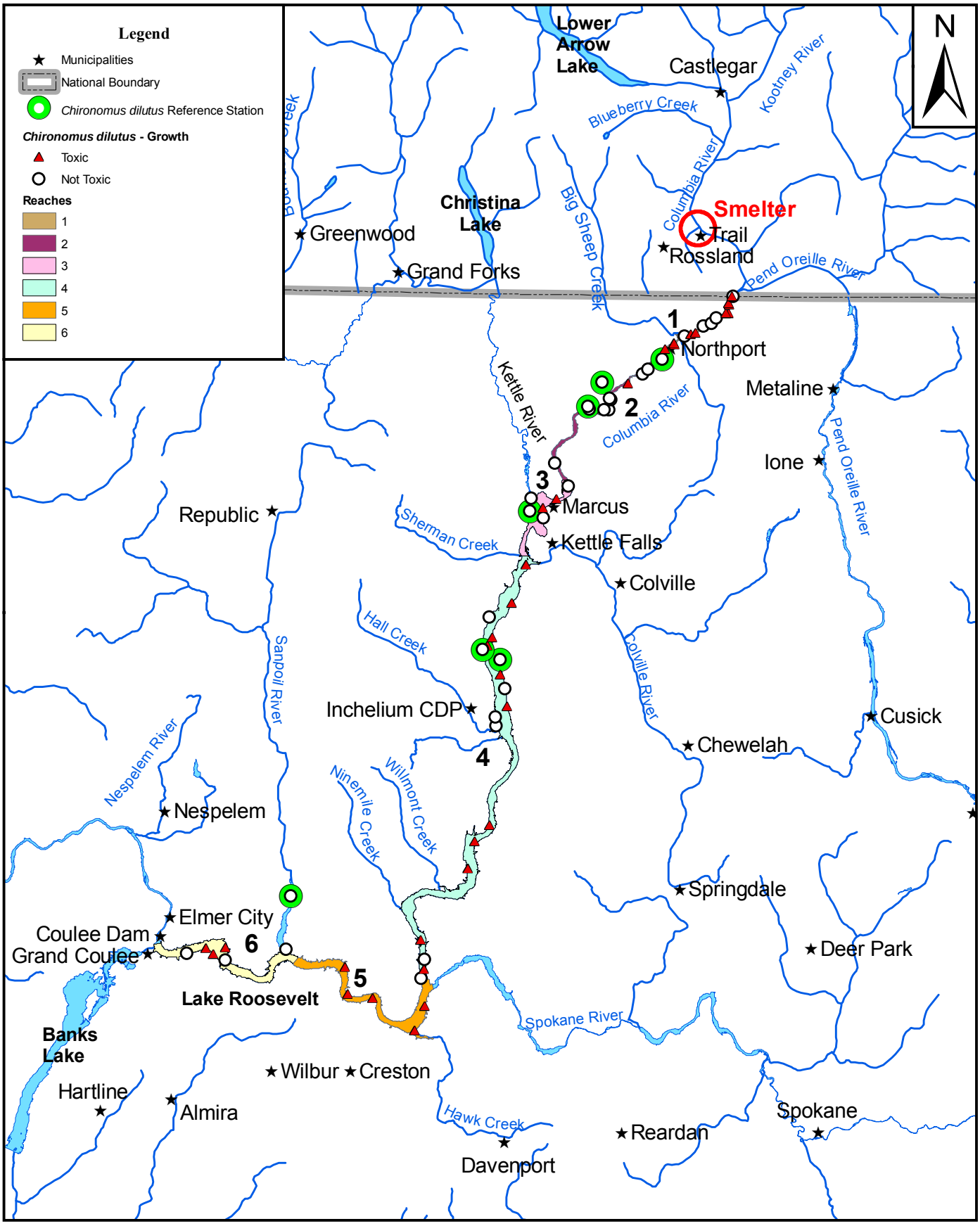


Figure 6.26. Map of the Upper Columbia River showing toxic and not toxic stations for *Chironomus dilutus* (Biomass). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

