



# Natural Resource Monitoring at Golden Spike National Historic Site



Replica steam locomotive engine #119, Golden Spike National Historic Site/NPS

## The Northern Colorado Plateau Network

The Northern Colorado Plateau Network (NCPN) covers a geologically and biologically diverse region comprising 16 national parks in four western states. These parks contain desert grasslands, shrublands, forests, caves, large rivers, perennial streams, seeps, springs, and striking geology. Invasive plants, trampling and grazing by livestock, and adjacent land-use activities are some of the most significant threats to NCPN parks. The NCPN is designing and implementing a long-term monitoring program to measure key indicators of ecological integrity, or “vital signs.” Multiple monitoring efforts will help inform managers of the health of park resources and provide early detection of potential problems. This brief describes recent NCPN activities at Golden Spike National Historic Site.

## Exotic Invasive Plants



Tamarisk  
(J.S. Peterson/USDA-NRCS PLANTS database)

Exotic invasive plants represent one of the most significant threats to natural resources in national parks. Exotic plants are a concern because they are able to reproduce prolifically, rapidly colonize new areas, displace native species, and alter ecosystem processes across multiple scales. To minimize costs and maxi-

mize the potential for eradication, it is critical to detect new populations of invasive species early. At Golden Spike NHS, surveys will cover the places where exotic invasives are most likely to occur: roads, trails, and riparian corridors.

## Vegetation Mapping



Blue Creek Canyon/NPS

In 2007, the NCPN started a multi-year, multi-partner effort to map the vegetation at Golden Spike NHS. This project has included gathering aerial photography, collecting initial vegetation-plot data, using the vegetation data to classify vegetation types and write vegetation descriptions, writing a dichotomous vegetation-type key, performing photo interpreta-

tion, collecting accuracy-assessment data, creating a geodatabase, and writing the final report. These maps will be a valuable resource for use in park management, natural resource monitoring, interpretive programs, park planning, prescribed fire, and as a baseline for designing ecological studies.

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## Species Lists



Horned lizard/NPS

The NCPN has completed NPSpecies certification at Golden Spike NHS for five taxonomic categories—birds, mammals, reptiles, amphibians, and vascular plants—and has posted the results on its website. An interactive application allows users to select a desired taxonomic category and an alphabetic sort function (i.e., by common name, scientific name, or family–scientific name). Additionally, users

can search by park, by status of the species in the park (e.g., present, historic, unconfirmed), and by individual species—allowing users to query, for example, does Golden Spike NHS have a verified report of a horned lizard? The resulting species list can be downloaded into an Excel spreadsheet for use by the public, park staff, or park cooperators.

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## Land Condition



MODIS satellite image of northern Utah  
(USDA Forest Service)

Information on landscape-scale plant vigor and productivity (land condition) is key to understanding natural and human-caused ecosystem changes. Land-condition monitoring involves the use of the MODIS (MODerate Resolution Imaging Spectoradiometer) satellite imagery. A measure of vegetation productivity, Normalized Difference Vegetation Index (NDVI), is calculated over time to esti-

mate the start and end of the growing season, the time of peak production, and seasonal productivity. This coarse-scale assessment of land condition can reveal important trends in the overall health of a park and surrounding ecosystem. A draft protocol for land-condition monitoring is scheduled to be complete in spring 2008, with monitoring to follow.

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## Land Cover and Land Use



Chinaman's Arch/NPS

The composition, configuration, and connectivity of land-cover types determine habitat availability, energy and material flows, and the movement of organisms on a landscape. Large changes in landscape structure occur in response to natural and human-caused disturbances. Land-cover information will be estimated by maps derived from satellite imagery of park units and a surrounding >10-km buffer, on a four-year, rotating basis. Change, status, and trends in land cover will be as-

essed by comparing baseline maps to maps from the last monitoring period. These data will provide park managers with a baseline against which to assess future changes in landscape structure and composition; the ability to detect large-scale disturbances in remote areas, and information on land-use activities along park boundaries. A draft protocol for land cover and land use monitoring is scheduled to be complete in fall 2008, with monitoring to follow.

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## Human Demographics



Road within Golden Spike NHS/NPS

Land-use activities outside park borders, such as urbanization and agricultural development, can pose substantive threats to park resources. Monitoring such activities may help us to understand the reasons for changes on park lands. The NCPN will examine public records for information on housing development and population density, water discharge and pollution, hydrologic flows, well-drilling permits,

dam construction and operation, agricultural land-use trends and agro-chemical use, and grazing allotments. This information may then be used by park managers to anticipate mitigation for park lands, motivate conservation agreements with private or other public agencies, and influence change in area land-use policies. Protocol development has not yet begun.

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## Future Projects

The NCPN hopes to expand ecological monitoring at Golden Spike NHS through partner-

ships and cost-sharing opportunities.

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## For more information

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