GENERAL SPRINGS RESTORATION PLAN OUTLINE:
Draft 28 November 2012

Northern Arizona University Ecohydrology Class (GLG 670)
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I. ADMINISTRATIVE CONTEXT

A. General administrative approach

1) Relate springs site restoration to mission and vision
2) Develop specific goals for restoration
    - Restore the site to as nearly natural and ecologically functioning a condition as possible *OR* restore specific resources, characteristics or populations as desired by the manager *OR* restore other desired future condition of the site
    - Consider: Minimizing maintenance costs and activities
    - Optional: Provide outreach about springs to the community, schools, and springs stewards
3) Identify and engage stakeholders – develop a small but effective steering committee
4) Clarify water rights
5) Identify and develop funding
    - Governmental sources
    - Local landowners and stakeholders
    - Local NGOs or other donors

II. BACKGROUND INFORMATION AND ASSESSMENT

A. Sources of Existing Information

1) Locate historic oblique and aerial photographs, and historical reports
    - Libraries
    - City, County, State, Federal sources of informatoin
2) Consultation with elders (local and Tribal communities)
3) Locate private well data?

B. Information Needs and Syntheses

1) Develop a groundwater model
2) Conduct a springs ecosystem assessment (SSI SEAP)
3) Comparison with nearby similar springs
4) Compile/evaluate flow trends over time
5) Compile/evaluate water quality and trends over time
6) Develop soils and stratigraphic maps
7) Occurrence of native and non-native vegetation, invertebrates, vertebrates
8) Develop a detailed site topographic map
9) Dendrochronological analysis?

III. PLANNING

A. Draft Proposed Plan Development

1) Steering Committee refines goals and plan preparation
    - Hold regular stakeholder meetings
2) Develop budget and schedule
3) Plan components
    - Evaluate pre-treatment ecosystem assessment analysis
    - Identify features to preserve in s*itu*
    - Identify features to remove – old pipes, concrete, fencing, roads/trails, etc.

        - How to accomplish with the least impact?
    - Recontour channel to maximize wet meadow area
    - Developing footpath(s) to prevent further erosion
    - Eliminate non-native species
    - Revegetation with native species
        - Determine irrigation needs and costs, and irrigation schedule and maintenance
    - Develop a monitoring plan and implementation schedule
    - Develop an outreach plan on-site and virtual
        - Public relations – newspaper and radio
        - Local exhibit(s)
        - Remember to repeatedly thank contributors and volunteers
4) Identify permitting requirements
    - USACE – Section 404 permit required?
        - Need concise project description and wetland delineation
    - ADEQ – SWPPP (if needed)
    - ADOT – ROW (width of ROW, work space environmental protection)
    - Fish and Wildlife Service – Endangered Species Act compliance
5) Define project success metrics
6) Refine plan , budget, and schedule

IV. IMPLEMENTATION

A. Initiate compliance activities

B. Site Preparation

1) Site survey
2) Hazmat protection
3) Remove non-native and undesired species
4) Accounting

B. Construction

1) Remove concrete box, old barbed wire
2) Recontour channel to maximize wet meadow area
3) Develop a footpath to prevent further erosion
4) Accounting and reporting

C. Post-construction

1) Restore site from construction impacts
2) Establish irrigation, if needed
3) Replant desired species
4) Reintroduce or translocate desired faunal species
5) Accounting and reporting

D. Implement Outreach Program

1) Report to MNA Board
2) Write-ups in scientific, popular, and news venues
3) Accounting and reporting

V. MONITORING, FEEDBACK, PROJECT WRAP-UP

A. Evaluate project success

1) Conduct a post-treatment SEAP analysis
2) Integrate findings in relation to plan

B. Evaluate Outreach Success

C. Publicize project importance, approach, results and success

1) Report to stakeholders
2) Write-ups in scientific, popular, and new venues

D. Continue periodic monitoring and feedback