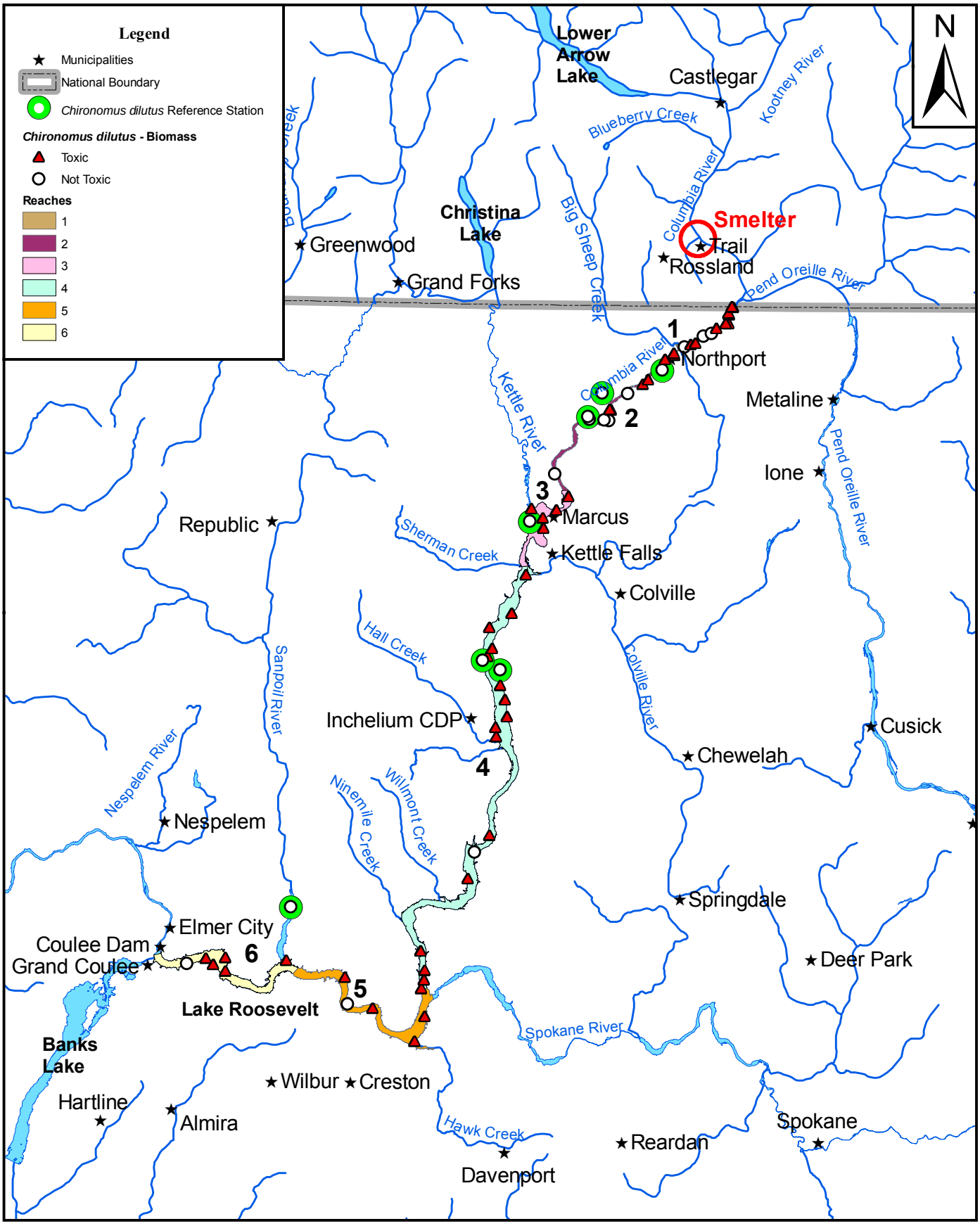


Figure 6.27. Map of the Upper Columbia River showing toxic and not toxic stations for *Chironomus dilutus* (Biomass, Survival, or Growth). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

