Wetland Restoration Literature

Bates, C.R. and P.W. Byham. 2001. Bathymetric sidescan techniques for near shore surveying. Hydro. J. 10: 13-18.

The authors describe methods and techniques for conducting depth measurements of the sea floor using sidescan sonar. They provide the results from three case histories: Plymouth Sound, Loch Sunart and Megget Reservoir. They also describe the metrics used to calculate the footprint on the seafloor produced by transducer signals.

Cairns, J., Jr. 2000. Setting ecological restoration goals for technical feasibility and scientific validity. Eco. Eng. 15: 171-180.

The author states that ecological restoration goals with ecosystem sustainability in mind will not be possible without an understanding of ecological function, project scale and the support of society. The most successful restoration projects are those that incorporate people who have an appreciation for the value of wetlands and want to reverse the damage inflicted upon them. The challenge is to integrate a technical science staff with a non-technical public to work together within a scientifically-valid framework and to inform the public of the benefits naturally-functioning systems provide.

Callaway, J.C., G. Sullivan, J.S. Desmond, G.D. Williams, and J.B. Zedler. 2001. Assessment and monitoring. In J.B. Zedler (ed.) handbook for restoring tidal wetlands, pp.271-335, CRC Press, Boca Raton, Florida.

The authors of chapter six describe monitoring under an adaptive management framework and stress the importance of sampling ecosystem attributes such as water quality, soils, vegetation etc., on a standard schedule. The chapter is organized into different monitoring parameters with rationale, methods, sample frequency and equipment described for each attribute.

Coats, R.N., P.B. Williams, C.K. Cuffe, J.B. Zedler, D. Reed, S.M. Watry and J.S. Noller. 1995. Design guidelines for tidal channels in coastal wetlands. Report prepared for U.S. Army Corps of Engineers waterways experiment station, Catalog. No. TA7W343.D47, Vicksburg, MS.

This report provides a framework of necessary features (biological and physical) to consider when designing tidal channels. It describes the importance of clear ecological and engineering goals and stresses the need to harmonize both. It also explains hydraulic geometry relationships, features of the plan view of channels and tidal channel example calculations.

Desmond, J.S., J.B. Zedler and G.D. Williams. 2000. Fish use of tidal creek habitats in two southern California salt marshes. Eco. Eng. 14: 233-252.

The authors chose two sites: Sweetwater Marsh and the Tijuana Estuary and sampled fish within different creek orders of each site. Since a goal of some habitat restoration projects is to create habitat for fish species, the authors wanted to test what extent small creeks play in fish usage. They say that most restoration projects do not include small creeks and have channel complexities much less than what is found in natural systems. The study concluded that integrating small excavated creeks into restoration projects may open up more habitats for fish to utilize, but it is not known how sustainable this created habitat may be.

Garano, R., B. Anderson, R. Robinson, and C. Simenstad. 2003. Change in land cover along the lower Columbia River estuary as determined from landstat tm imagery. Draft report submitted to the Lower Columbia River Estuary Partnership by Earth Design Consultants, Inc. November 2003. Portland, OR.

This study assessed landcover change in the lower Columbia River from 1992 to 2000 by using remotely sensed data to conduct a crosstabulation change analysis (spot changes in a habitat from one point in time to the next). Results were used to produce a map of land cover classes as well as matrices that describe habitat changes.

Hood, W.G. 2002. Landscape allometry: from tidal channel hydraulic geometry to benthic ecology. Can. J. Fish. Aquat. Sci. 59: 1418-1427.

The author uses allometry to describe the relationship between two parts in a system (when the rate of change between two different parts of a system are proportional to one-another). The author studied channels in the estuarine portion of the Chehalis River to investigate a relationship between channel structure and ecological development. This idea has implications for habitat restoration projects because it provides another view of how physical as well as biological features can act to shape estuarine ecosystems.

Kentula, M.E. Perspectives on Setting Success Criteria for Wetland Restoration. 2000. Eco. Eng. 15: 199-201.

The paper incorporates many different ideas on how to assess success criteria from various papers written on the subject. It provides approaches on how to evaluate restoration projects as well as describes a case highlighting a soil organic matter attribute from a 10-year wetland study. It also describes the importance of adaptive management in wetland restoration projects and using learned knowledge to evaluate success.

Ministry of Environmental Lands, and Parks, Water Management Branch for the Aquatic Inventory Task Force. 1999. Automated water quality Monitoring. 61pp. Available URL: http://www.for.gov.bc.ca/ric/pubs/aquatic/waterqual/index.htm.

The authors of this manual provide a framework on how to construct an automated water quality monitoring program and describe the necessary components. They explain how to select between automated or manual monitoring methods, how to choose a monitoring site, preliminary preparation for a monitoring project, sampling scheme, data verification and how to handle collected data.

National Estuarine Research Reserve System. 2004. Systemwide monitoring program. Available URL: http://cdmo.baruch.sc.edu/overview.html

This overview includes the NERR system overall goals and objectives, research methods, and quality control and quality assurance procedures. It also describes the policy for metadata distribution as well as general and physical descriptors for different site locations.

Oregon Plan for Salmon and Watersheds (OPSW). 1999. Water quality monitoring, technical guide book. Version 2.0. Corvallis, Oregon. Web link: http://www.oweb.state.or.us/publications/index.shtml.

This water quality guidebook provides a framework for a monitoring plan and describes various protocols for environmental water quality monitoring parameters. It provides lists of essential field equipment and references for various studies. The guidebook also includes specific data sheets for monitoring protocols and reference diagrams.

