# Designing lakeshore habitat restoration projects - ten steps

1. Initial landowner meeting / preliminary site inventory
   - Explore, begin to get familiar with the lakeshore property, the landowners and the site's existing conditions
   - Begin to identify landowner goals and objectives for their property
   - Discuss potential partner roles and the assorted resources available to support the project (cost-share options; partners that can provide technical assistance or free planting labor; hard copy resources; county booklets; nursery catalogs; etc.)
   - Develop a project timeline and preliminary project budget; consider a phased approach to the work if needed
   - Discuss a project communication strategy (regular emails; site visit schedule; points of contact to include in correspondence; etc.)

2. Create a base plan (first layer) / site sketch of existing conditions
   - Sketch out or capture existing general conditions (slope; wave action; water level fluctuation; ice ridge status; forest type along lakeshore)
   - Map out and identify existing vegetation – trees, shrubs, groundlayer – by ecological zone: upland; transitional lakeshore area; aquatic zone (littoral zone)
   - Transfer the information from your site sketches to a "to scale" base map of the site; use a convenient scale (e.g., 1"= 10')
   - Describe biological features: native plant communities by ecological zone: upland; transitional lakeshore area; aquatic zone (littoral zone); rare plants; wetlands / wet places at the site; high quality habitat areas; nuisance plants or animals present
   - Identify problem areas and elements of the site that need attention in the planning process: list out current management and lakeshore problems
   - Create human use base map (access location; property lines; house and outbuilding structures; utility lines; beach / swimming area; reading / napping areas; firepits; stairways and pathways; docks; boat houses and gazebos; pet areas; grassy area for kids; storage spots for equipment, docks, rafts, or other items; bird or wildlife feeding stations; lighting; septic tank and drainage field locations; lakeshore / land interface and the ordinary high water mark [OHWM]; etc.)
   - Inventory the soil type(s) on site; complete soil borings if necessary; access soil moisture availability around your site; denote wet versus dry areas on the property

3. Develop a list of your lakeshore property owner's needs & desires (first layer - Overlay #1 on trace paper – future conditions)
   - Describe desired future lakeshore conditions and designate wanted landowner patterns of usage (access area; recreational uses; family needs; etc.)
   - Identify appropriate state standards that apply to your project and the permitting needs that goes with them; check with agencies such as county zoning, county land conservation department, or your local WDNR office for permit needs and regulations that apply to your project
   - Gain an understanding for what the entire family thinks of this project? Perhaps you facilitate a family discussion on the project
   - Address any neighboring properties concerns / points of view to the project
   - Identify site preparation needs and to-do's such as turf grass suppression; invasive species control; watering system; timing of installation; etc.
   - You can utilize "bubble" shapes on a map to define functional spaces for your site: highlight areas for preservation; identify the buffer setback zone; designate activity areas (lawn, swimming area, reading/napping areas, beach and swimming area, dock and boat slips; screening [with taller vegetation]; other uses, preferences)

4. Analyze your site (add to Overlay #1 – map out desired outcomes / planting areas)
   - Utilize a nearby reference site to inform the plant choices and natural community type we're striving to emulate
   - Layout initial planting scheme: consider views, existing vegetation, and lakeshore property uses; calculate the square footage of your various planting areas to determine the amount of plant material you will need for your site
   - Develop detailed native planting plans for specific native planting restoration areas and their accompanying ecological zones; order plant material
   - Identify access area specifics and storage plans; review stairways, dock, firepit, driveway, beach area, etc.
   - Incorporate ecological design elements appropriate to the site: protect and improve soil quality; include as many vegetative layers as possible; select the right plant for the right place for the right function; use vegetation to reduce the force and slow the flow of surface water; maximize the amount of vegetative buffer along the lakeshore including a good percentage of the plantings as native grasses, sedges, and rushes; minimize areas of impermeable surface; encourage the property owner to rethink the size of their lawn; design for low inputs and low-maintenance landscape; support biodiversity / wildlife through native plantings; etc.

5. Consider water conservation strategies suitable for the site
   - Perform a hydrological assessment / "*Follow the flow*" assessment for your site; map out surface water drainage patterns for your site: note any wet areas or seeps on the property; take inventory of all paved and compacted areas; investigate the point sources of surface water flows on the property; account for any paths, trails and cleared areas that lead to the lake; identify any areas where water tends to pond; etc.
   - Create a detailed map of slopes, drainage patterns, and eroding areas
   - Identify "broken" water connections and potential remedies to restore hydrologic connectivity; explore ways of keeping human use disturbance patterns to a minimum: minimize and divert surface water runoff to ecologically sound areas of the property for recharge and infiltration

6. Develop erosion control plans and solutions (if applicable)
   - Complete a professional engineer site assessment (topography; treatment areas identified; cross-sections and work specifications for each erosion control strategy; etc.)
   - Review signs of erosion on the site and assess the types of erosion that are occurring: rilling; exposed ground and/or tree roots; slumped banks; undercut banks;
   - Complete the NR328 energy assessment for your site
   - Map out erosion control strategies based on: symptoms, soil type; NR328 findings; product availability; site access constraints; engineer findings and recommendations; etc.
   - Review erosion control plans with landowner and permit granter (when appropriate)

7. Compile final conservation plan / installation process / timeline and project implementation steps to follow
   - Combine all steps (layers) into final draft conservation plan: conceptual plan outlining planting areas, treatment areas,
   - Reconfirm plant material order; order other materials needed for the project
   - Final plan review and pre-installation meeting between partners: landowner, project designer, installer / contractor / landscaper, and others
   - Establish a cost estimate for the project tiered to the conservation plan; review with landowner
   - Discuss cost-share reimbursement process (if applicable)

8. Consider long-term maintenance and monitoring strategies suitable for the site
   - Watering plan
   - Invasive species control and identification support
   - Nuisance critter control startegies (geese; muskrats; browsing wildlife like rabbits and deer;
   - Fencing monitoring and upkeep

9. Install project according to conservation plan specifications and project instructions
   - Site preparations completed according to plan specifications
   - Make sure all partners understand the installation process and the roles they have in it
   - Digger's hotline called; permits needed are in place
   - Schedule the project installation day(s)
   - Install water control strategies and erosion control measures first; then plant your woody material; then wildflowers, grasses, sedges, rushes, and ferns

10. Follow through on long-term maintenance and monitoring strategies
    - Review with landowner and other partners the maintenance needs and who will do what maintenance to-do's: watering; weeding / invasive species control; dead vegetation, plant mortality monitoring and plant replacement / supplemental plantings; fencing monitoring and maintenance; nuisance critter protection and control; seedling / plant identification support; etc.
    - Implement the monitoring protocol you developed for your site

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