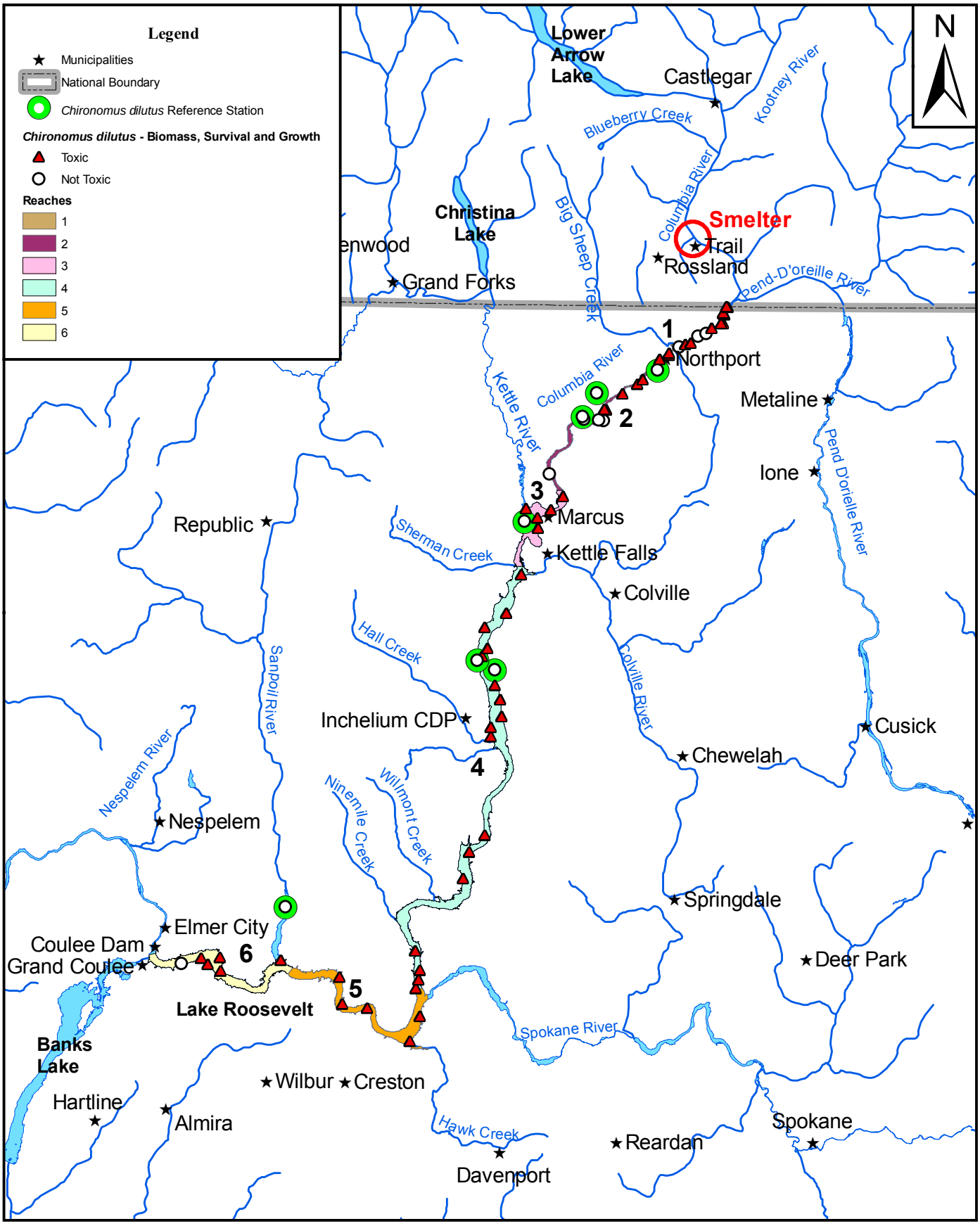


Figure 6.28. Map of the Upper Columbia River showing the results of toxicity tests conducted with the cladoceran, *Ceriodaphnia dubia* (Survival and Reproduction). (Note: Each sediment sample was designated as not toxic, moderately impacted, or highly impacted using the reference envelope approach, as described in Section 6.7).

