

# 30 Years of ECI's Vegetation Management Research: From the Well Known to the Unknown

## ENVIRONMENTAL CONCERNS IN RIGHTS-OF-WAY MANAGEMENT 9<sup>TH</sup> INTERNATIONAL SYMPOSIUM

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### LIST OF CITATIONS FROM THE ANNOTATED BIBLIOGRAPHY:

#### Herbicides and TGR's

1. AES.1978. Benefit Analysis, Use of 2,4,5-T for Vegetation Management on Rights-of-Way. Asplundh Environmental Services, Willow Grove PA. 44 pp.
2. ECI. 1988. Summary of Third-Year Results, TGR Study. Study for Potomac Edison Power Company. Environmental Consultants, Inc., Southampton, PA. 36 pp.
3. ECI. 1990. Tree Growth Regulator Study Final Report. Study for Minnesota Power. Environmental Consultants, Inc., Southampton, PA. 14 pp.
4. ECI. 1990. Tree Growth Regulator Study-Final Report. Study for Potomac Edison Power Company. Environmental Consultants, Inc., Southampton, PA. 24 pp.
5. ECI. 1991. Tree Growth Regulator Study-Final Report. Study for Wisconsin Utilities Association. Environmental Consultants, Inc., Southampton, PA. 45 pp.
6. Abrahamson, L.P., C.D. Nowak, P.M. Charlton and P.G. Snyder. 1992. Cost Effectiveness of Herbicide and Non-Herbicide Vegetation Management Methods for Electric utility Rights-of-Way in the Northeast: State of the Art Review and Annotated Bibliography. ECI Final Report to Niagara Mohawk Power Corporation. Environmental Consultants, Inc. 203 pp.
7. Norris, L.A. 1996. Herbicide Use on Rights-of-Way in Michigan. 1995. Environmental Consultants, Inc., Stoughton WI. 35 pp.
8. Chaney, W.R. 1999. Effect of Tree Growth Regulators on Re-sprout Biomass and the Time to Trim Silver Maple. Study for NIPSCO. Environmental Consultants, Inc., Stoughton, WI. 36 pp.
9. Norris, L.A., Environmental Consultants, Inc. Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality. EPRI, Palo Alto, CA, and ESEERCO: 1999. TR-113160. 203 pp. ✕
10. Chaney, W.R., Environmental Consultants, Inc. Tree Growth Regulators for Management of Trees in Electric Utility Rights-of-Way, A Literature Review and Current Status. EPRI, Palo Alto, CA, and ESEERCO: 2000. 1000317. 67 pp. ✕
11. Norris, L.A., F.N. Dost, R. VanBossuyt Jr., D.M. Browning, Environmental Consultants, Inc. Use of the Registered Tree Growth Regulators Paclobutrazol (Profile ®2SC) and Flurprimidol (Cutless®) in the State of New York. Generic Environmental Impact Statement. EPRI, Palo Alto, CA, and ESEERCO: 2000. 1000272. 195 pp. ✕
12. Norris, L.A., F.N. Dost and P.J. Appelt. 2004. Herbicide Risk Assessment: A Report to National Grid. Environmental Consultants, Inc., Stoughton WI. 221 pp.



13. McLoughlin, K.A., Environmental Consultants, Inc. Product Options for Herbicide Application. EPRI, Palo Alto, CA: 2005. 1010125. 4 pp.

## **ROW Management**

14. Holewinski, D.E. and A.J. Zeigler. 1979. ASSESSMENT OF: Guidelines for Removing Hazardous Trees from Highway Rights-of-Way. A Report to the Michigan Department of Transportation. Asplundh Environmental Services, Willow Grove, PA, 120 pp.

15. Bairley, P., R. Cupit, P. Simson, T.W. Hroust, K. Joscelyn, V. Nelhiebel and J. O'Day. 1979. Phase 2 Report: Roadside Obstacle / Tree Removal Management Program and Preparation of Environmental Assessment. A Report to the Michigan Department of Transportation. Asplundh Environmental Services, Willow Grove, PA, 1979, 192 pp.

16. Galvin, M. 1979. Management of Transmission Line Rights-of-Way for Fish and Wildlife, Volume 2. Eastern United States and Volume 3. Western United States, Fish and Wildlife Service, U.S. Department of the Interior. Asplundh Environmental Services, Willow Grove, PA. 347 pp.

17. Environmental Consultants. 1996. The Economic Impacts of Deferring Electric Utility Tree Maintenance on the Northern States Power Company Distribution System. Environmental Consultants, Inc., Southampton, PA. 7 pp.

