

Exploring effects of climate change on Northern Plains American Indian health

John T. Doyle · Margaret Hiza Redsteer ·
Margaret J. Eggers

Received: 27 January 2013 / Accepted: 18 May 2013 / Published online: 22 June 2013
© U.S. Government 2013

Abstract American Indians have unique vulnerabilities to the impacts of climate change because of the links among ecosystems, cultural practices, and public health, but also as a result of limited resources available to address infrastructure needs. On the Crow Reservation in south-central Montana, a Northern Plains American Indian Reservation, there are community concerns about the consequences of climate change impacts for community health and local ecosystems. Observations made by Tribal Elders about decreasing annual snowfall and milder winter temperatures over the 20th century initiated an investigation of local climate and hydrologic data by the Tribal College. The resulting analysis of meteorological data confirmed the decline in annual

This article is part of a Special Issue on “Climate Change and Indigenous Peoples in the United States: Impacts, Experiences, and Actions” edited by Julie Koppel Maldonado, Rajul E. Pandya, and Benedict J. Colombi.

Electronic supplementary material The online version of this article (doi:10.1007/s10584-013-0799-z) contains supplementary material, which is available to authorized users.

J. T. Doyle (✉)
Crow Water Quality Project, Little Big Horn College, 8645 S. Weaver Drive, Crow Agency, MT, USA
e-mail: johndoyle91@gmail.com

J. T. Doyle
Apsaalooke Water and Wastewater Authority, Crow Agency, MT, USA

J. T. Doyle
Crow Environmental Health Steering Committee, Crow Agency, MT, USA

J. T. Doyle · M. H. Redsteer
Crow Tribal member, Crow Reservation, MT, USA

M. H. Redsteer
US Geological Survey Flagstaff Science Campus, Flagstaff, AZ, USA
e-mail: mhiza@usgs.gov

M. J. Eggers
Little Big Horn College, 8645 S. Weaver Drive, Crow Agency, MT 59022, USA
e-mail: eggersm@lbhc.edu

M. J. Eggers
Microbiology Department/CBE, Montana State University Bozeman, PO Box 173980, Bozeman, MT, USA

snowfall and an increase in frost free days. In addition, the data show a shift in precipitation from winter to early spring. The number of days exceeding 90 °F (32 °C) has doubled in the past century. Streamflow data show a long-term trend of declining discharge. Elders noted that the changes are affecting fish distribution within local streams and plant species which provide subsistence foods. Concerns about warmer summer temperatures also include heat exposure during outdoor ceremonies that involve days of fasting without food or water. Additional community concerns about the effects of climate change include increasing flood frequency and fire severity, as well as declining water quality. The authors call for local research to understand and document current effects and project future impacts as a basis for planning adaptive strategies.

1 Introduction

Climate change impacts present distinct risks to human health throughout Indian country. Although documented in Alaska (Brubaker et al. 2011a) and the Southwest (Redsteer et al. 2013a, b; Redsteer et al. 2010), these issues are not as well researched for Northern Plains Tribal communities. To address this data gap, observations of Crow Tribal elders in addition to changes in monitored temperature, precipitation and streamflow in the Little Bighorn River valley, Montana are provided. Located in south central Montana, the Crow Reservation encompasses 2.3 million acres, including three mountain ranges and three large river valleys. Approximately 8,000 of the 11,000+ Tribal members reside on the Reservation, primarily along the rivers and creeks. The majority of communities, including the “capital” town of Crow Agency, are situated in the Little Bighorn River valley (Fig. 1). The Crow language is still widely spoken and many cultural traditions continue to be practiced today. Water is one of the most important natural resources to the Crow community and has always

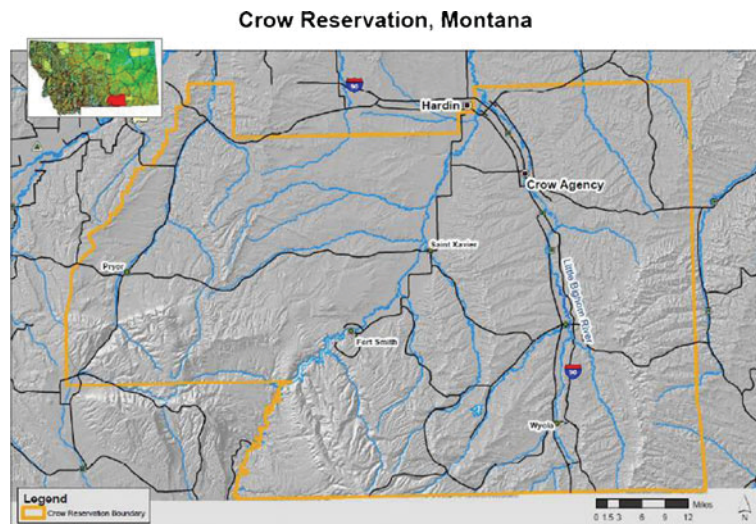


Fig. 1 Map delineating Crow Reservation (in yellow) and proximity to Hardin, MT where meteorological data for the study was collected, 15 miles northwest of Crow Agency, MT. The Reservation is southeast of Billings, MT, with the Reservation’s southern border on the Montana-Wyoming State boundary. (Map prepared by Eggers; inset courtesy US Department of Agriculture 2013)