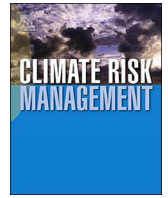




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## Anatomy of an interrupted irrigation season: Micro-drought at the Wind River Indian Reservation

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### ABSTRACT

Drought is a complex phenomenon manifested through interactions between biophysical and social factors. At the Wind River Indian Reservation (WRIR) in west-central Wyoming, water shortages have become increasingly common since the turn of the 21st century. Here we discuss the 2015 water year as an exemplar year, which was characterized by wetter-than-normal conditions across the reservation and, according to the U.S. Drought Monitor, remained drought-free throughout the year. Yet parts of the reservation experienced harmful water shortages, or “micro-drought” conditions, during the growing season in 2015. In this assessment of the 2015 water year at the WRIR we: (1) describe the hydroclimatic and social processes under way that contributed to the 2015 water year micro-drought in the Little Wind Basin; (2) compare water availability conditions within and between other basins at the WRIR to illustrate how micro-droughts can result from social and environmental features unique to local systems; and (3) describe how a collaborative project is supporting drought preparedness at the WRIR. We combine a social science assessment with an analysis of the hydroclimate to deconstruct how shortages manifest at the WRIR. We provide insights from this study to help guide drought assessments at local scales.

### 1. Introduction

The Wind River Indian Reservation (WRIR) in west-central Wyoming is home to the Eastern Shoshone and Northern Arapaho tribes, who depend on snowpack- and glacier-fed tributaries to the Wind River, near the headwaters of the Missouri Basin (Fig. 1). The local climate and the management of water resources are both important drivers for ensuring adequate supplies of high-quality water to meet human and environmental needs in the region. Although drought is part of natural variability in west-central Wyoming, the region has experienced several severe and long-lasting drought events in the last two decades—most notably during the early 2000s and 2012–2013—that caused significant water shortages and devastating impacts to social and ecological systems across the reservation. For example, during the extreme 2012–2013 drought, reduced spring runoff led to a management crisis and drastically reduced the summer irrigation season, which forced several local cattle producers to liquidate their herds and caused productive agricultural fields to die (Feemster, 2013). In comparison, the 2015 water year (defined as the period of October 1, 2014 –

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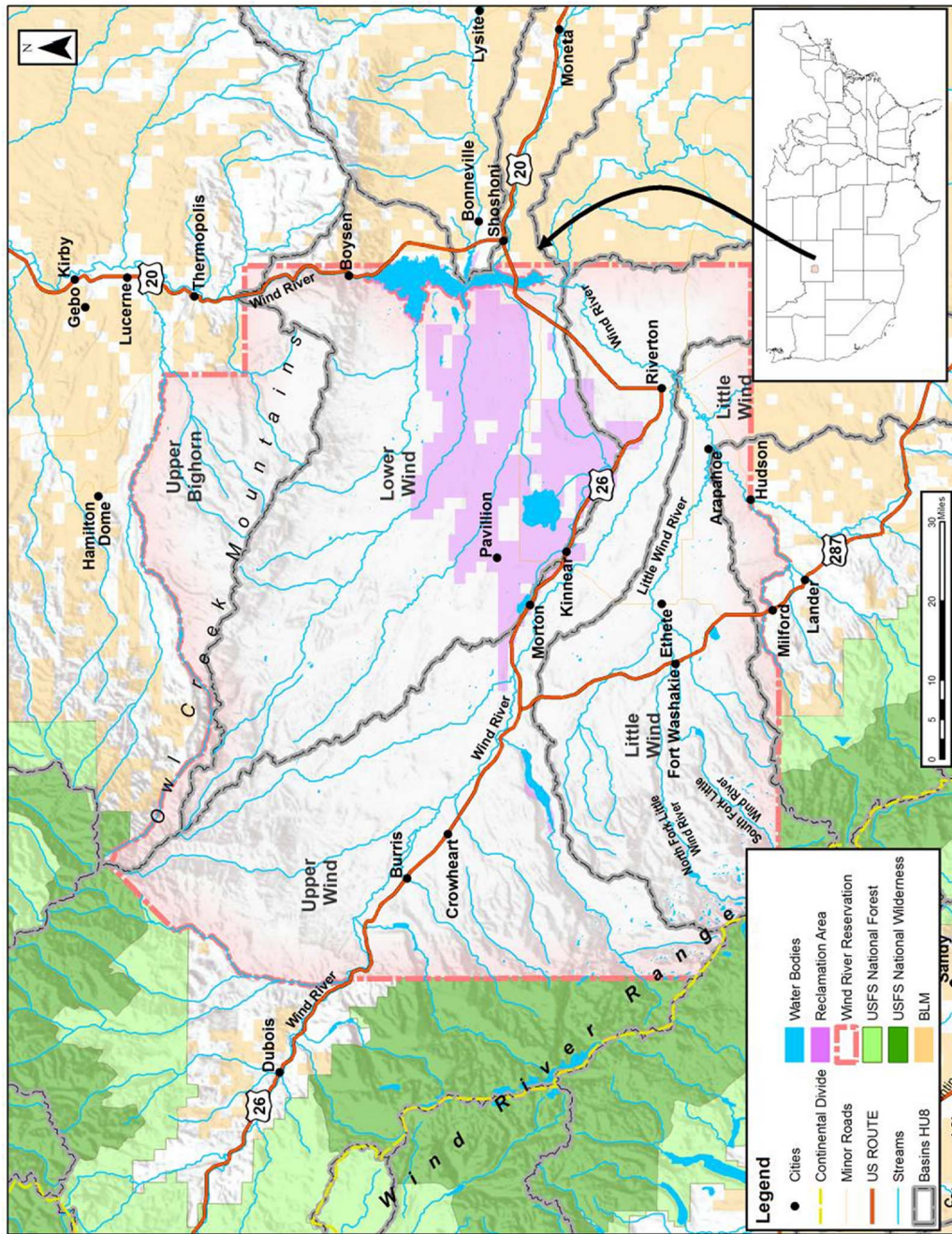


Fig. 1. Map of Wind River Indian Reservation and surrounding area.

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