18. Nowak, C.D., B.D. Ballard, P.M. Charlton, K.A. McLoughlin, Environmental Consultants, Inc. Right-of-Way Treatment Cycles: Update 2000. EPRI, Palo Alto, CA, and ESEERCO: 2000. 1000525. 77 pp. ✂

19. Nowak, C.D., B.D. Ballard, P.M. Charlton, K.A. McLoughlin, Environmental Consultants, Inc. Long-term Right-of-Way Effectiveness: Update 2000. EPRI, Palo Alto, CA, and ESEERCO: 2000. 1000271. 41 pp. ✂

20. Nowak, C.D., B.D. Ballard, P.M. Charlton, Environmental Consultants, Inc. Cost Comparison of Right-of-Way Treatment Methods: Update 2000. EPRI, Palo Alto, CA, and ESEERCO: 2000. 1000270. 246 pp. ✂

21. Nowak, C.D., Environmental Consultants, Inc. Wildlife and Integrated Vegetation Management on Electric Transmission Line Rights-of-Way Technical Update. EPRI, Palo Alto, CA: 2002. 1005366. 10 pp. ✂

22. Browning, D.M. 2003. Deferred Tree Maintenance What Does It Really Cost. Utility Arborist Association Quarterly. 12:1, 6-7.

23. Nowak, C.D., B. Ballard and J. Lee, Environmental Consultants, Inc. Electric Transmission Rights-of-Way Uses and Risks. EPRI, Palo Alto, CA: 2004. 1008479. 238 pp. ✂

24. Wetteroff, J. and D. Konieczka, Environmental Consultants, Inc. Electric Transmission Right-of-Way Invasive Non-Native Woody Plant Species Control. EPRI, Palo Alto, CA: 2006. 1010127. ✂

25. McCloughlin, K.A. and D. Konieczka, Environmental Consultants, Inc. Electric Transmission Right-of-Way Post-Blackout Vegetation Management Strategies. EPRI, Palo Alto, CA: 2007. 1012551. 64 pp. ✂

## **Environmental Impacts**

26. Holewinski, D.E., A.J. Zeigler, T.D. Mayer and H.R. Johns. 1977. Environmental and Economic Aspects of Contemporaneous Electric Transmission Line Right-of-Way Management Techniques Volume 1. General Methods, Special Studies, Discussion of Trends. Study for Empire State Electric Energy Research Corporation. Asplundh Environmental Services, Willow Grove, PA. 159 pp.

27. Holewinski, D.E., A.J. Zeigler, T.D. Mayer and H.R. Johns. 1977. Environmental and Economic Aspects of Contemporaneous Electric Transmission Line Right-of-Way Management Techniques Volume 2. Individual case Studies Sites 1-11. Study for Empire State Electric Energy Research Corporation. Asplundh Environmental Services, Willow Grove, PA. 182 pp.



