

Mobile Prototype with Solar Panels for Rehabilitation of Natural Reservations Lakes

Victorita RADULESCU

Hydraulics, Hydraulic Machinery and Environmental Engineering
University POLITEHNICA of Bucharest

Bucharest, Romania

vradul4@gmail.com

Abstract—In Romania, there are two Natural Reservations Lakes Mangalia and Techirghiol with salt-water, near the Black Sea, which confront with new environmental problems. In the last decades appeared infiltration with fresh-water, due to the local earthquakes. As an immediate effect, new types of vegetation develop, leading to a complex eutrophication process. The appeared excessive sludge perturbs the ecologic balance of the existent active one. This one is well known, since 200 years for its human therapeutically effect. The present paper presents a prototype, patent pending in Romania, of an autonomic pilot station placed on a mobile pontoon, powered by photovoltaic panels, able to collect and partially dry the sludge from these natural lakes. First are mentioned the climate, the physical, and chemical conditions encountered in these areas, with environmental effects. Some words referring to the presently living conditions, for many birds, different species, many of them law-protected are described. Further, is detailed scheduled the prototype, realized to solve the local problem, mobile, energetic efficient, using solar panels, representing a technical and an ecological challenge, the only one efficiently in these natural reservations. The solution is implemented, and tested nowadays. The extracted sludge can be in short time integrally consumed for agricultural purpose, as ecologic and nutritive fertilizer, to restore the near agriculture lands. Finally, some conclusions, acknowledgement, and references are presented.

Keywords—Prototypes, Water conservation, Solar panels, Environmental friendly manufacturing techniques, Environmental engineering

REFERENCES

- [1] I. Seteanu, V. Radulescu, "Numerical models in Hydraulics and Power Engineering", Bren Publisher, ISBN 973-99604-4-8, 2000
- [2] W. Rodhe, "Crystallization of eutrophication concepts in North Europe", National Academy of Sciences, Washington D.C., Standard Book Number 309-01700-9, pg. 50-64, 1979
- [3] V. Radulescu, "Complex utilisation of water resources", "Utilizarea complexa a resurselor de apa", Seria Hidraulica, Editura Bren, ISBN 973-648-255-3, Bucuresti, 2004
- [4] R.W. Howarth, G.D. Billen, "Regional nitrogen budgets and river inputs of N and P for the drainages to the North Atlantic Ocean: natural human influences", Biogeochemistry 35:75-139, 1996
- [5] V. Radulescu, V. Nistranu, "Hydraulic systems of transport", Bren Publishing, Bucharest, ISBN 973-648-255-3, 2004
- [6] "Over fertilization of the World's Freshwaters and Estuaries", University of Alberta Press. pg. 1-18, 2008
- [7] S.E. Shumway, "A review of the effects of algal blooms on shellfish and aquaculture", Journal of the World Aquaculture Society 21: 65–104. doi:10.1111/j.1749-7345.1990
- [8] I. Seteanu, S. Seteanu, V. Radulescu, "Convective-Diffusive Transport of Pollutants at River Branching (k- ε Model)", Proc. pg.101-112, Editura Orizonturi Universitare, Timisoara, ISBN 973-8109-70-1, 2001
- [9] A. Selman, "Mindy Eutrophication, An Overview of Status, Trends, Policies, Strategies", World Resources Institute, 2007
- [10] I. Seteanu, V. Radulescu, "Identification, calibration of the hydraulic parameters-linear optimization", Romanian Journal of Hydrology & Water Resources, vol. 2, No 1-2, pag.33-37, ISSN1223-1126, 1995
- [11] V.H. Smith, G.D. Tilman, and J.C. Nekola, "Eutrophication: impacts of excess nutrient inputs on freshwater, marine, and terrestrial ecosystems", Environmental Pollution 100 (1-3): 179–196, doi:10.1016/S0269-7491(99)00091-3, 1999
- [12] I. Seteanu, M. Erhan, V. Radulescu, "Optimal Decisions for Irrigation- Drainage Systems", Revue Roumaine des Sciences Techniques: Série de Mecanique Appliquee, Publisher: Romanian House of the Romanian Academy, Tome 38, Issue 4, pag.375-382, ISBN: 0035-4074, 1993
- [13] S.R. Carpenter, N.F. Caraco, and V.H. Smith, "Non-point pollution of surface waters with phosphorus and nitrogen", Ecological Applications 8:559-568, 1998
- [14] V. Radulescu, "A Complex Pilot Station using Renewable Resources": 15-th Energy Engineering Conferene, JSE, ISSN: 2284-6999 Electronic, Print: 2067-5534, Cod B+ 817, 2009
- [15] L.A. Lawton, G.A. Codd, "Cyanobacterial (blue-green algae) toxins-their significance in UK and European waters", Journal of Soil and Water Conservation 40: 87–97, 1991
- [16] A.N. Sharpley, T.C. Daniel, and J.T. Sims, "Determining environmentally sound soil phosphorus levels", Journal of Soil and Water Conservation 51:160-166, 1996
- [17] O.U.G.57 – Ordonanța de urgență a Guvernului nr. 57 din 20 iunie 2007 privind Ariile naturale protejate.
- [18] Protocol on the Protection of the Marine Environment of the Black Sea from Land-Based Sources and Activities, 2009
- [19] O.642 – Ordin nr. 642 din 15 iulie 2005 privind instituirea unor măsuri de protecție pentru unele specii de pești cu valoare economică și/sau ecologică