

Home > Journal > Earth & Environmental Sciences > JWARP

[Indexing](#) [View Papers](#) [Aims & Scope](#) [Editorial Board](#) [Guideline](#) [Article Processing Charges](#)

JWARP > Vol. 4 No. 6, June 2012

OPEN ACCESS

Check Dams in an Ephemeral Stream in a Tropical Deciduous Forest Extend Water Period with Minimal Effect on Reptile Assemblage

PDF (Size: 743KB) PP. 363-369 DOI : 10.4236/jwarp.2012.46041

Author(s)

Ratchata Phochayavanich, Wichase Khonsue, Noppadon Kitana

ABSTRACT

Although numerous check dams have been constructed in many countries, and its effect on physical factors were well documented, only a few reports were available on its effect on biotic component in adjacent area. This research aims to address effects of the check dam on reptile assemblage in an ephemeral stream based on an assumption that reptile live in the stream and adjacent area may be susceptible to prolonged hydroperiod after check dam construction. Ten stream transects and 40 terrestrial strip transects, including 5, 10, 25, and 50 m from the stream, were used to monitor reptile diversity and composition in a deciduous forest of northern Thailand during April 2009 to February 2011. Physical factors related to water pattern in the stream and the terrestrial habitats were also collected. Results on physical factors indicated that the water pattern and soil moisture in the stream, as well as leaf litter moisture in the terrestrial habitat were increased as a result of the check dam. However, rarefaction curve indicated that reptile diversity was not significantly different between pre- and post-check dam periods in every transect. Moreover, Morisita's index of similarity indicated that reptile composition between pre- and post-check dam periods was approximately the same (86% - 100%). These results indicated that reptile assemblage was not affected by the check dam. It can be concluded based on data of one year after the check dam construction that check dam can effectively prolong water and moisture to the habitat with minimal effect on reptile assemblage in the area.

KEYWORDS

Check Dam; Reptile; Diversity; Composition; Nonpermanent Stream

Cite this paper

R. Phochayavanich, W. Khonsue and N. Kitana, "Check Dams in an Ephemeral Stream in a Tropical Deciduous Forest Extend Water Period with Minimal Effect on Reptile Assemblage," *Journal of Water Resource and Protection*, Vol. 4 No. 6, 2012, pp. 363-369. doi: 10.4236/jwarp.2012.46041.

References

- [1] Intergovernmental Panel on Climate Change (IPCC), "Climate Change 2007: Synthesis Report, Contribution of Working Group I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change," IPCC, Geneva, 2007, p. 104.
- [2] D. H. Gray and A. T. Leiser, "Biotechnical Slope Protection and Erosion Control," 1st Edition, Van Nostrand Reinhold, New York, 1982. Cited in K. Solaimani, E. Omidvar and A. Kelarestaghi, Eds., "Investigation of Check Dam's Effects on Channel Morphology (Case study: Chehel Cheshme Watershed)," *Pakistan Journal of Biological Sciences*, Vol. 11, No. 17, 2008, pp. 2083-2091.
- [3] Department of Local Administration, "Check Dam Construction," 2008. http://www.thailocaladmin.go.th/work/e_book/eb1/stan12/p10.pdf
- [4] C. Liu, "The Effectiveness of Check Dams in Controlling Upstream Channel Stability in Northeastern Taiwan," *Proceeding of Erosion, Debris Flows and Environment in Mountain Regions (Proceeding of the Chengdu Symposium 209)*, Chengdu, 5-9 July 1992, pp. 423-485.

