

**MANAGEMENT PLAN FOR THE  
UNIVERSITY OF WASHINGTON'S  
CEDAR ROCK PRESERVE ON SHAW ISLAND  
SAN JUAN COUNTY, WASHINGTON**

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by

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### ABOUT THIS DOCUMENT

This document was written as a private unpaid scholarly endeavor for the benefit of the author and the University of Washington San Juan Islands Biological Preserves Committee. In order for the committee to see changes that have occurred on the Preserve over time, I have scanned and reproduced here a variety of maps and photographs, including aerial maps obtained with permission from the San Juan County Assessor's Office and the San Juan County Office of Community Development and Planning. Figure 15 (Top) is a direct scan from the Soil Survey of San Juan County (1962). If you happen to be reading a pdf version of this document, note that you can see much more detail in the maps and aerial photos if you increase their magnification on your computer screen by clicking in the zoom-bar at the top of the page.

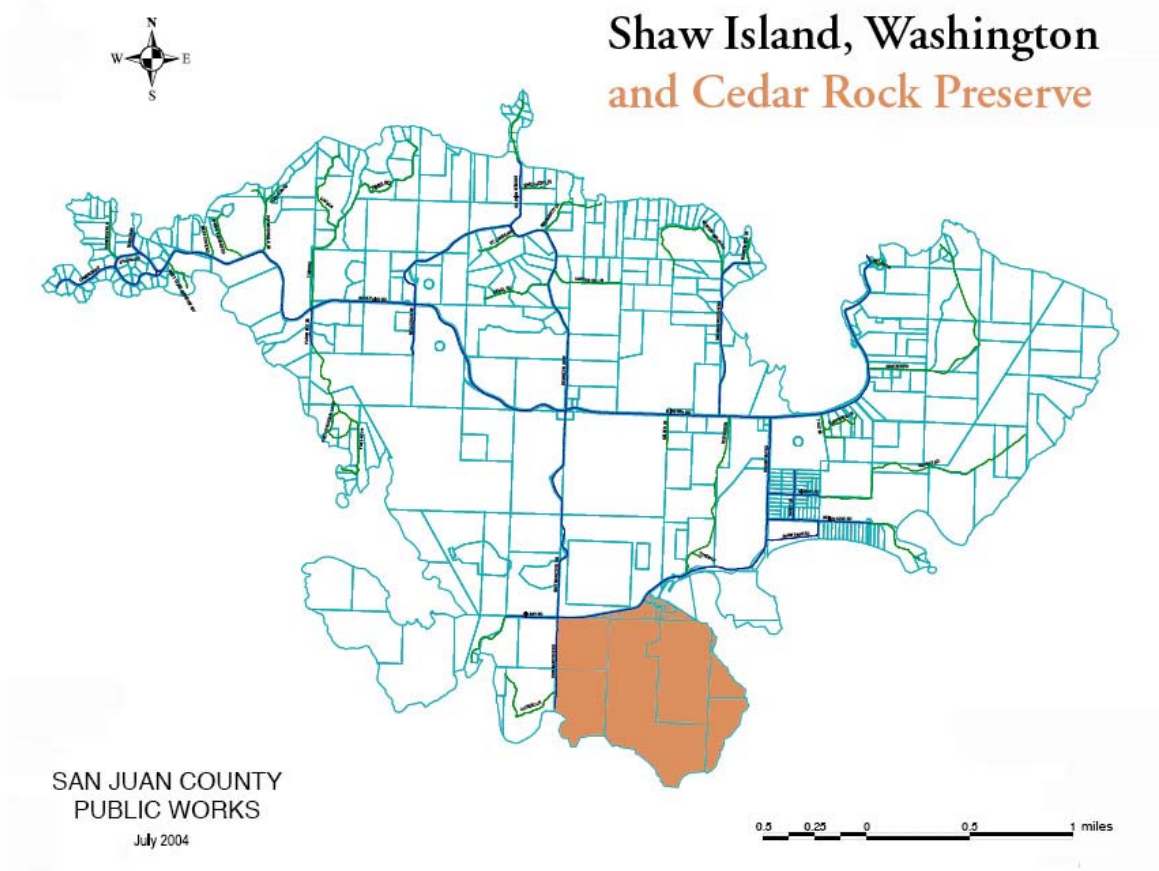


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## ABOUT THE AUTHOR

Claudia Mills has been a researcher working at the University of Washington Friday Harbor Laboratories since 1976, having first visited the Labs in 1974 as a student in the Comparative Invertebrate Embryology course. She received her PhD in Biology in 1982 from the University of Victoria on marine plankton work, conducted partially in Victoria, British Columbia, and partially at the Friday Harbor Laboratories, and has spent three decades studying jellyfish in the world's oceans. Dr. Mills was born in Seattle and has had a lifelong interest in the terrestrial as well as marine natural history of western Washington. She has lived on San Juan Island since 1978. In the late 1990s, she began several years of botanical surveys on the nearly 1400 terrestrial acres of biological preserves owned by the University of Washington in San Juan County, developing baseline inventories of the plants on these properties. She is a founding member of the UW San Juan Islands Biological Preserves Committee, established in 2004.

