

Comprehensive methods to conduct landscape-level analyses for improving springs ecosystems stewardship

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ABSTRACT

Springs are places where groundwater discharges at or near the Earth's surface. Springs support a wide diversity of species and cultures across all landscapes. At least thirteen spheres of discharge have been proposed to classify spring ecosystems. Comprehensive inventory and assessment techniques have been developed and used to describe 56 springs in Alberta, Canada, and 1,000s more across Western North America. Springs support the headwaters of most perennial streams, but the location and identification of springs continues to be limited by the adoption of a universal classification system and database by hydrogeologists. Less than 10 % of the springs on most landscapes have been identified and even fewer have been comprehensively inventoried and assessed. Springs support some of the most productive, biologically, and socio-economically important and threatened ecosystems on Earth. Although springs occupy far less than 1 % of the land area, inventories of springs across landscapes indicate that up to 25 % of all plant species are supported at springs. Comprehensive inventory and assessment data are accessible on the secure, cloud-sourced Springs Online database of the Springs Stewardship Institute. Inventory and assessment techniques have been adapted and adopted by many land and resource management organizations, including many indigenous nations. Prioritization techniques developed with assessment measures can be used to prioritize stewardship action for springs across landscapes. Stewardship prioritization is an essential component of successful landscape conservation design planning.