Other Resources – *last updated 30 March 2020*

This document contains links to videos, photos, design plans and other resources that I use in teaching my class on ecological restoration. I will update it periodically. Users are responsible for ensuring that they are complying with copyright laws. Please email me (kholl at ucsc.edu) with suggestions of additional resources.

General Resources

Case Studies in the Environment (http://cse.ucpress.edu/).

A journal of peer-reviewed case study articles, case study pedagogy articles, and a repository for editor-reviewed case study slides. The journal aims to inform faculty, students, researchers, educators, professionals, and policymakers on case studies and best practices in the environmental sciences and studies. You can search by keywords for restoration case studies of interest.

Society for Ecological Restoration (SER) Project Database (https://www.ser-rrc.org/project-database/).

A searchable database of restoration projects from around the world intended to serve as a resource for practitioners, researchers, educators, students, and the general public. Projects have been freely contributed by users of the SER website, or have been compiled from publicly available information by SER staff or other designees of SER. Videotapes of all the talks from the SER 2019 conference available here. Membership in SER is required to view most resources.

Society for Ecological Restoration (SER) Webinar Library (https://www.ser.org/page/WebinarLibrary).

Online presentations by global experts across academia and applied restoration that are presented by SER, regional chapters, and partners. Membership in SER is required to view most webinars.

SERDP-ESTCP Webinar Series (https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series/Past-Webinars).

Online seminars on restoration (under the "Resource Conservation and Resiliency" heading) and clean up from hazardous wastes (under the "Environmental Restoration" heading) based on research done on U.S. Department of Defense sites, but results are applicable more broadly.

Chapter 3. Project Planning

Example Restoration Design Plans.

Several practitioners from the western US have shared examples of project design plans for readers to review. I welcome other plans from different ecosystems and region. Please send them to kholl at ucsc.edu.

Buck Gully restoration plan – *click here to download plan*
An urban riparian restoration project in southern California

Capay restoration plan – *click here to download plan*
A riparian forest restoration plan along the Sacramento River, California

Carmel River Floodplain and Environmental Enhancement Project (short overview: https://bigsurlandtrust.org/carmel-river-free/; all project documents: http://www.co.monterey.ca.us/government/departments-i-z/resource-management-agency-rma-/planning/current-major-projects/carmel-river-free)
A multi-objective restoration project on the central California Coast.

Lakeside Ranch coastal sage scrub restoration and enhancement plan - *click here to download plan*
A plan for coastal sage scrub restoration and enhancement to mitigate for the impacts of a power company project. Link provides the restoration plan and 1-year compliance monitoring report.

Mathis trail restoration plan - *click here to download plan*
A riparian restoration project as mitigation for road construction in southern California

Monarch butterfly site management plan - *click here to download plan*
A plan to create monarch butterfly overwintering habitat at a site on the central coast of California

Strawberry farms coastal sage scrub restoration plan - *click here to download plan*
A plan for 6 ha of coastal sage scrub restoration in southern California. Link provides the restoration plan and 5-year compliance monitoring report.

Yachats Commons Park plan
(http://people.oregonstate.edu/~adamusp/Oregon_YachatsRestoration/Yachats%20wetland%20restoration%20plan.pdf)
A wetland restoration plan in Lincoln County, Oregon

Chapter 4. Monitoring and Adaptive Management

Books

Elzinga, C. L., D. W. Salzer, and J. W. Willoughby. 1998. *Measuring and Monitoring Plant Populations*. Denver, CO: Bureau of Land Management.
http://msuinvasiveplants.org/documents/archives_cism/BLM_Measuring_and_monitoring.pdf
An excellent monitoring reference that is available online.

Chapter 5. Applying Ecological Knowledge to Restoration

Photos available in slides

- A photo of the Trans-Canada Highway passing below a wildlife bridge. Photo by daveynin, licensed under CC BY 2.0.

Photos and webpages available online

National Geographic. 2019. "How wildlife bridges over highways make animals – and people – safer". Accessed June 10, 2019. https://www.nationalgeographic.com/animals/2019/04/wildlife-overpasses-underpasses-make-animals-people-safer/

Many photos of wildlife crossing structures, and an eight-minute video on a structure that aids pronghorn migration in the Western United States, are viewable on National Geographic's webpage.

Conservation Corridor. 2018. "Man-made corridors". Accessed June 10, 2019. https://conservationcorridor.org/corridors-in-conservation/man-made-corridors/

A webpage with photos and descriptions of wildlife crossing over and under-passes in several locations globally.

