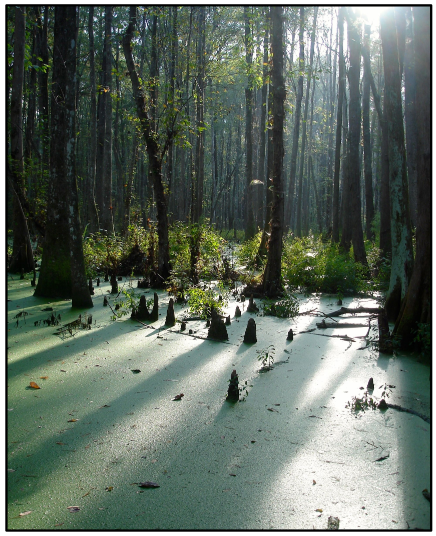
Wetland Design and Restoration

ENV 6309 (Sections XXXX, XXXX) – Spring 20XX



<u>Catalog Description</u>: 3 credits. Applied and theoretical aspects of wetlands use for water quality management; natural and constructed treatment wetlands; engineering and ecology of wetland systems; design for sustainability and ancillary benefits. Theoretical and applied aspects of the restoration and management of wetland ecosystems.

<u>Instructor</u>: Dr. David Kaplan, Environmental Engineering Sciences
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<u>Contact</u>: Class website (UF e-Learning): https://lss.at.ufl.edu
Course e-mail: use e-Learning for correspondence
Office Hours: after class and by appointment

<u>Prerequisite</u>: Wetland Ecology (EES 6308C, SWS 5242, or WIS 6934) or instructor permission

<u>Time and Location</u>:

- XXX, XXX

<u>Course Description</u>: Wetlands have been shown to remove or assimilate large quantities of nutrients (i.e., nitrogen and phosphorous), suspended sediments, and biological oxygen demand from inflowing waters. Both natural and constructed wetlands are increasingly being used to remove nutrients, metals, pesticides, and even industrial solvents from a variety of source waters including municipal, agricultural, and stormwater runoff. The first half of this course will focus on the design of wetlands specifically for water quality enhancement by providing a thorough review of the physical, chemical, and biological processes that drive contaminant removal. Students will also have the opportunity to develop expertise in the planning, design, operation, and trouble-shooting of wetland treatment systems. This portion of the course was originally developed by Dr. Bob Knight, co-author of Treatment Wetlands, and benefits greatly from his expertise.

Unfortunately, more than half of the wetlands in the United States have been destroyed by draining, dredging, filling, and land-use conversion since the 1600s. In recent decades, a growing appreciation of the environmental and ecological functions provided by wetland ecosystems has motivated widespread efforts—on the scale of millions of acres and billions of dollars—to regain a portion of this lost function through ecological restoration (and/or enhancement) and improved wetland management. The science and practice of wetland restoration is still relatively new, however, and by some estimates, *more than 75% of restoration attempts fail*. In the second half of this course, we briefly review the drivers of natural wetland structure and function and explore major theoretical and applied aspects of wetland restoration and management, including: restoration ecology theory; self-organization vs. design; wetland hydrology; restoration design; regulation, permitting, and mitigation; adaptive management; and the economics of wetland restoration and management.

In both sections, course content will consist of instructor and guest lectures (including staff from management agencies, non-profits, and consulting firms), critical reviews/discussions of foundational and new literature, and local field trips.

Who Should Take This Course? Anyone interested in the theory and practice of wetland restoration and management, including those who study and/or practice environmental or water resources engineering, ecology, environmental science, natural resource management, and environmental policy or law. This course is also intended for those interested in treatment wetlands from a management or administrative perspective and for those who wish to develop their design skills. This course will be of value to those interested in treatment wetland technology: environmental, civil, agricultural, and wastewater engineers; biologists; environmental scientists; landscape architects; utility managers; treatment plant operators, and environmental advocates.

