1026-20-141 **Eric M Freden***, Department of Mathematics, Southern Utah University, Cedar City, UT 84720, and **Caroline Nielson**. *Growth in Baumslag-Solitar groups: Subgroups and rationality.* Preliminary report.

The growth series for the higher Baumslag-Solitar groups are currently unknown. We study the growth of the horocyclic subgroup as the key to the overall growth of these Baumslag-Solitar groups $BS(p,q)$, where $1 < p < q$. We exhibit two distinct algorithms that compute the growth of the horocyclic subgroup and discuss the time and space complexity of these algorithms. We show that when p divides q, the horocyclic subgroup has a geodesic combing whose words form a context-free language. A theorem of Chomsky-Schutzenberger allows us to compute the growth series for this subgroup, which turns out to be rational. When p does not divide q, we show that no geodesic combing for the horocyclic subgroup forms a context-free language, although there is a context-sensitive geodesic combing. (Received February 23, 2007)