Yokochi, K and R Bencini. 2015. "A remarkably quick habituation and high use of a rope bridge by an endangered marsupial, the western ringtail possum." *Nature Conservation* 11:79-94. https://doi.org/10.3897/natureconservation.11.4385

This article includes several photos of an endangered marsupial using a rope bridge that crosses over a road in Eastern Australia.

Videos

The Alberta Story: Banff Wildlife Crossing. 2 min. Andrew Evans for National Geographic. https://youtu.be/1Odg5sqjM-M

Provides background and visuals of some of the over 35 passages over and under the major highways that cut through Banff National Park, which allow many species of wildlife to travel safely and greatly reducing the amount of traffic-related wildlife mortality.

Behind the scenes of the red crab migration – Christmas Islands 2012. Parks Australia. 4 min. https://parksaustralia.gov.au/christmas/people-place/red-crabs.html

An overview of the strategies Parks Australia uses to protect the millions crabs the make their annual breeding migrations from the interior forest to the coast of Christmas Island. Parks Australia prevents the deaths of thousands of crabs with temporary and permanent fencing and road underpasses ("grids"), to protect crabs and reduce mortality.

Chapter 6. Landform and Hydrology

Photos available in slides

- Images of a fish ladder available in figure slides for chapter 6. Figure shows a fish ladder at the Hiram M. Chittenden Locks in Seattle, Washington. A. The concrete fish ladder

stairs. B. The locks, which otherwise prevent salmon from traveling upstream. C. The fish ladder is publicly accessible. D. A salmon acclimating to freshwater, visible in the publicly accessible viewing room. Photo credit: Josie Lesage.

- Images of log check dams available in figure slides for chapter 6. Figure shows log check dams along a coastal California rivers. Photo credit: Karen Holl
- Image of a culvert available in figure slides for chapter 6. Figure shows a half culvert with a natural river bottom along a coastal river in California. Photo credit: Karen Holl
- Hydroseeding of a levee slope. Photo by the U.S. Army Corps of Engineers, licensed under CC BY 2.0.
- Visualization of channel meandering over time. https://hinderedsettling.com/2014/03/16/rivers-through-time-as-seen-in-landsat-images/

Videos

Lesson of the Kissimmee River. 2010. 8 min. Produced by the South Florida Water Management District. https://www.youtube.com/watch?v=OGxYacXM1SU

Provides an overview of the Kissimmee River Restoration Project.

Marsh Creation Step by Step. 2011. 6 min. Produced by the Coastal Wetlands Planning, Protection, and Restoration Act. https://www.youtube.com/watch?v=n1wYo4u9_-I

Describes a project moving large quantities of sediment to restore tidal marsh in coastal Louisiana, US.

Time Lapse Dam Removal. 2011. 2 min. Produced by National Geographic. https://www.youtube.com/watch?v=4LxMHmw3Z-U

Shows time lapse photography of the dramatic Condit Dam removal along the White Salmon River in Washington, US.

Undammed. 2016. 6 min. Produced by Olympic National Park. https://www.youtube.com/watch?v=7MRqPV6tSFo

One of several videos produced by the U.S. National Park Services and others about the Elwha River dam removals in Washington, US.

Chapter 7. Soil and Water Quality

Books

Zedler, J. B. 2018. Waubesa Waubesa Wetlands: New Look at an Old Gem. Town of Dunn, Dane County, Wisconsin *https://town.dunn.wi.us/media/1486/ww2ed.pdf*

This book describes the history, ecology, and conservation value of the Waubesa wetlands in Wisconsin and in the process describes a great deal of freshwater wetland ecology that is transferable to other systems.

Photos available in slides

- A 2-meter hedgerow/buffer strip at the edge of an agricultural field. Photo by Pete Birch, licensed under CC BY 2.0.

Chapter 8. Invasive Species

Photos available in slides

- A warning to boaters at Lake Mead warning to prevent the spread of invasive mussels. Photo by J. N. Stuart, licensed under CC BY 2.0.

Chapter 9. Revegetation

Photos and webpages available online

SustainabilityLeader.org. 2018. "Tall Pots for Desert Planting." Accessed August 1, 2019. https://www.sustainabilityleader.org/Sustainability_Leader/Tall_pots_for_desert_planting.html

This webpage shows several photos of plants being grown in deep pots to increase root:shoot ratio before outplanting.

Bureau of Land Management. 2015. Technical Protocol for the Collection, Study, and Conservation of Seeds from Native Plant Species for *Seeds of Success*. https://www.blm.gov/sites/blm.gov/files/program_nativeplants_collection_quick%20links_technical%20protocol.pdf

This protocol outlines the procedures for making seed collections for "Seeds of Success", a program in the United States to establish a national, high quality, accurately identified and well documented native plant species seed collection

Burkhart, B. 2006. "Selecting the Right Container for Revegetation Success with Tap-rooted and Deep-rooted Chaparral and Oak Species". *Ecological Restoration* 24:2, 87-92. http://er.uwpress.org/content/24/2/87.full.pdf+html

Figure 2 from this article shows containers of various sizes used for different species and purposes.

