

Scientists Follow Rabbits In Third Wave 'Invasion'

By James K. Agee

San Juan Island National Historical Park in the Puget Sound area of Washington has been invaded again and again by "foreign agents." The first "invasion" provided the historical event for which the park was created: American and British troops simultaneously occupied the island during 1859-1872 while the final settlement of the Oregon Territory boundary dispute was negotiated. The major casualty was an English-owned pig, shot by an American settler.

The second invasion was by European rabbits (*Oryctolagus cuniculus*) in the 1880s. They occupied the area now in the park from the 1880s until about 1980, when a significant population crash virtually eliminated them from park lands. The third invasion was in 1983, when an interdisciplinary science team invaded the 1750 acre, two-unit park to investigate the rabbit decline and provide an updated resource management framework for the park.

The team was funded for a one-year study by the Interdisciplinary Science Projects initiative from the Washington Office, based on a proposal drafted by Jim Larson, Regional Chief Scientist, PNRO. Other PNR team members included Supt. Frank Hastings and Chief Range Mac Foreman, PNRO natural resource people Dick Prasil and Dick Hoffman, PNRO cultural resource people Stephanie Toothman and Jim Thomson, and CPSU scientists Jim Agee (University of Washington), Ed Starkey (Oregon State University) and Gerry Wright (University of Idaho).

The team objectives were (1) to develop a conceptual ecological model to identify key components and processes operating in the system, (2) to increase the knowledge base on the rabbit population decline, (3) to describe the historic landscape and restoration options, and (4) to define a data base for an updated resource management plan.

The conceptual ecological model was an important first step for the team. When the rabbits' decline began several years ago, herbaceous cover started to increase, as did the problem of visitor-caused wildfires. The open fields, many of which once were forested lands cleared for cultivation and maintained in grass by rabbit grazing, became dotted with small invading trees. Many of the trees subsequently were girdled by an expanding rodent population responding to increased cover and food resources. The model showed the relationships between these and other

variables and which ones could be affected by management actions.

Studying the rabbit decline proved to be a difficult task. Earlier baseline studies by Fred Stevens and A.R. Weisbrod (NPS biologist now in the Midwest Region) had shown high reproduction rates in the mid-1970s. Although reproduction rate declined in the early 1980s, considerable young should have been produced: almost none appeared. While disease and nutrition have not been totally ruled out, predation seems to be the most plausible working hypothesis. The ferret (another introduced animal) is common in the park, and will indiscriminately kill rabbits in their underground warrens prior to their emergence above ground. Voles and mice can provide an alternate prey base that will allow ferret populations to subsist, even in the face of rabbit decline, and thus continue to exert significant influence on the rabbit population. Considerable additional research will be required to test these working hypotheses. In the interim, monitoring of rabbit population levels will continue.

The historic landscape problem was easier to approach. Although much of both English Camp and American Camp was logged, a few trees were left uncut, and some stumps could be roughly dated through time comparison of historic photographs. The analysis showed English Camp to be close to historic character at present. Some replanting of cultivated fields and vista clearing in the vicinity of historic Officers' Quarters were management options proposed. American Camp has more prairie, of which some is natural and some has been maintained in grassland by rabbit grazing pressure. Options here include replanting trees, and protecting the plantations from rodents or perhaps from a rebounding rabbit population.

Since this historical park was created, more attention has been given, understandably, to cultural resources than natural resources. The cultural resource input to the team was in the nature of fine-tuning: some parade ground fencing at American Camp, consideration of "ghost structures" where accurate building reconstruction cannot be done, limited building rehabilitation, and some archeological work.

The goal of all the restoration work is to provide visitors with a sensory ambience of the historical period, rather than a precisely restored landscape. Visitors to English Camp should see a largely forested

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setting with natural openings in rocky areas. Visitors to American Camp should be able to sense why the site was chosen – it was protected from wind and was nestled up against a forest, not positioned in the midst of a rabbit-infested grassland. The team provided a quantum leap for the park data base, which should serve as the core of a rewritten resource management plan.

This team approach to resource management in small areas is being extended in the Pacific Northwest Region. The next area to be "invaded" is Whitman Mission National Historic Site, where the team leader will be PNRO Cultural Resources Chief Dr. Allan Comp. This type of approach – an integrated problem analysis by interdisciplinary teams – may have value in other small NPS areas across the nation.

Agee is an NPS Research Biologist. Limited copies of the interdisciplinary report, "Rabbits, Redoubts, and Royal Marines," and the technical report, "Historic Landscapes of San Juan Island National Historical Park," are available from Dr. Agee, NPS CPSU, College of Forest Resources (AR-10), University of Washington, Seattle, WA 98195.