Reading Material:
- Required Text: Kadlec and Wallace, 2009. Treatment Wetlands, Second Edition, CRC press.
- Additional readings: Readings will come from the scientific literature, case studies, and agency reports. Relevant readings on each topic area will be assigned weekly.

Course Expectations:
- **Attend class** and arrive on time. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

- **Complete assigned readings** PRIOR to the class for which they are assigned.
- **Participate in class discussions**, including your thoughts on the assigned readings and lecture subjects. Learning is more than passive accumulation of information.

Grading Scheme and Assignments:

Participation:	10%
"Mini-Projects" (3):	15%
Project 1 – WTS Design (due DATE):	20%
Mid-term Exam (DATE):	20%
Synthesis Paper (due DATE):	20%
Project 2 – Wetland Restoration (due Dec 3rd):	20% (10% Report + 10% Presentation)

Attendance and Participation: Attending class is required (for on-campus students), and your in-class participation is strongly encouraged; it will make class a lot more interesting. Note, you cannot receive an A in this course without actively participating.

- On-campus students: earn your participation grade by consistently attending class, asking and answering questions (*based on your reading assignments ahead of time*), and offering your opinion on course topics and current events.
- EDGE Students: earn your participation grade by posting one question or comment about the current readings or lecture to the Discussion board each week; I will select one or more question to answer each Tuesday during lecture.

Mini-Projects: Three individual and/or group mini-projects will be assigned during the semester. Consider these like homework assignments. You will have two weeks to work on each assignment, and additional details will be announced in class.

Project 1 – WTS Design: Group projects (3-5 students/group) will integrate the theoretical and applied aspects of the first half of the course. Groups will design a WTS for a specific wastewater source and location, and will produce a Basis of Design Report (BODR) and an in-class presentation. The BODR consists of a description of the problem, project goals, alternatives analysis, a description of the preferred alternative, and implementation details (construction, permitting, budget, operations and maintenance requirements). Groups will have ~2 weeks to produce a succinct (<15 page) project report. Specific group assignments and further instructions will be delivered in class.

Project 2 – Wetland Restoration Design: Group projects (3-4 students) will integrate the theoretical and applied aspects of the second half of the course. Groups will be assigned a specific project location with degraded wetland ecosystems and will develop a site restoration proposal that includes (at the minimum) the following:

- Site history and physiogeograhpic setting
- Characterization of current soils, hydrology, vegetation, and wildlife function
- Restoration design that addresses the causes and consequences of the ecosystem impairment
- Adaptive monitoring plan to assess restoration success
- Assessment of local, state, and federal regulations
- Project cost estimate and suggestions for funding opportunities to implement the project

Groups will have ~4 weeks to provide a succinct (<10 page) project report and will share their proposals with the class in 30-minute presentations. Groups will be formed to balance the skill sets of enrolled students. Specific group assignments and further instructions will be delivered in class.

Synthesis Paper: An original, well-written and thoroughly researched synthesis paper, focused on emerging topics in wetland restoration or the use of wetland systems for wastewater treatment. Ideally, this paper will cover a topic that bridges your own research and the central concepts of this course. Papers should be 10-15 pages long (double-spaced, excluding references). ***Original figures or tables (i.e., ones you develop using data from multiple sources) synthesizing information from a broad variety of sources are strongly encouraged.***

- A brief (2-paragraph) summary of your chosen topic is due to the instructor by **September 24th.**
- **START EARLY**—the Synthesis Paper and Semester Project are both due near the end of the semester.

Grading Scale: A (≥93), A^{-} (≥90 & <93), B+ (≥87 & <90), B (≥83 & <87), B- (≥80 & <83), C+ (≥77 & <80), C (≥73 & <77), C- (≥70 & <73), D+ (≥67 & <70), D (≥63 & <67), D- (≥60 & <63), E (<60). GPA information can be found: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Field Trips: One or two field trips will be organized to visit regional treatment wetlands. Participation is optional but strongly recommended to help you fully appreciate the material covered in this course. Trip locations and dates are TBD and will be finalized in the first few weeks of class.

