TACCIMO
Template for Assessing Climate Change Impacts and Management Options

TACCIMO Literature Report

Literature Report - Annotated Bibliography Format

Report Date: September 03, 2013

Content Selections

Freshwater Ecosystems

Lakes and Ponds

R1: Northern

How to cite the information containted within this report

Each source found within the TACICMO literature report should be cited individually. APA 6th edition formatted citations are given for each source. The use of TACCIMO may be recognized using the following acknowledgement:

"We acknowledge the Template for Assessing Climate Change Impacts and Management Options (TACCIMO) for its role in making available their database of climate change science. Support of this database is provided by the Eastern Forest Environmental Threat Assessment Center, USDA Forest Service."

Best available scientific information justification

Content in this Literature report is based on peer reviewed literature available and reviewed as of the date of this report. The inclusion of information in TACCIMO is performed following documented methods and criteria designed to ensure scientific credibility. This information reflects a comprehensive literature review process concentrating on focal resources within the geographic areas of interest.

Suggested next steps

TACCIMO provides information to support the initial phase of a more comprehensive and rigorous evaluation of climate change within a broader science assessment and decision support framework. Possible next steps include:

1. Highlighting key sources and excerpts
2. Reviewing primary sources where needed
3. Consulting with local experts
4. Summarizing excerpts within a broader context

More information can be found in the user guide. The section entitled Content Guidance provides a detailed explanation of the purpose, strengths, limitations, and intended applications of the provided information.

Where this document goes

The TACCIMO literature report may be appropriate as an appendix to the main document or may simply be included in the administrative record.

Brief content methods

Content in the Literature Reports is the product of a rigorous literature review process focused on cataloguing sources describing the effects of climate change on natural resources and adaptive management options to use in the face of climate change. Excerpts are selected from the body of the source papers to capture key points, focusing on the results and discussions sections and those results that are most pertinent to land managers and natural resource planners. Both primary effects (e.g., increasing temperatures and changing precipitation patterns) and secondary effects (e.g., impacts of high temperatures on biological communities) are considered. Guidelines and other background information are documented in the user guide. The section entitled Content Production System fully explains methods and criteria for the inclusion of content in TACCIMO.

Resource Area (Factor): Freshwater Ecosystems

Lakes and Ponds

R1: Northern

Covich, A. P., Fritz, S. C., Lamb, P. J., Marzolf, R. D., Matthews, W. J., … & Winter, T. C. (1997). Potential effects of climate change on aquatic ecosystems of the Great Plains of North America. Hydrological Processes, 11, 993 – 1021.

"Lake level appears to be controlled primarily by climate, although the complex hydrology of the [Devils Lake, North Dakota], which includes a number of upstream storage basins, complicates the relationship. Analysis of climate data indicates that periods of very low lake level are correlated with both decreased summer precipitation and increased summer temperature for the first half of the twentieth century. Water level fluctuations from 1931 to 1983 are also correlated with changes in the cumulative departure from average winter precipitation until 1969; but the relationship breaks down after this date, perhaps because of changes in basin storage and drainage area (Wiche et al., 1986). Based on the sensitivity of the modern lake to climate the stratigraphic record of palaeosalinity fluctuations has been used to reconstruct the climate history of the Devils Lake region, and this record clearly demonstrates that severe drought is a common climatic feature of the northern Great Plains (Fritz et al., 1991, 1994; Haskell et al., 1996)."

Ouyang, Z., Becker, R., Shaver, W. & Chen, J. (2013). Evaluating the sensitivity of wetlands to climate change with remote sensing techniques. Hydrological Processes [online]. DOI: 10.1002/hyp.9685

"On the basis of our prediction [using a simple linear model between WSA (water surface area) and the PDSI (Palmer Drought Severity Index) climate index to simulate temporal change of WSA in the future under A1B climate change scenarios for Kidder County, North Dakota], WSA in the PPR [Prairie Pothole Region] will have a decreasing trend with some oscillation, and local minimums will be found at the end of 2030s, the end of 2060s and the beginning of 2070s and the beginning of 2090s. Table V lists the mean modelled WSA of every decade as a percentage of the baseline WSA, which suggests that we could lose more than half of the wetland WSA in the PPR by 2050s, lose more than two-thirds of the wetland WSA in the PPR by 2080s and have a slight recovery of the PPR wetland WSA in the 2090s."

"Also, as wetlands have been noted to be important carbon sink (Brander et al., 2006); the decrease of wetlands caused by climate change will have a positive feedback on itself by reducing their carbon uptake and triggering further carbon release. This must be considered in future adaptation to climate change. Our predictions [using a simple linear model between WSA (water surface area) and the PDSI (Palmer Drought Severity Index) climate index to simulate temporal change of WSA in the future for Kidder County, North Dakota] are made on the basis of the 'moderate' A1B climate scenario; however, we must be aware that there are different expectations of warming and drought magnitude over PPR [Priairie Pothhole] region under other climate scenarios. For example, a more serious dry trend is simulated under the A2 climate scenario (a high carbon emission scenario) (Burke et al., 2006). Thus, according to our concept model, we would lose even more wetlands if future climate change underwent as the A2 climate scenario projects."