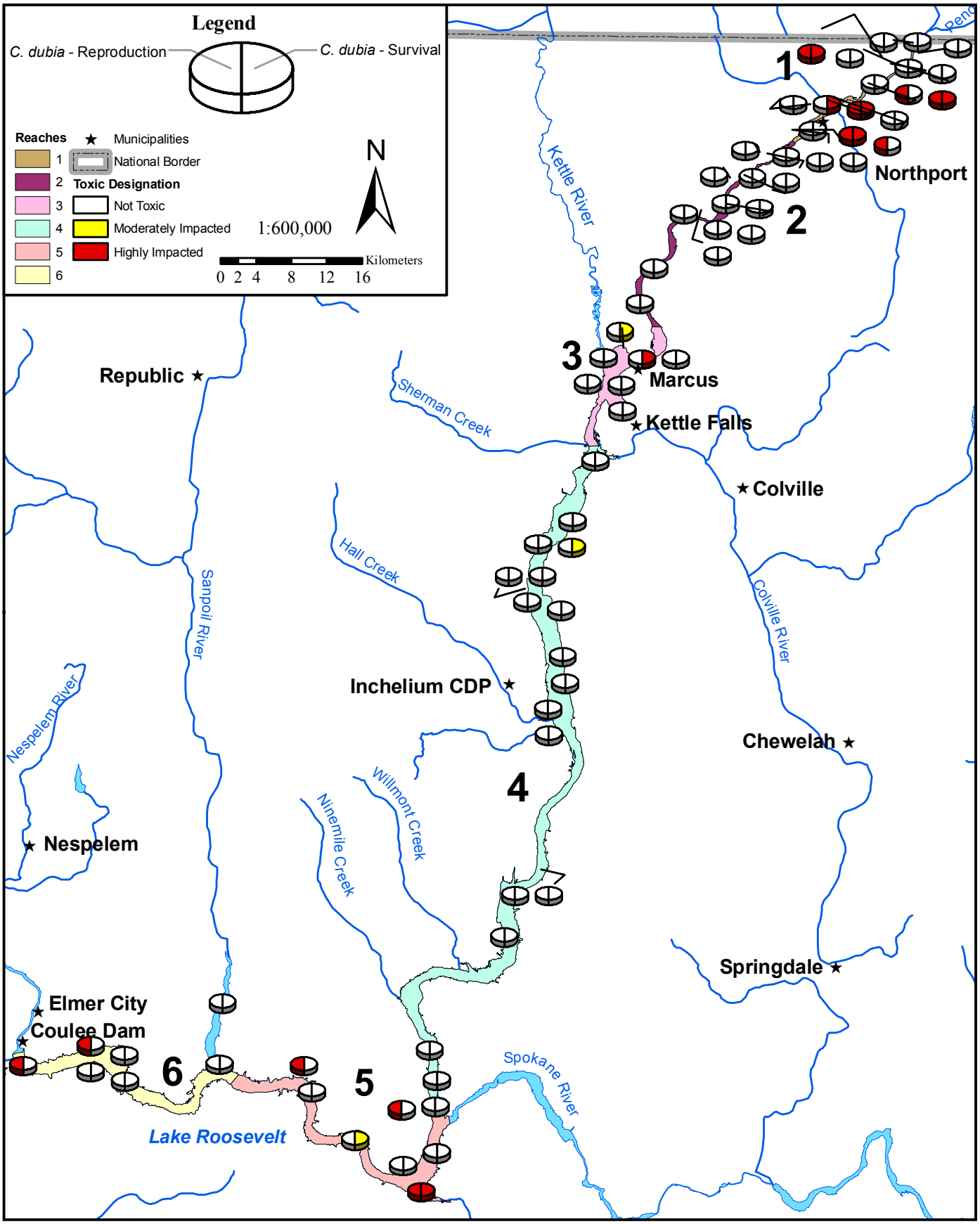


Figure 6.29. Map of the Upper Columbia River showing toxic and not toxic stations for *Ceriodaphnia dubia* (Survival). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