Landis, T. D., D. E. Steinfeld, and R. K. Kasten Dumroese. 2010. "Native plant containers for restoration projects." *Native Plants*. Accessed July 30, 2019. https://www.fs.fed.us/rm/pubs_other/rmrs_2010_landis_t001.pdf

Figure 1 shows tall pots with "anti-spiraling" grooves that allow roots to grow deeper while preventing spiraling root growth that leads to unstable plants in the field.

Great Basin Factsheet Series. "Seeding Techniques for Sagebrush Community Restoration After Fire." 2016. Accessed Aug. 1, 2019. https://www.fs.fed.us/rm/pubs_journals/2016/rmrs_2016_ott_j003.pdf

Figure 1 shows a modified rangeland drill used to disperse seed in the soil surface for restoration following fire.

Presidio Time Machine. https://timemachine.presidio.gov/

This website has outstanding historical landscape and before-after restoration photos of various coastal, terrestrial restoration projects at the Presidio in San Francisco, California.

Levy, S. 2019. "Filling the Carbon Sink." *Biographic.* https://www.biographic.com/refilling-the-carbon-sink/

This article describes effort to remove exotic trees and restore historic bogs to enhance carbon storage.

Videos

Great Green Wall of China. 2015. 5 min. Produced by Tufts University Environmental Biology Students. https://www.youtube.com/watch?v=DKHawJmHJGc.

Provides an overview of the Three North Shelterbelt project that aims to combat desertification of China through a massive reforestation project primarily with nonnative species.

Direct seeding the Xingu River Basin, Brazil. 2017. 3 min. Produced by Marina Guimaraes Freitas. Portuguese with English subtitles. https://www.youtube.com/watch?v=uKRrrD1N11g

Describes a 10 year project to restore forest in central Brazil through direct seeding.

Tropical forest restoration in Costa Rica. 2018. 7 min. Rakan Zahawi. https://www.youtube.com/watch?v=QPZIIMZrIqQ&t=11s

Describes research on tropical forest restoration conducted by Drs. Karen Holl and Rakan Zahawi, who produced the video

Caatinga restoration in Brazil. 2015. 4 min. Produced by Dr. Gislene Ganade. Video in Portuguese. https://www.youtube.com/watch?v=81cddGOv9wg

Demonstrates an innovative way to plant plants with deep rooting systems.

Hydroseeding Hillsides for Erosion Control. 2017. 3 min. Produced by Sean Anderson. https://www.youtube.com/watch?v=falwn9XW77M

Dr. Sean Anderson of CSU Channel Islands explains the use of hydroseeding for erosion control following a fire.

Chapter 10. Fauna

Photos available in slides

See chapter 5 for photos of various animal crossing structures and chapter 6 for photos of fish ladders.

Books

Fitszimons, J. et al. 2019. Restoration Guidelines for Shellfish Reefs. The Nature Conservancy. https://cdn.ymaws.com/www.ser.org/resource/resmgr/custompages/publications/ser_publications/tnc_shellfish_reef_restorati.pdf

This book was developed through a partnership between SER and The Nature Conservancy. It provides a detailed overview of the ecology, planning, implementing, and monitoring shellfish reef restoration projects**.**

Videos

They released 14 wolves in a park. But no one was prepared for this. 2017. "4 min. https://weloveanimals.me/released-14-wolves-park-no-one-prepared-unbelievable-nature11/.

Provides an overview of the cascade of ecological changes that occurred in Yellowstone National Park after wolves were reintroduced

Restoring an Island. 2011. Produced by Oikonos. http://oikonos.org/seabird-nests/

3 min. video and a photo flipbook of efforts to restore Rhinocerous Auklet seabird habitat on Año Nuevo Island, California.

Chapter 12. Paying for Restoration

Videos

Insuring Nature to Ensure a Resilient Future. 2019. 2 min. Produced by The Nature Conservancy (TNC). https://www.nature.org/en-us/what-we-do/our-insights/perspectives/insuring-nature-to-ensure-a-resilient-future/

Describes a TNC-led effort to work with the tourism industry in Cancun, Mexico to provide insurance for coral reef restoration.

Rewilding Patagonia. 2019. 26 min. https://www.aljazeera.com/programmes/earthrise/2019/06/rewilding-patagonia-chile-great-conservation-leap-190625074436948.html

Describes the Tompkins Family Foundations efforts to rewild large areas of Chile.