Academic Honesty: As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*" You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment*." It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. **It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code**. Violations of the Honor Code at the University of Florida will not be tolerated. **Violations will be reported to the Dean of Students Office for consideration of disciplinary action**. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.php.

Software Use: All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources: Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance:

- *University Counseling & Wellness Center*, 3190 Radio Road, 352-392-1575,

www.counseling.ufl.edu/cwc/
  - Counseling Services
  - Groups and Workshops
  - Outreach and Consultation
  - Self-Help Library
  - Training Programs
  - Community Provider Database
- *Career Resource Center*, First Floor, J. Wayne Reitz Union, 392-1601, www.crc.ufl.edu

Students with Disabilities Act: Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter, which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Distance Students: Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See http://distance.ufl.edu/student-complaints for more details.

Evaluations: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

Course Topics and Schedule: This schedule is tentative and subject to change based on the timing of fieldtrips, guest lecturer schedules, student interests, current events, and the whim of the instructor.

Week	Tuesday Lecture/Discussion	Thursday Lecture/Discussion/Activity	Readings*
Jan 3	Course Overview, Wetland Ecology 101	Introduction to Wetland Treatment Systems (WTS)	**Odum 1969, KW (1)**
Jan 10	Wetland Hydrology	Wetland Hydraulics: FWS	**KW (2-3)**
Jan 17	Wetland Hydraulics: SSF	Energy Flows and Chemistry in WTS	**KW (4-5)**
Jan 24	WTS Design I: Performance Expectations & Intro to WQ Models	Contaminant Removal Processes I: Solids and BOD	**KW (6-8)**
Jan 31	Contaminant Removal Processes II: Nitrogen and Phosphorous	Contaminant Removal Processes IV: Metals, Organics, Pathogens, etc.	**KW (9-13)**
Feb 7	WTS Design II: Planning, Permits, and Regulations	WTS Design III: FWS Systems	**KW (16-19)**
Feb 14	WTS Design IV: SSF Systems	WTS Management, Operations, and Maintenance and Economics	**KW (20-23)**
Feb 21	Catch-up and Review	**Midterm Exam (In Class)**	---
Feb 28	**SPRING BREAK – NO CLASS**	**SPRING BREAK – NO CLASS**	---
Mar 6	Intro: Is restoration possible?	History of wetland loss & degradation	**1, 2,** 3-6, B1 (Ch. 1-4), B2, B3
Mar 13	Restoration Ecology I – Context, Disturbance & Succession	Restoration Ecology II – Attributes of Restored Ecosystems	B1 (Ch. 5-8), 7-11, **12,** 13-17

Mar 20	Restoration Ecology III – Reference Models & Ecosystem Trajectories	Restoration Ecology IV – Metapopulation theory, etc.	**18,** 19-25, **26,** 27
Mar 27	Restoration Design – Project Development & Management I	Restoration Design – Project Development & Management II	28-33, **34, 35**
Apr 3	Design & Implementation – RCE of Freshwater Wetlands	Design & Implementation – RCE of Tidal Wetlands	36-42, **43, 44, 45**
Apr 10	Adaptive Management in Wetland Restoration	Other Issues: Permitting, Economics of Restoration & Management	
Apr 17	**Project 2 Presentations (In Class)**	**Reading Days - No Class**	
Apr 24	**NO FINAL EXAM**		

*KW = Kadlec and Wallace, 2009; numbered readings correspond to reading list below. Relevant readings provide a good background, and we will discuss ***a subset (noted in BOLD)*** in class (***in other words, you will not be expected to read everything on the list, but they may be useful for your synthesis paper***). Discussion readings will be assigned the week prior to in-class discussion. The list is subject to change based on new publications, student and instructor interests, and lecture timing.

Preliminary Reading List: The following readings are all available (online) through the UF Library subscription or on reserve at the Marston Science Library. Please let me know if you are unable to access any of these resources and I will make them available as PDF. List subject to grow, shrink, and/or change.

