

Home > Journal > Earth & Environmental Sciences > JWARP

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

JWARP > Vol.3 No.1, January 2011

OPEN ACCESS

Influence of Dams on River Ecosystem and Its Countermeasures

PDF (Size:88KB) PP. 60-66 DOI: 10.4236/jwarp.2011.31007

Author(s)

Qicai Lin

ABSTRACT

Dam construction is an important engineering measure in dealing with the relationship between water and human being. However, with dam construction, some disadvantages to the river basin may be caused, including flow flux of downstream changed, flooded area reduced, river species and other organisms changed and substance sedimentation. Furthermore, it brings some diseases to human being and human residential areas reduced too. Based on the basic principles of ecohydraulic engineering, some countermeasures to minimize the negative effects on rivers were put forward. They are reservoir ecological regulation, ecohydraulic engineering construction and comprehensive water pollution treatment.

KEYWORDS

Dam, River Ecosystem, Ecohydraulic Engineering, Environmental Impact, Countermeasure

Cite this paper

Q. Lin, "Influence of Dams on River Ecosystem and Its Countermeasures," *Journal of Water Resource and Protection*, Vol. 3 No. 1, 2011, pp. 60-66. doi: 10.4236/jwarp.2011.31007.

References

- [1] W. L. Graf, " Dam Nation: A Geographic Census of American Dams and Their Large-Scale Hydrologic Impacts," *Water Resources Research*, Vol. 35, No. 4, 1999, pp. 1305-1311. doi:10.1029/1999WR900016
- [2] J. Y. Qi and X. H. Ruan, " Dam Construction-Induced Environmental Impact on Riverine Ecosystem," *Journal of Hohai University (Natural Sciences)*, Vol. 33, No. 1, 2005, pp. 37-40.
- [3] W. J. Mitsch and S. E. Jorgense, " Ecological Engineering and Ecosystem Restoration," John Wiley & Sons, Inc., New Jersey, 2004.
- [4] F. R. Hauer and G. A. Lamberti, " Methods in Stream Ecology," Academic Press, San Diego, 1996.
- [5] Heinz Center, " Dam Removal: Science and Decision Making," The Heinz Center, Washington DC., 2002.
- [6] G. Friedl and A. Wuest, " Disrupting Biogeochemical Cycles - Consequences of Damming," *Aquatic Sciences*, Vol. 64, No. 1, 2002, pp. 55-65. doi:10.1007/s00027-002-8054-0
- [7] G. E. Petts, " Impounded Rivers, Perspectives for Ecological Management," John Wiley and Sons, New York, 1984.
- [8] Z. P. Mao, Y. C. Wang, W. Q. Peng and H. D. Zhou, " Advances in Effects of Dams on River Ecosystem," *Advances in Water Science*, Vol. 16, No. 1, 2005, pp. 134-140.
- [9] A. T. Bednarek, " Undamming Rivers: A Review of the Ecological Impacts of Dam Removal," *Environmental Management*, Vol. 27, No. 6, 2001, pp. 803-814. doi:10.1007/s002670010189
- [10] M. Collier, R. H. Webb and J. C. Schmidt, " Dams and Rivers: A Primer on the Downstream Effects of Dams," US Geological Survey Circular 1126, Arizona, 1996.