## ACKNOWLEDGMENTS

This plan was born out of six meetings of the University of Washington San Juan Islands Biological Preserves Committee in 2004, 2005, 2006 and 2007, attended variously by Peter Dunwiddie (UW Biology and the Nature Conservancy), Fred Ellis Jr. (UW Friday Harbor Labs Maintenance Supervisor and neighbor living on Shaw Island), Kern Ewing (UW Center for Urban Horticulture), Perry Gayaldo (UW Landscape Architecture and NOAA), Roxanne Hamilton (UW Landscape Architecture), Iain Robertson (UW Landscape Architecture), Jeanette Henderson (UW Real Estate Office), Terrie Klinger (UW School of Marine Affairs and Friday Harbor Labs), Estella Leopold (UW Biology), Claudia Mills (UW Biology and Friday Harbor Labs), Gordon Orians (UW Biology), Scott Schwinge (UW Friday Harbor Labs Administrator), Ken Sebens (UW Biology and Friday Harbor Labs Director), Richard Strathmann (UW Biology and Friday Harbor Labs Resident Associate Director), Jack Temple (past caretaker), Genavie Thomas (caretaker 2004-2006), Carson and Samantha Sprenger (caretakers in residence 2007 to present). Guests Lynn Bahrych (Shaw Island resident), Andrew Behm, Liz Dunwiddie, Betty Orians, and Victoria Wyllie-Echeverria (Shaw Island resident and botany student) each attended one meeting; Fred Ellis Sr. (Shaw Island resident) attended two meetings. Written comments and suggestions about management of the Preserve were also provided to the committee by James Agee (UW College of Forest Resources), who was unable to personally attend any meetings. The vision statement on p. 10 was formulated and agreed upon by the committee in October 2005 for all of the UW

Biological Preserves on San Juan and Shaw Islands. The first draft of this management plan was distributed to committee members and discussed in September 2006; the final draft was approved in July 2008; a few minor changes have occurred since then.