Background Material:

B1. Mitsch, J.W. and Gosselink. J. 2007. Wetlands, 3rd Edition. John Wiley and Sons, NY. **(ON RESERVE IN MARSTON).**

B2. U.S. Geological Survey, 1996. National Water Summary on Wetland Resources: U.S. Geological Survey Water-Supply Paper 2425, 431 p. Available at http://water.usgs.gov/nwsum/WSP2425/index.html (verified 5 Dec 2012).

B3. EPA, 2012. Wetlands. Available at http://water.epa.gov/type/wetlands/toc.cfm (confirmed 6 Dec 2012).

Reading List:

1. **SER, 2004. SER International Primer on Ecological Restoration (Version 2, October, 2004). Society for Ecological Restoration International Science & Policy Working Group. Available at http://www.ser.org/resources/resources-detail-view/ser-international-primer-on-ecological-restoration (verified 5 Dec 2012).**
2. **Clewell, A.F. & Aronson, J. (2005) Motivations for the restoration of ecosystems. Conservation Biology, 20, 420–428.**
3. EPA, 2012. River Corridor and Wetland Restoration. Available at http://water.epa.gov/type/wetlands/restore/ (verified 6 Dec 2012).
4. Aronson, J., S. J. Milton, and J. Blignaut, (2007). Restoring Natural Capital: Science, Business and Practice. Island Press, Washington, DC. **(ON RESERVE IN MARSTON).**
5. Zedler, J. B., & Kercher, S. (2005). Wetland resources: status, trends, ecosystem services, and restorability. Annu. Rev. Environ. Resour., 30, 39-74.
6. Dahl, T.E. and G.J. Allord. History of Wetlands in the Conterminous United States. Available at http://www.fws.gov/wetlands/Documents/History-of-Wetlands-in-the-Conterminous-United-States.pdf (verified 20 Dec 2012).
7. Vaughn, K. J., Porensky, L. M., Wilkerson, M. L., Balachowski, J., Peffer, E., Riginos, C. & Young, T. P. (2010) Restoration Ecology. Nature Education Knowledge 3(10):66.
8. Hobbs, R. J. & D. A. Norton. 1996. Towards a conceptual framework for restoration ecology. Restoration Ecology 4:93–110.
9. Hobbs, R. J. & J. A. Harris. 2001. Restoration ecology: repairing the earth's ecosystems in the new millenium. Restoration Ecology 9:239–246.
10. Suding, 2011. Toward an era of restoration in ecology: successes, failures and opportunities ahead. Annu. Rev. Ecol. Evol. Syst., 42 (2011), pp. 465‐487.
11. Ehrenfeld, J.G. Defining the limits of restoration: the need for realistic goals. Restor. Ecol., 8 (2000), pp. 2–9.
12. **Hilderbrand, R. H., Watts, A. C., & Randle, A. M. (2005). The myths of restoration ecology. Ecology and Society, 10(1), 19.**