Osprey Environmental Services. 1996. A guide to photodocumentation for aquatic inventory. Prepared for the aquatic ecosystems task force, resources inventory committee on behalf of the B.C. ministry of environment, lands and parks, fisheries branch. British Columbia, Canada. Available URL: http://www.publications.gov.bc.ca, 1-800-663-6105.

This comprehensive manual describes ground-based photodocumentation techniques for watershed, stream and lake inventories. It provides a discussion of methods associates with taking photographs of specific subjects such as landscape (watershed) features, channel and lake features and close-up features. They author suggests which types of cameras, lenses and film to use as well as provides sample data sheets that categorize the relevant information to collect when documenting a subject.

Rice, C. A. and six co-authors. In Press. Monitoring rehabilitation in temperate North American estuaries.

The authors first describe ecological patterns of estuaries and how Pacific Northwest salmon fit into habitat restoration goals. They also give ways in which humans have negatively impacted natural systems. Next, they describe the most common types of estuary rehabilitation and provide

examples from well studied estuaries around the United States. They also illustrate the methods behind designing a monitoring program and finally present the challenges of estuary rehabilitation.

Schuette-Hames, D. A.E. Pleus, E. Rashin, and J. Mathews 1999. TFW monitoring program method manual for the stream temperature survey. Prepared for the Washington State Department of Natural Resources under the Timber, Fish, and Wildlife Agreement. TFW-AM9-99-005. DNR #107. June 1999.

The TFW monitoring manual offers standard procedures on how to sample stream temperature and thermal reach characteristics. The protocol provides notes on methods, how to document measurements when conducting stream temperature surveys, step-by-step procedures in the use and placement of stream temperature equipment and sample data collection sheets.

Short, F.T., Burdick, D.M., Short, C.A., Davis, R.C., Morgan, P.A. 2000. Developing success criteria for restored, eelgrass, salt marsh and mud flat habitats. Eco. Eng. 15: 239-252.

The authors used data from eelgrass transplant sites in the New Hampshire Port Mitigation Project to develop criteria on which success of restoration projects could be based. This methodology is designed to be used in habitats where ecological functions and values have been established. The authors believe this methodology can be transferred to other restoration/creation projects.

Simenstad, C.A., Cordell, J.R. 2000. Ecological assessment criteria for restoring anadromous salmonid habitat in Pacific Northwest estuaries. Eco. Eng. 15: 292-302.

The authors suggest that ecological assessment criteria and habitat metrics be based upon habitat capacity, opportunity and realized function. These metrics in a restored system would provide a framework on which to assess whether or not the restored site was providing the necessary parameters to support various salmon life histories.

Skalski, J. and six co-authors. 2001. Estimating in-river survival of migrating salmonid smolts using radiotelemetry. Can. J. Fish. Aquat. Sci. 58: 1987-1997.

The authors present a method for estimating survival rates of salmon and steelhead smolts by using radio-tags instead of PIT-tags. The benefits of using radio-tags is that recognition rates are high, fewer fish need to be tagged and the associated statistical models offer more comprehensive and specific information on river survival. The paper also addresses a statistical model and the associated equations used to assess salmonid survival.

Teel, D.J., G.B. Milner, G.A. Winans, and W.S. Grant. 2000. Genetic population structure and origin of life history types in Chinook salmon in British Columbia, Canada. Transactions of the American Fisheries Society 129: 194-209.

The authors used protein electrophoresis to study Chinook salmon life history strategies as well as population organization in British Columbia salmon populations. They were concerned with both stream and ocean-type life histories and found that some populations in British Columbia may have come from a common ancestor even though some of the stream-type populations had been isolated for many generations. They also studied the variation among populations by examining allele frequency.

Thom, R.M., R. Zeigler and A.B. Borde. 2002. Floristic development patterns in a restored Elk River estuarine marsh, Grays Harbor, Washington. Restoration Ecology 10(3): 487-496.

This study analyzed the progression of vegetation in the Elk River marsh after tidal reconnection. A dike was breached which allowed saltwater to inundate a freshwater pasture. A nearby natural marsh was used as a reference site. The system was monitored for 11-years and at the 11-year mark continued to show changes in monitored attributes. The succession of plant development in this study was similar to results found in other tidal reconnection studies.

Wetlands Regulatory Assistance Program. 2000. Installing monitoring wells/piezometers in wetlands. ERDC TN-WRAP-00-02.

This manual provides a thorough, step-by-step description of well and piezometer construction and placement. The manual also supplies instructions for reading water levels once the equipment is in place and sample data sheets for recording pertinent information.

Williams, P.B. and M.K. Orr. 2002. Physical evolution of restored breached levee salt marshes in the San Francisco Bay estuary. Rest. Eco. 10(3): 527-542.

The authors reviewed the sequence of tidal marsh evolution within 15 re-flooded sites around the San Franscisco Bay estuary. For each site, the authors identified 11 attributes such as, area restored to tidal action, extent of tidal range and approximate length of time until the site has more than 50% vegetation cover, etc. They found that the time it takes for a salt marsh to develop a vegetated marshplain and tidal channels depends on initial site conditions. This evolution can take 5 to 20+ years to develop.

Williams, P.B., M.K. Orr and N.J. Garrity. 2002. Hydraulic geometry: a geomorphic design tool for tidal marsh channel evolution in wetland restoration projects. Rest. Eco. 10(3): 577-590.

This paper describes the relationship between tidal flows and channel geometry and how they can be incorporated into salt marsh restoration design. The authors studied coastal salt marshes within San Francisco Bay to determine hydraulic geometry relationships to predict the depth, width, and cross-sectional area of developed tidal channels as functions of the existing salt marsh area or tidal prism. These findings can also be used to predict the sequence of events in immature marsh evolution.