In researching the history of the properties, I received generous assistance from Cherie Christiansen of the Shaw Island Historical Society. I also benefited from conversations with Betty Gilson - 36 year resident of Shaw Island, Judy Gilson Moody - longtime resident of Shaw and co-caretaker of Cedar Rock Preserve from 1979-1983, Jack Temple – caretaker from 1983-1996, and Genavie Thomas - caretaker from 2002-2006, in learning more about Shaw Island and about the Preserve. Terrie Klinger helped with the sections on the San Juan County Marine Stewardship Area Plan and management of the marine shoreline. Barbara Jensen of the San Juan Audubon Society helped with the preliminary bird list in Appendix A, an excellent indicator of the habitat diversity at the Cedar Rock Preserve and its adjacent marine waters. Jonathan Stern and Kari Koski helped with the marine mammal portions of the animal list. Tom Schroeder made the initial inventory of aerial photographs located in San Juan County offices, from which Appendix D was born. Patrick Kirby gave some advice about use of aerial photographs and soil maps and Jon Bakker pointed me to the new soil survey information online at <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Jeanette Henderson and Carol Haire of the University of Washington Real Estate Office provided information about the all of the deeds and the restrictions attached by Robert Ellis. Dan Powell of the San Juan County Assessor's Office explained several things about the property descriptions including differences in shoreline ownership in properties in which the patents were proved up prior to Washington statehood and all other properties in the state. Lincoln Bormann, Director of the San Juan County Land Bank, suggested writing the future vision section. Lena Tso of the Tribal Historic Preservation Office of the Lummi Nation gave me some important cultural insights when I visited her with Latasha Richards. Ms. Richards wrote a cultural resources management plan for the Cedar Rock in the summer of 2007 for her M.S. Thesis in Museology at U.W. The cultural resources plan operates in parallel to this management plan and is on file with the Administrator of the Friday Harbor Labs.

I can't help but mention my surprise to learn that homesteader Archibald Rader arrived on his homestead at Cedar Rock in 1880 from Port Madison on Bainbridge Island, where he worked as a logger. My great-grandfather had worked at the sawmill in Port Madison for more than a decade by that time, having emigrated from Scotland via San Francisco – his family moved to Puget Sound within a few weeks, with a promise of work at that mill. Populations were very small in the 1870s in Puget Sound and I have no doubt that Archibald Rader and David Mills knew each other.





Figure 2. Cedar Rock Preserve. (Top) Agricultural vista looking south across two buildings in the vicinity of the original Newton Jones homestead at Cedar Rock in Stand Number 2. (Bottom) Shoreline gravel beach vista looking southeast from Cedar Rock in Stand Number 23. Photographs by Claudia Mills, August 2006.

## VISION STATEMENT FOR THE MANAGEMENT OF THE UW CEDAR ROCK PRESERVE

The Cedar Rock Preserve, owned by the University of Washington, is a 370 acre property composed of 10 contiguous parcels on Shaw Island, Washington. The overarching goals for these properties are to maintain and restore native biodiversity and ecosystem function and to facilitate education and research that is consistent with these goals; a secondary goal is to maintain important parts of the cultural landscape.

## INTRODUCTION TO THE PROPERTY

The Cedar Rock Preserve is a beautiful and peaceful place on the south shore of Shaw Island, at the center of the San Juan Archipelago. It is part forest, part open fields, and edged along approximately two-thirds of its boundary by shoreline; a visit there can be restorative to even the most jaded soul. Its landscape encompasses much of the history of the San Juan Islands, from the native Indian middens along its shoreline, which attest to centuries of seasonal occupation by indigenous people, to the fields first cleared only about 125 years ago by American homesteaders on Shaw Island. Remnants of orchards planted in the last century and split rail fences from 100 years of agriculture and livestock-tending on the property provide further cultural context to this biological preserve. The Cedar Rock Preserve represents for many visitors the ultimate San Juan experience, and it remains free of the pressures now driving rapid change in many other parts of the archipelago.

## PROPERTY DESCRIPTION

- LOCATION AND BRIEF DESCRIPTION

The Cedar Rock Preserve comprises 370.43 acres in ten contiguous parcels located in Township 35 North, portions of Range 2 (east) and Range 3 (west), W. M., Shaw Island, San Juan County. The property lies on the south-central shoreline of Shaw Island and is bounded to the west by Hoffman Cove Road, to the north by Squaw Bay Road, to the east by the waters of Squaw Bay and to the south by Upright Channel. Road access is by Hoffman Cove Road or Squaw Bay Road (San Juan County roads).