13. Maron, M., Hobbs, R. J., Moilanen, A., Matthews, J. W., Christie, K., Gardner, T.A., Keith, D. A., Lindenmayer, D. B., McAlpine, C. A. 2012, "Faustian bargains? Restoration realities in the context of biodiversity offset policies", Biological Conservation, v. 155, pp. 141-148.
14. Holling, C.S. Resilience and stability of ecological systems. Annu. Rev. Ecol. Syst., 4 (1973), pp. 1–23
15. Gunderson, L.H. Ecological resilience – in theory and application. Annu. Rev. Ecol. Syst., 31 (2000), pp. 425–439.
16. Clewell, A. (2009). Guidelines for reference model preparation. Ecological Restoration, 27(3), 244-246.
17. Zweig, C. L., & Kitchens, W. M. (2009). Multi-state succession in wetlands: a novel use of state and transition models. Ecology, 90(7), 1900-1909.
18. **Moreno-Mateos D, Power ME, Comín FA, Yockteng R (2012) Structural and Functional Loss in Restored Wetland Ecosystems. PLoS Biol 10(1): e1001247. doi:10.1371/journal.pbio.1001247**
19. Chambers, J.C. and A.R. Linnerooth. (2001). Restoring riparian meadows currently dominated by Artemesia using alternative state concepts – the establishment component. Appl. Veg. Sci., 4 (2001), pp. 157–166.
20. Matthews, J.W., and G. Spyreas. "Convergence and divergence in plant community trajectories as a framework for monitoring wetland restoration progress." Journal of Applied Ecology 47.5 (2010): 1128-1136.
21. Matthews, J.W., G. Spyreas, and A.G. Endress. "Trajectories of vegetation-based indicators used to assess wetland restoration progress." Ecological Applications 19.8 (2009): 2093-2107.
22. Bishel-Machung, L., R. P. Brooks, S. S. Yates, K. L. Hoover, 1996. Soil properties of reference wetlands and wetland creation projects in Pennsylvania. Wetlands 16:532 541.
23. Brinson, M. M. & R. Rheinhardt. 1996. The role of reference wetlands in functional assessment and mitigation. Ecological Applications 6:69–76.
24. Zedler, J.B. and J.C. Callaway. Tracking wetland restoration: do mitigation sites follow desired trajectories? Restor. Ecol., 7 (1999), pp. 69–73.
25. Findlay, S.E.G., Kiviat, E., Nieder, W.C. & Blair, E.A. (2002) Functional assessment of a reference wetland set as a tool for science, management and restoration. Aquatic Sciences, 64, 107–117.
26. **FDEP, 2002. Paynes Prairie Unit Management Plan. Florida Department of Environmental Protection. Available at http://www.dep.state.fl.us/parks/planning/parkplans/PaynesPrairiePreserveStatePark.pdf (verified 25 Feb 2013).**
27. Peterson. G.D. Contagious disturbance, ecological memory, and the emergence of landscape pattern. Ecosystems, 5 (2002), pp. 329–338
28. **Scheffer, M., Carpenter, S., Foley, J. A., Folke, C., & Walker, B. (2001). Catastrophic shifts in ecosystems. *Nature*, *413*(6856), 591-596.**
29. **Suding, K. N., & Gross, K. L. (2006). The dynamic nature of ecological systems: multiple states and restoration trajectories *in* Falk, D., Palmer M., and Zedler, J. (eds.) *Foundations of restoration ecology*, 190-209.**
30. Bachmann, R.W. et al. The restoration of Lake Apopka in relation to alternative stable states. Hydrobiologia, 394 (1999), pp. 219–232.
31. Suding, N. et al. 2004. Alternative states and positive feedbacks in restoration ecology. Trends Ecol. Evol., 19: 46–53.
32. Suding, K.N., Gross, K.L. & Houseman, G.R. (2004) Alternative states and positive feedbacks in restoration ecology. Trends in Ecology & Evolution, 19, 46–53.
33. Groffman, P.M. et al. Ecological thresholds: The key to successful environmental management or an important concept with no practical application? Ecosystems, 9 (2006), pp. 1–13.
34. **Mitsch, W.J. and R.F. Wilson Improving the success of wetland creation and restoration with know-how, time, and self-design Ecol. Appl., 6 (1996), pp. 77–83**
35. **Lindig-Cisneros, R., Desmond, J., Boyer, K. E., & Zedler, J. B. (2003). Wetland restoration thresholds: Can a degradation transition be reversed with increased effort?. *Ecological Applications*, *13*(1), 193-205.**
36. Zedler, J.B. Progress in wetland restoration ecology. Trends Ecol. Evol., 15 (2000), pp. 402–407.
37. Richardson, Curtis J., et al. "Integrated stream and wetland restoration: A watershed approach to improved water quality on the landscape." Ecological Engineering 37.1 (2011): 25-39.
38. Rood, S.B., Gourley, C.R., Ammon, E.M., Heki, L.G., Klotz, J.R., Morrison, M.L., Mosley, D., Scoppetone, G.G., Swanson, S. & Wagner, P.L. (2003) Flows for floodplain forests: a successful riparian restoration. BioScience, 53, 647–656.
39. Sedell, J.R., Reeves, G.H., Hauer, F.R., Stanford, J.A. & Hawkins, C.P. (1990) Role of refugia in recovery from disturbances: modern fragmented and disconnected river systems. Environmental Management, 14, 711–724.
40. Stanturf, J. A., S. H. Schoenholtz, C. J. Schweitzer, J. P. Shepard. 2001. Achieving restoration success: myths in bottomland hardwood forests. Restoration Ecology 9:189–200.
41. Sweeney, B.W., Czapka, S.J. & Yerkes, T. (2002) Riparian forest restoration: increasing success by reducing plant competition and herbivory. Restoration Ecology, 10, 392–400.
42. Wissmar, R.C. & Beschta, R.L. (1998) Restoration and management of riparian ecosystems: a catchment perspective. Freshwater Biology, 40, 571–585.