- [Open Special Issues](#)
- [Published Special Issues](#)
- [Special Issues Guideline](#)

[JWARP Subscription](#)

[Most popular papers in JWARP](#)

[About JWARP News](#)

[Frequently Asked Questions](#)

[Recommend to Peers](#)

[Recommend to Library](#)

[Contact Us](#)

Downloads: 402,262

Visits: 1,010,941

[Sponsors, Associates, and Links >>](#)

- [5] N. Kalantari, K. Rangzan, S. S. Thigale and M. H. Rahimi, " Site Selection and Cost-benefit Analysis for Artificial Recharge in the Baghmalek Plain, Khuzestan Province, Southwest Iran," *Hydrogeology Journal*, Vol. 18, No. 3, 2010, pp. 761-773. doi: 10.1007/s10040-009-0552-x
- [6] J. Nyssen, M. Veyret-Picot, J. Poesen, J. Moeyersons, M. Haile, J. Deckers and G. Govers, " The Effectiveness of Loose Rock Check Dams for Gull Control in Tigray, Northern Ethiopia," *Soil Use and Management*, Vol. 20, No. 1, 2004, pp. 55-64. doi: 10.1111/j.1475-2743.2004.tb00337.x
- [7] A. Romero-Díaz, F. Alonso-Sarriá and M. MartínezLloris, " Erosion Rates Obtained from CheckDam Sedimentation (SE Spain): A Multi-Method Comparison," *CATENA*, Vol. 71, No. 1, 2007, pp. 172-178. doi: 10.1016/j.catena.2006.05.011
- [8] X. Xiang-Zhou, Z. Hong-Wu and Z. Ouyang, " Development of Check-dam Systems in Gullies on the Loess Plateau, China," *Environmental Science & Policy*, Vol. 7, 2004, pp. 79-86. doi: 10.1016/j.envsci.2003.12.002
- [9] Q. L. Zeng, Z. Q. Yue, Z. F. Yang and X. J. Zhang, " A Case Study of Long-Term Field Performance of CheckDams in Mitigation of Soil Erosion in Jiangjia Stream, China," *Environmental Geology*, Vol. 58, No. 4, 2009, pp. 897-911. doi: 10.1007/s00254-008-1570-z
- [10] C. Shieh, Y. Guh and S. Wang, " The Application of Range of Variability Approach to the Assessment of a Check Dam on Riverine Habitat Alteration," *Environmental Geology*, Vol. 52, No. 3, 2007, pp. 427-435. doi: 10.1007/s00254-006-0470-3
- [11] Watershed Conservation and Management Office, " Benefit of the Check Dam," 2008. http://www.dnp.go.th/Watershed/checkdam_site/cd_benefit3.htm
- [12] P. Treepatanasuwan and P. Ploychareon, " Plant Community Change in the Check Dam Forestry Area at Phu-Phan Royal Development Study Centre, Sakon Nakorn Province," *Wildlife and Plant Conservation*, Bangkok, 2006.
- [13] G. R. Zug, L. J. Vitt and J. P. Caldwell, " Herpetology: An Introductory Biology of Amphibians and Reptiles," 2nd Edition, Academic Press, Cambridge, 2001, p. 630.
- [14] P. Dumrongrojwatthana, " Impacts of Forest Disturbance on Soil Organic Matter, Soil Nutrients and Carbon Sequestration in Nam Wa Sub-Watershed, Nan Province," M.Sc. thesis, Chulalongkorn University, Bangkok, 2004, p. 191.
- [15] H. Walter, E. Harnickell and D. Mueller-Dombois, " Climate-Diagram Maps," Springer-Verlag, Berlin, 1975, p. 36.
- [16] W. R. Heyer, M. A. Donnelly, R. W. McDiarmid, L. C. Hayek and M. S. Foster, " Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians," Smithsonian Institution Press, Washington DC, 1994, p. 364.
- [17] J. H. Zar, " Biostatistical Analysis" 4th Edition, Prentice Hall International, Hemel Hempstead, 1999, p. 663.
- [18] R. K. Colwell, " EstimateS: Statistical Estimation of Species Richness and Shared Species from Samples," Version 8, 2006. <http://purl.oclc.org/estimates>
- [19] R. K. Colwell, C. X. Mao and J. Chang, " Interpolating, Extrapolating, and Comparing Incidence-Based Species Accumulation Curves," *Ecology*, Vol. 85, No. 10, 2004, pp. 2717-2727. doi: 10.1890/03-0557