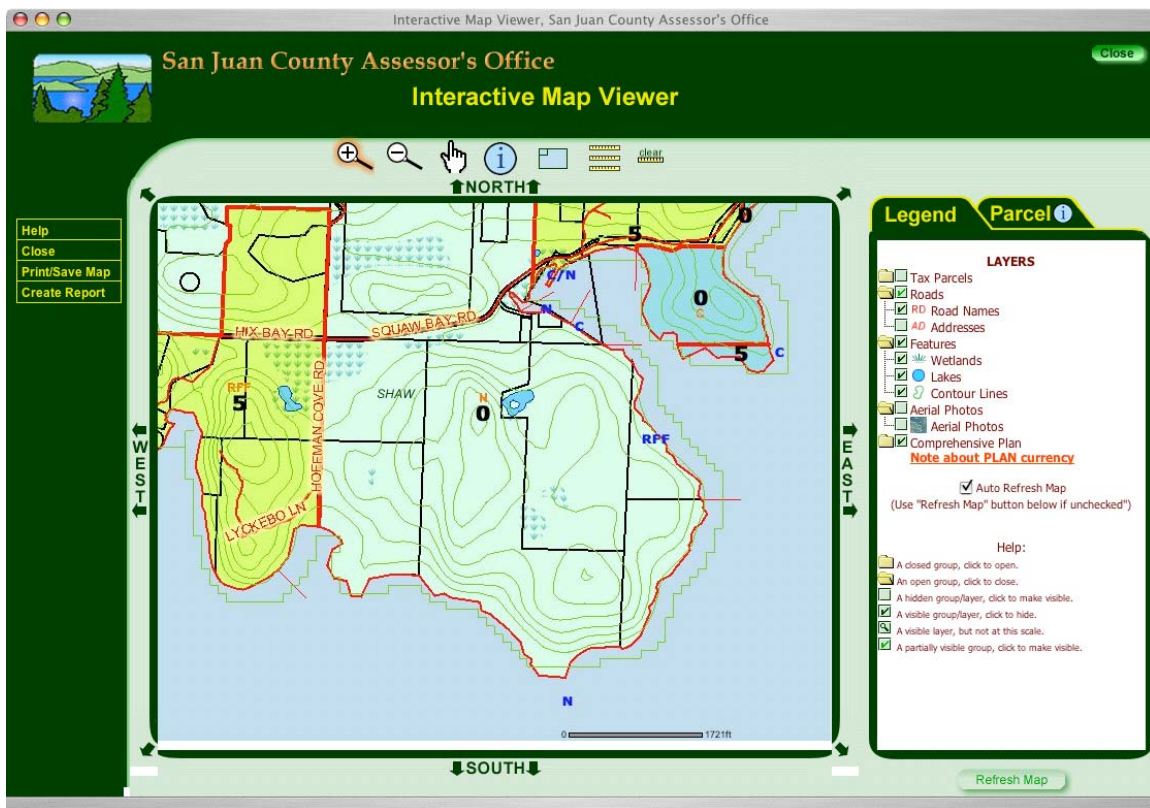


Figure 3. San Juan County Assessor's Office online parcel map of the Cedar Rock Preserve and nearby properties on Shaw Island, photographed as a computer "screen shot" July 2006, showing parcel boundaries, roads, topographic contour lines, wetlands, lakes, and zoning according to the 2002-amended Comprehensive Plan of San Juan County.

The uplands of the Cedar Rock Preserve include a mix of second-growth Douglas fir-dominated, mixed conifer forest, fields that were constructed by slash burning beginning in the 1870s and used for farming and for an airstrip until the mid-1970s, remnants of several orchards of various sizes and in various states of disrepair, a small central pond, and a narrow strip of coastal prairie bounding much of the shoreline.

The highest elevation is about 200 feet. Hay was cut annually on most of the fields until about 2000.