43. **Lewis III, R. R. (2011). How successful mangrove forest restoration informs the process of successful general wetland restoration. National Wetlands Newsletter, 33, 23-25.**
44. **LEWIS III, R. (2009). Mangrove Field of Dreams: If We Build It, Will They Come? SWS Research Brief , 1-4.**
45. **Additional background at www.mangroverestoration.com and www.royrlewis3.com (verified 1 March 2012).**
46. **Vardi, T., Williams, D. E., & Sandin, S. A. (2012). Population dynamics of threatened elkhorn coral in the northern Florida Keys, USA. *Endangered Species Research*, *19*, 157-169.**
47. **Boumans, R. M. J., Burdick, D. M., & Dionne, M. (2002). Modeling habitat change in salt marshes after tidal restoration. *Restoration Ecology*, *10*(3), 543-555.**
48. **Neckles, H. A., Dionne, M., Burdick, D. M., Roman, C. T., Buchsbaum, R., & Hutchins, E. (2002). A monitoring protocol to assess tidal restoration of salt marshes on local and regional scales. *Restoration Ecology*, *10*(3), 556-563.**
49. Zedler, Joy B., and J. Callaway. "Tidal wetland restoration." Ecology 5 (2009): 291-300.
50. Handa, I.T. and R.L. Jefferies. Assisted revegetation trials in degraded salt-marshes J. Appl. Ecol., 37 (2000), pp. 944–9585
51. Brophy, Laura, et al. "New Tools for Tidal Wetland Restoration: Development of a Reference Conditions Database and a Temperature Sensor Method for Detecting Tidal Inundation in Least-disturbed Tidal Wetlands of Oregon, USA. Amended Final Report." (2011).

Additional Readings:

Case Studies

- Comín, F. A., J. A. Romero, O. Hernández, M. Menéndez. 2001. Restoration of wetlands from abandoned rice fields for nutrient removal, and biological community and landscape diversity. Restoration Ecology 9:201–208.
- Cui, Baoshan, et al. "Evaluating the ecological performance of wetland restoration in the Yellow River Delta, China." Ecological Engineering 35.7 (2009): 1090-1103.
- Klotzli, F. and A.P. Grootjans. Restoration of natural and semi-natural wetland systems in Central Europe: progress and predictability of developments. Restor. Ecol., 9 (2001), pp. 209–219.

Climate Change

- Choi, Y.D. et al. Ecological restoration for future sustainability in a changing environment. Ecoscience, 15 (2008), pp. 53–64.
- Erwin, Kevin L. "Wetlands and global climate change: the role of wetland restoration in a changing world." Wetlands Ecology and Management 17.1 (2009): 71-84.
- Harris, J.A. et al. Ecological restoration and global climate change. Rest. Ecol., 14 (2006), pp. 170–176.

Economics

- Milon, J. W., & Scrogin, D. (2006). Latent preferences and valuation of wetland ecosystem restoration. Ecological Economics, 56(2), 162-175.