- [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: 402,254

Visits: 1,010,110

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

- [11] D. M. Rosenberg, P. Mccully and C. M. Pringle, " Global-Scale Environmental Effects of Hydrological Alterations: Introduction," *Bioscience*, Vol. 50, No. 9, 2000, pp. 746-751. doi:10.1641/0006-3568(2000)050[0746:GSEEOH]2.0.CO;2
- [12] S. Han, Z. Q. Xia, M. Liu and F. F. Sun, " The Influence of Reservoir Operation on In-Stream Ecological Flow Downstream of Dam," *Water Resources Protection*, Vol. 26, No. 1, 2010, pp. 21-23.
- [13] M. E. Power, W. E. Dietrich and J. C. Finlay, " Dams and Downstream Aquatic Biodiversity: Potential Food Web Consequences of Hydrologic and Geomorphic Change," *Environmental Management*, Vol. 20, No. 6, 1996, pp. 887-895. doi:10.1007/BF01205969
- [14] C. Nilsson and M. Svedmark, " Basic Principles and Ecological Consequences of Changing Water Regimes: Riparian Plant Communities," *Environmental Management*, Vol. 30, No. 4, 2002, pp. 468-480. doi:10.1007/s00267-002-2735-2
- [15] C. C. Mann and M. L. Plummer, " Can Science Rescue Salmon?" *Science*, Vol. 289, No. 5480, 2000, pp. 716- 719. doi:10.1126/science.289.5480.716
- [16] M. C. Patrick, " *Silenced Rivers: The Ecology and Politics of Large Dams*," Zed Books Ltd, London, 1996.
- [17] T. M. Koel and R. E. Sparks, " Historical Patterns of River Stage and Fish Communities as a Criteria for Operations of Dams on the Illinois River," *River Research and Applications*, Vol. 18, No. 1, 2002, pp. 3-19. doi:10.1002/rra.630
- [18] C. Nilsson, R. Jansson and U. Zinko, " Long-Term Responses of River Margin Vegetation to Water-Level Regulation," *Science*, Vol. 276, No. 5313, 1997, pp. 798-800. doi:10.1126/science.276.5313.798
- [19] C. Nilsson and K. Berggren, " Alterations of Riparian Ecosystems Caused by River Regulation," *Bioscience*, Vol. 50, No. 9, 2000, pp. 783-792. doi:10.1641/0006-3568(2000)050[0783:AORECB]2.0.CO;2
- [20] S. E. Bunn and A. H. Arthington, " Basic Principles and Ecological Consequences of Altered Flow Regimes for Aquatic Diversity," *Environmental Management*, Vol. 30, No. 4, 2002, pp. 492-507. doi:10.1007/s00267-002-2737-0
- [21] J. G. Gosselink, " Landscape Conservation in a Forested Wetland Watershed," *Bioscience*, Vol. 40, No. 8, 1990, pp. 588-600. doi:10.2307/1311299
- [22] A. T. Bednarek, " Undamming Rivers: A Review of the Ecological Impacts of Dam Removal," *Environmental Management*, Vol. 27, No. 6, 2001, pp. 803-814. doi:10.1007/s002670010189
- [23] Y. H. Yang, X. Y. Ruan and X. Deng, " Analysis of Effect of Bahe River Hydropower Development on Eco-Environment of Niyang River Basin," *Water Resources Protection*, Vol. 26, No. 1, 2010, pp. 91-94.
- [24] J. L. Zhai, W. Deng and Y. He, " Flood-Plain Wetland Eco-Environmental Functions and Its Management Countermeasures," *Advances in Water Science*, Vol. 14, No. 2, 2003, pp. 203-209.
- [25] M. Dynesius and C. Nilsson, " Fragmentation and Flow Regulation of River Systems in the Northern Third of the World," *Science*, Vol. 266, No. 5186, 1994, pp. 753-762. doi:10.1126/science.266.5186.753
- [26] G. Wu, Q. X. Zhang, X. X. Zheng, L. F. Mu and L. M. Dai, " Water Quality of Lugu Lake: Changes, Causes and Measurements," *International Journal of Sustainable Development & World Ecology*, Vol. 15, No. 1, 2008, pp. 10-17.
- [27] F. Li, Z. Q. Xia and Y. K. Wang, " Influence of Gezhouba Project on Hydrological and Hydraulic Characteristics of Yichang River Reach," *Journal of Hohai University (Natural Sciences)*, Vol. 38, No. 1, 2010, pp. 36-40.
- [28] C. Nilsson, C. A. Reidy, M. Dynesius and C. Revenga, " Fragmentation and Flow Regulation of the World's Large River Systems," *Science*, Vol. 308, No. 5720, 2005, pp. 405-408. doi:10.1126/science.1107887
- [29] G. Morris and J. H. Fan, " *Reservoir Sedimentation Handbook*," McGraw-Hill Publishers, New York, 1998.