The 2.3 miles of shoreline of the Cedar Rock Preserve is mostly low-bank bedrock, interspersed with gravel beaches and a small amount of mudflat near the head of Squaw Bay. In most cases, the University should own down to the ordinary high tide (OHT) line at the Cedar Rock Preserve, with the exceptions described next. Most waterfront parcels in Washington State are owned to the line of ordinary high tide (= mean high water), unless the deed specifies otherwise. However, if the land patent was proved up prior to Washington statehood (November 11, 1889), then the property line extends seaward either to the government meanderline from the original Government Land Use Survey (drawn up in this case in 1874) or to the line of ordinary high tide, whichever is further seaward. There were five original homesteads proved up and patented in the Cedar Rock Preserve (see Figure 8 (Top) on p. 23): Hugh Park – proved up 1882, Archibald Rader – proved up 1887(?), James Ross – proved up what day? 1889?, and Newton Jones – proved up 1891. None of the waterfront in the Hugh Park homestead lies in the Cedar Rock Preserve. Oliver O’Hara’s homestead also had no waterfront in the Preserve. Newton Jones proved up after Washington statehood, so the shoreline extent of parcel # 250424 001 is to the ordinary high tide line. Archibald Radar may have proved up in 1887 and James Ross in 1889. If both were completed by November 11, 1889, then it seems that the University of Washington owns to the government meander line, anywhere in those parcels that it is seaward of the OHT line, which is true along much of those shorelines, bringing the University ownership quite far down through some of the intertidal in places. The ownership of all other tidelands bordering Cedar Rock Preserve, except any portions down to the “meander line” is with the State of Washington to the line of mean low tide. (The information about tidelands ownership in the above paragraph comes from a conversation with Dan Powell, San Juan County Assessor’s Office, October 8, 2007.)

- **PARCEL NUMBERS AND SIZES, AND YEAR OF ACQUISITION BY UW**

San Juan County parcel numbers and sizes for the ten parcels are listed below. These were confirmed through the SJC Assessor's Office on June 22, 2007. The number of waterfront feet in each parcel was obtained at the same time from plat maps at the SJC Assessor’s Office. The five parcels acquired in 1975 as a gift from Robert Ellis are listed in San Juan County records with the title owner identified as “University of Washington.” The three parcels acquired in 1983 upon the death of Robert Ellis are listed as having the title held by “The Board of Regents of the University of Washington,” as are the two parcels purchased from Merle and Virginia Adlum in 1986.

PARCEL NUMBER	ACRES	WATERFRONT	YEAR ACQUIRED
SJC # 250421 001000 (University of Washington)	39.02	0	1975
SJC # 250424 001000 (University of Washington)	50.20	2,328’	1975
SJC # 250412 001000 (University of Washington)	141.66	3,461’	1975
SJC # 263343 001000 (University of Washington)	8.32	0	1975

SJC # 250323 002000 (University of Washington)	26.84	2,453'	1975
SJC # 250323 001000 (Board of Regents of UW)	15.98	2,202'	1983
SJC # 250411 001000 (Board of Regents of UW)	82.20	501'	1983
SJC # 263344 002000 (Board of Regents of UW)	4.13	706'	1983
SJC # 263344 001000 (Board of Regents of UW)	1.13	391'	1986
SJC # 263343 002000 (Board of Regents of UW)	0.95	0	1986
<b>TOTAL ACREAGE AND FEET WATERFRONT</b>	<b>370.43</b>	<b>12,042'</b>	<b>(2.3 MILES)</b>
<i>(these values have been digitally corrected by the San Juan County Assessor's Office from the 390 acres in original deeds)</i>			

- **DEED RESTRICTIONS**

The information below was provided by Jeanette Henderson and Carol Haire of the University of Washington Real Estate Office, in June 2001 and September 2007.