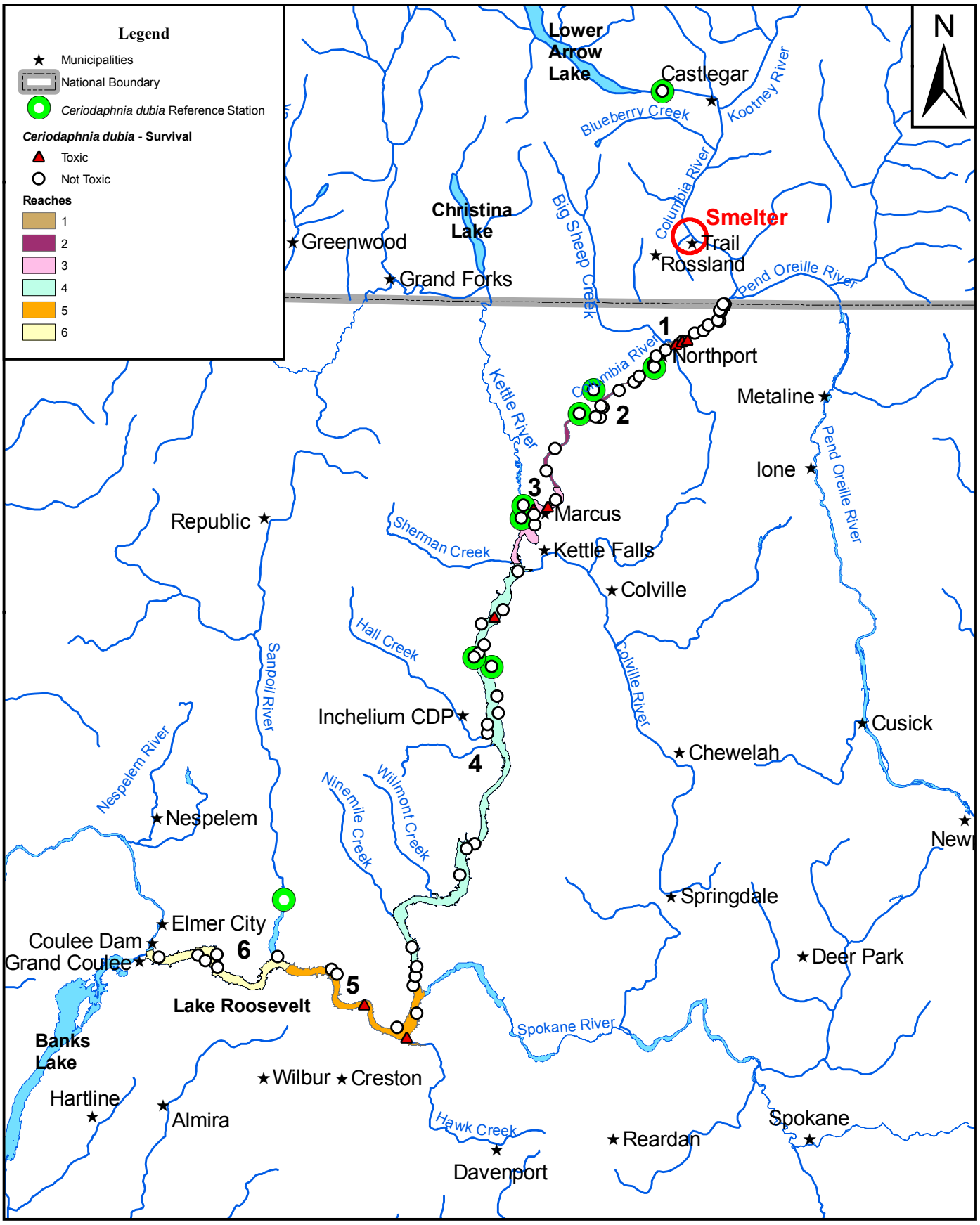


Figure 6.30. Map of the Upper Columbia River showing toxic and not toxic stations for *Ceriodaphnia dubia* (Reproduction). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)