Exotic Species

- D'Antonio, C. and L.A. Meyerson. Exotic plant species as problems and solutions in ecological restoration: a synthesis. Restor. Ecol., 10 (2002), pp. 703–713
- Gordon, D.R. Effects of invasive, non-indigenous plant species on ecosystem processes: lessons from Florida. Ecol. Monogr., 8 (1998), pp. 975–989
- MacDougall, A.S. & Turkington, R. (2005) Are invasive species the drivers or passengers of change in degraded ecosystems? Ecology, 86, 42–55

Fauna

- Charalambidou, I. & Santamaría, L. (2002) Waterbirds as endozoochorous dispersers of aquatic organisms: a review of experimental evidence. Acta Oecologia, 23, 165–176.
- Gawlik, D. E. (2006). The role of wildlife science in wetland ecosystem restoration: lessons from the Everglades. Ecological Engineering, 26(1), 70-83.
- Opperman, J.J. and A.M. Merenlender. Deer herbivory as an ecological constraint to restoration of degraded riparian corridors. Restor. Ecol., 8 (2000), pp. 41–47
- Stralberg, Diana, et al. "Optimizing wetland restoration and management for avian communities using a mixed integer programming approach." Biological Conservation 142.1 (2009): 94-109.

General
- Dobson, A. et al. Hopes for the future: restoration ecology and conservation biology. Science, 227 (1997), pp. 515–522
- Gunderson, L.H. Managing surprising ecosystems in southern Florida. Ecol. Econ., 37 (2001), pp. 371–378
- Harris, J. Progress with Restoration: Our Widening Scope. Ecological Restoration Vol. 29, Nos. 1–2, 2011
- Higgs, E. S. 1997. What is good ecological restoration? Conservation Biology 11: 338–348.
- Hobbs, R.J. Setting effective and realistic restoration goals: Key directions for research. Restor. Ecol., 15 (2007), pp. 354–357.
- Jackson, S.T. and R.J. Hobbs. Ecological restoration in the light of ecological history. Science, 325 (2009), pp. 567–569
- Jackson, S.T. Vegetation, environment, and time: the origination and termination of ecosystems. J. Veg. Sci., 17 (2006), pp. 549–557.
- Landres, P.B. et al. Overview of the use of natural variability concepts in managing ecological systems. Ecol. Appl., 9 (1999), pp. 1179–1188.
- McGraw, K. and R.M. Thom. Protection and Restoration: Are We Having an Effect? Ecological Restoration Vol. 29, Nos. 1–2, 2011
- Palmer, M.A., Ambrose, R.F. & Poff, N.L. (1997) Ecological theory and community restoration ecology. Restoration Ecology, 5, 291–300.
- Parker, V. T. & S. T. A. Pickett. 1997. Restoration as an ecosystem process: implications of the modern ecological paradigm. Pages 17–32 in K. M.Urbanska, N. R.Webb and P.J. Edwards, editors. Restoration ecology and sustainable development. Cambridge University Press, Cambridge.
- Prach, K. et al. The role of spontaneous vegetation succession in ecosystem restoration: a perspective. App. Veg. Sci, 4 (2001), pp. 111–114
- Stein, Eric D., et al. "Historical ecology as a tool for assessing landscape change and informing wetland restoration priorities." Wetlands 30.3 (2010): 589-601.
- Teal, John M., and Susan Peterson. "US Wetland Protection and Restoration: Have We Made a Difference?." Ecological Restoration 29.1 (2011): 22-24.
- Tobe, J. D., Cantrell, R. W., & Burks, K. C. (1998). Florida wetland plants: an identification manual. University of Florida.
- Van Der Valk, A.G. (1992) Establishment, colonisation and persistence. Plant succession: theory and prediction (ed. by T.T.Veblen). Chapman & Hall, London.
- Van Diggelen, R., Grootjans, A.P. & Harris, J.A. (2001) Ecological restoration: state of the art or state of the science? Restoration Ecology, 9, 115–118.
- Willis, K.J. and H.J.B. Birks. What is natural? The need for a long-term perspective in biodiversity conservation. Science, 314 (2006), pp. 1261–1265.
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