**DEED #1.** December 4, 1975, recorded January 19, 1976, for parcels 250421001, 250424001, 250412001, 263343001 and 250323002. Robert Hale Ellis, Jr. conveyed and quitclaimed to the Board of Regents of the University of Washington 273.4 acres with 8,242 feet of waterfront located on the south side of Shaw Island. This property, known as "Cedar Rock Preserve," was given subject to conditions stated in the Statutory Quitclaim Deed of Gift as below:

*That the premises herein conveyed shall forever be held, used and maintained as a nature preserve for scientific, educational, research and aesthetic purposes, and shall be kept in their natural state without disturbance of the native plant, bird and animal populations and habitat. Nothing contained herein shall restrict the grantee from maintaining existing buildings or constructing new ones, provided that they shall be inconspicuous buildings appropriately designed for the environment, nor from constructing piers or docks, roads, fences, foot trails and fire trails on the premises, nor from making modest modifications in the environment, all only as the grantee deems necessary to maintain the premises for the purposes described herein.*

*The property shall be perpetually known as “Cedar Rock Preserve,” and there shall be placed and maintained in a conspicuous location on the property the following inscription in readable size in metal or stone, or other permanent material:*

*“Cedar Rock Preserve is dedicated to the glory of nature and is established in grateful remembrance of my parents, Blanche Eloise Day Ellis and Robert Hale Ellis, whose judgment and foresight have made this possible. Robert Hale Ellis, Jr.”*



Figure 4. Large metal marker located on the ground at “Cedar Rock” on high rocks above the Preserve shoreline, dated December 19, 1975, with four compass points around the perimeter.

*In the event the grantee becomes unable or unwilling to, or fails to keep and maintain said property as hereinabove specified, the grantee shall transfer and deliver said property to a nonprofit organization, a gift to which is deductible for federal and Oregon income tax purposes, that is willing to accept and maintain said property as hereinabove specified.*

*In the event of the condemnation of all or any part of the property, the proceeds of the condemnation shall be used by the grantee for the acquisition and establishment of another nature preserve with appropriate recognition of the grantor.*

**DEED #2.** Conveyed by the estate dated June 14, 1983, recorded June 27, 1983 for parcels 250323001, 250411001 and 263344002, from the last will of testament of Robert Hale Ellis, Jr., dated January 14, 1982 (Article XII):

*I give and devise all of the land I own on Shaw Island in San Juan County, Washington, at the time of my death to the Board of Regents of the University of Washington, an agency of the state of Washington, subject to the following conditions: That the premises herein devised shall forever be held, used and maintained as a nature preserve for scientific, educational, research and aesthetic purposes, and shall be kept in their natural state without disturbance of the native plant, bird and animal populations and habitat. Nothing contained herein shall restrict the devisee from maintaining existing buildings, nor from constructing piers*

*or docks, roads, fences, foot trails and fire trails on the premises, all only as the devisee deems necessary to maintain the premises for the purposes described herein. In the event the devisee becomes unable or unwilling to, or fails to, keep and maintain said property as hereinabove specified, the devisee shall transfer and deliver said property to a non-profit organization, to which a gift of property would be exempt from federal and estate and inheritance taxes, that is willing to accept and maintain said property as hereinabove specified.*

*It is my wish that this land shall become a part of Cedar Rock Preserve established pursuant to my deed of December 4, 1975, to the Board of Regents of the University of Washington.*

Two additional parcels, 263344001 and 263343002, totaling 2.08 acres in the northeast corner of the Preserve, were conveyed to the University of Washington by Merle D. and Virginia L. Adlum, October 7, 1986 (recorded December 31, 1986), for \$90,000, without restrictions.

- COUNTY REGULATIONS (SEE ALSO P. 19)

As of 2001, according to the San Juan County Comprehensive Master Plan, the Cedar Rock Preserve carries land designations of “Rural Farm Forest” for approximately the northeastern quarter (containing both houses) and “Natural” for the remaining portion of the property (see Figure 3). “**Natural**” designation is intended to preserve unusual or valuable natural resource systems by the regulation of all activities or uses which might degrade or alter the natural characteristics which make these areas unusual or valuable; “**Rural farm-forest**” designation is intended to protect rural, agriculture and timber areas from urban and suburban forms of development. Further definitions and restrictions on these types of properties are given in the San Juan County Unified Development Code, presently available online at <http://www.sanjuanco.com/index.aspx> - choose “Government” in the right-hand column, and then “County Code”.