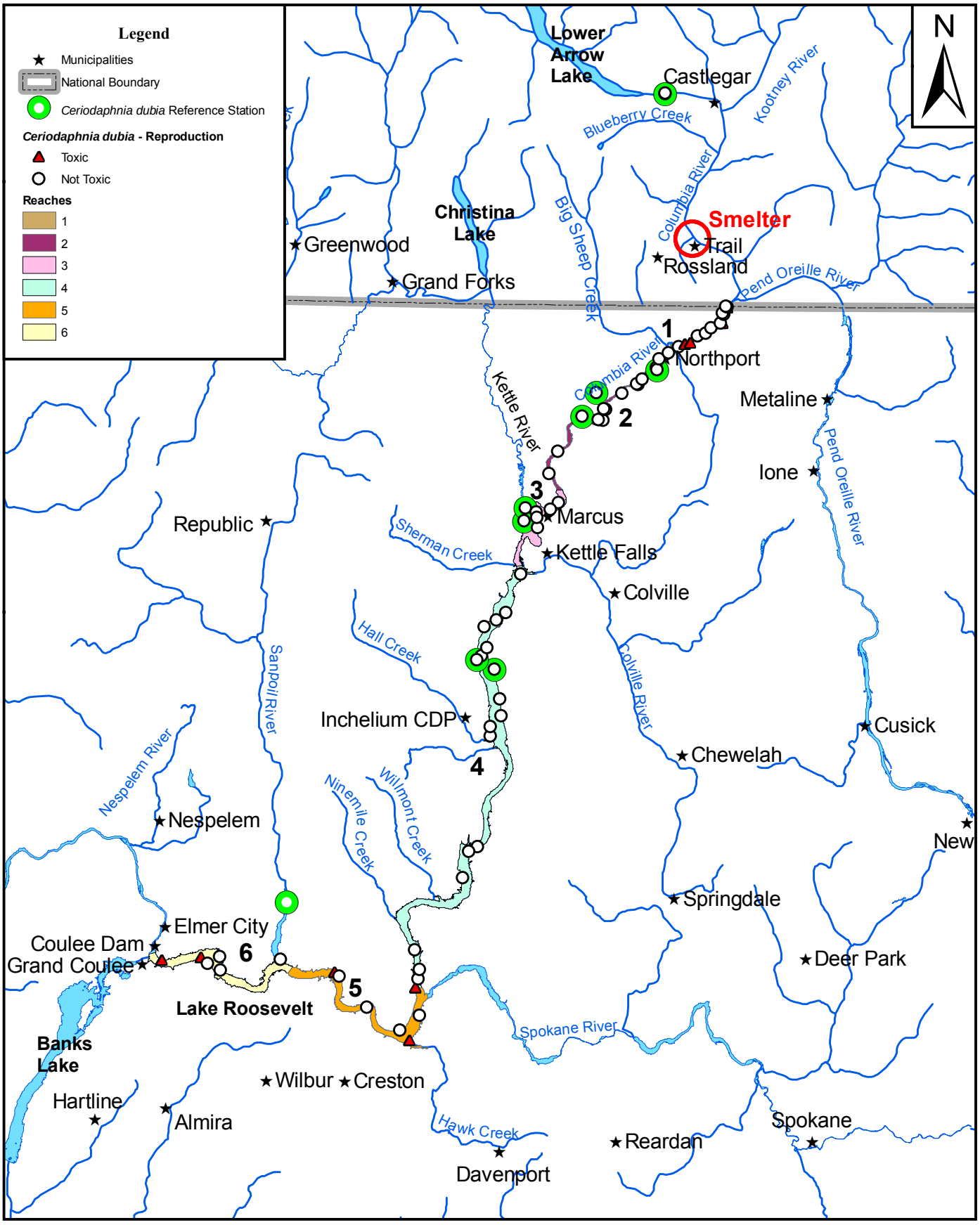


Figure 6.31. Map of the Upper Columbia River showing toxic and not toxic stations for *Ceriodaphnia dubia* (Reproduction or Survival). (Note: Each sediment sample was designated as toxic or not toxic using the reference envelope approach, as described in Section 6.7)