28. Holewinski, D.E., A.J. Zeigler, T.D. Mayer and H.R. Johns. 1977. Economic Aspects of Contemporaneous Electric Transmission Line Right-of-Way Management Techniques Volume 3. Individual Case Studies Sites 12 – 22. Study for Empire State Electric Energy Research Corporation. Asplundh Environmental Services, Willow Grove, PA. 161pp.
29. AES. 1978. Electric Power Generation and Transmission Decision Affecting Fish and Wildlife Resources. Fish and Wildlife Service, U.S. Department of the Interior, FWS/OBS-78/57. Asplundh Environmental Services, United Engineers & Constructors Inc., Ichthyological Associates. 95 pp.
30. AES.1978. Environmental Assessment Pertaining to Helicopter Application of Herbicides on Selected Sites on Transmission Line Rights-of Way. Asplundh Environmental Services, Willow Grove, PA, 1978. 59 pp.
31. Galvin, M.T., R.D. Cupit, AES. 1979. Right-of-Way Ecological Effects Bibliography. EPRI, Palo Alto, CA: 1979. EA-1080, Research Project 855-1. 246 pp.
32. Holewinski, D.E. 1979. Terrestrial Ecological Survey for Midland Nuclear-Tittabawassee Substation-Gary Road Substation 345 kV Transmission Right-of-Way for Consumers Power Company. Asplundh Environmental Services, Willow Grove PA, 130 pp.
33. Bramble, W.C., W.W. McFee, and G.C. Steinhardt. 1982. Soil Compaction Related to Agricultural and Construction Operations. Study for New York State Electric & Gas Corporation. Asplundh Environmental Services, Willow Grove, PA. 107 pp.
34. Johnston, P.A. 1983. The Effects of Right-of-Way Vegetation Management on Wildlife Habitat. Empire State Electric Energy Research Corporation, New York, NY, Research Report EP 82-13. Asplundh Environmental Services, Willow Grove, PA. 82 pp.
35. Bramble, W.C., W.R. Byrnes, K. Bensten, K.L. Carvell, L.A. Norris, N.H. Nickerson. 1989. Study of the Impacts of Vegetation Management Techniques on Wetlands for Utility Right-of-Way in the Commonwealth of Massachusetts. Environmental Consultants, Inc., Southampton PA. 311 pp.
36. Bramble, W.C., W.R. Byrnes, R.J. Hutnik, S.A. Liscinsky and R.H. Yahner. 1989-2004. Annual Reports to Cooperators 1989-2004: Green Lane Research Project on the Elroy to Hosensack 500 kV Line of the Philadelphia Electric Company. Environmental Consultants, Inc., Southampton, PA.
37. Bramble, W.C., W.R. Byrnes, R.M. Heisey and T.B. Williams. 1994. Evaluation of the Ability of Natural Plant Communities to Inhibit/Resist Invasion of Tree Seedlings on New York Transmission Rights-of-Way. Study for Consolidated Edison Company of New York, Inc. Environmental Consultants, Inc., Southampton, PA. 39 pp.
38. Norris, L.A., F.N. Dost and R. VanBossuyt, Jr. 1997. Final Environmental Impact Statement, Vegetation Management on Electric Utility Rights-of-Way. Allegheny National Forest. Environmental Consultants, Inc. Southampton PA. 502 pp.
39. Mladenoff, D., Environmental Consultants, Inc. Landscape Fragmentation and Electric Transmission Corridor Siting and Management. EPRI, Palo Alto, CA: 2003. 1005371. 44 pp.
40. Brockbank, R., K.A. McLoughlin, L. Askew, W. Hosman, and H. Harder, Environmental Consultants, Inc. Assessment of Environmental Effects of Underground and Overhead Transmission Line Construction and Maintenance in the United States. EPRI, Palo Alto, CA: 2008. 1015597. 152 pp.

## **TREES AND POWER INTERRUPTIONS**

41. ECI. 1999. Understanding the Way Trees Cause Power Interruptions, Allegheny Power System, Niagara Mohawk, Portland General Electric Report. Environmental Consultants, Inc., Southampton, PA. 17 pp.
42. ECI. 2000. Assessing the Seasonal Variation in the Electrical Characteristics of Trees: A Report to Allegheny Power. Environmental Consultants, Inc., Stoughton, WI. 25 pp.



43. ECI. 2000. Assessing the Relationship Between Tree-Conductor Contact and Momentary Outages at Niagara Mohawk Power Corporation. Environmental Consultants, Inc., Southampton, PA. 39 pp.
44. Goodfellow, J.W. 2000. Assessing the Relationship between Tree-Conductor Contact and Momentary Outages at Allegheny Power System. APS Trees and Momentaries – Phase II: Field Validation. Study for Allegheny Power System. Environmental Consultants, Inc., Southampton, PA. 15 pp.
45. Appelt, P.J., ECI. Electric Distribution Hazard Tree Risk Reduction Strategies. EPRI, Palo Alto, CA: 2004. 1008480. 26 pp.
46. ECI. 2004. Species-Specific Variation in Impedance as Related to Electrical Fault Potential. Environmental Consultants, Inc., Stoughton, WI. 112 pp.

## **EQUIPMENT**

47. AES. 1982. Development of Improved Tree-Trimming Equipment and Techniques: Phase 1. EPRI, Palo Alto, CA: 1982. EPRI EL-2599 RP 1780-1. 264 pp.
48. ECI. 1990. Advanced Tree-Trimming Equipment. A Report to EPRI, Palo Alto, CA: 1990. EPRI EL-6901, Project 2358-1. Environmental Consultants, Inc., Southampton PA. 33 pp.
49. Konieczka, D., Environmental Consultants, Inc. Automatic Vehicle Locating and Its Use for Electric Utility Vegetation Management. EPRI, Palo Alto, CA: 2005. 1010124. 4 pp.
50. Konieczka, D., Environmental Consultants, Inc. New Equipment for Electric Utility Vegetation Management. EPRI, Palo Alto, CA: 2005. 1010126. 4 pp.

## **Miscellaneous**

51. DeWalle, D. R., H.D. Gerhold, W.L. Myers, H.V. Wiant, R.R. Hicks and P.M. Charlton. 1995. Forest Carbon Management Project – Tree Planting. Study for Ohio Edison/Pennsylvania Power Company. Environmental Consultants, Inc., Southampton, PA. 35 pp.

✂ : Denotes publically available from the EPRI Web site: <http://my.epri.com>

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