A separate Shaw Island Subarea Plan was framed by a majority of Shaw Island residents and property owners and adopted by San Juan County in 1994 and supercedes portions of the county Comprehensive Plan; the Shaw Subarea Plan carries its own set of maps. This plan is further discussed on p. 19.

## CARETAKER

There has been a caretaker at the Cedar Rock Preserve for decades. While Robert Ellis still lived on the property (in the main house), Douglas Moody, later joined by his wife Judy, lived in “the old Mathison house” (which no longer exists) on the water near Cedar Rock and did caretaking activities for Mr. Ellis. They lived on the Preserve from the 1979 until 1986 in that house, ultimately working as caretakers for the University of Washington. Jack Temple and his wife Bess became the resident caretakers in fall 1983, living in the main house until the end of 1996. The next caretakers were Carl and Andrea Schmidt, who lived in the main house from July 1997 to November 2002. Genavie Thomas was resident caretaker from the end of 2002 to the end of 2006. Carson and Samantha Sprenger moved into the main house on the property as caretakers in August 2007.

The caretaker works part-time on the Preserve as a University of Washington employee and lives on the premises. The caretaker is expected to keep the property in good condition by doing general grounds-keeping including cutting the large fields in the summer, as directed by the Cedar Rock Management Plan and by the FHL Director, as advised by the University of Washington San Juan Island Preserves Committee. The caretaker is also the point of contact for visitors to the Preserve. Since this is the only resident caretaker on all of the University properties on Shaw Island, he or she will occasionally be asked to oversee the nearby properties that comprise the ~500-acre Fred and Marilyn Ellis Biological Preserve.



Figure 5. Caretaker's house (in the trees) and garden (at center of image) at the northeast corner of the Cedar Rock Preserve, bordering Squaw Bay. Photograph taken from radio-controlled airplane by Andrew Behm, spring 2005.



## CEDAR ROCK PRESERVE VISITOR POLICIES

The Cedar Rock Preserve was deeded to the University of Washington “*That the premises herein conveyed shall forever be held, used and maintained as a nature preserve for scientific, educational, research and aesthetic purposes, and shall be kept in their natural state without disturbance of the native plant, bird and animal populations and habitat.*” (Statutory Quitclaim Deed of Gift from Robert Hale Ellis Jr.). The Preserve has been, and will continue to be, the site of classes and independent research consistent with these conditions and with the vision statement on p. 10 of this document. Use of the property by classes and researchers must be approved by the Director of the University of Washington Friday Harbor Laboratories. Overnight stays by classes and researchers are possible, but must be prearranged and sited by the director of the Friday Harbor Laboratories and the caretaker, so as to protect sensitive areas and research sites.

The Preserve is presently open for day use on foot to the public, who are invited to sign the guest book at the Hoffman Cove entrance; regular visitors include many Shaw Island residents (some of whom visit nearly daily at least seasonally) and their guests, as well as people who independently come to Shaw Island primarily to visit the Preserve. Groups larger than 6 must contact the caretaker before using the Preserve (this regulation, agreed upon by the committee in 2005, should be posted along with the recommended means for contacting the caretaker). Visitors without an approved project are asked to stay on the maintained trails or beaches in order to minimize disturbance of the flora and fauna. Trails and mowed paths on the Preserve are maintained by the caretaker. Volunteers who would like to help with grounds maintenance should contact the caretaker. Picnics should be located outside of the sensitive coastal prairie areas, with the emphasis on reduced trampling in these areas. Large social gatherings, including weddings, unrelated to the goals of the Preserve should not be sited on the Preserve. Chasing or harassing wildlife in any way is prohibited. Dogs and other pets are not allowed on the Cedar Rock Preserve, either on or off-leash, as their presence is inconsistent with the goals of the preserve; the quiet unpaved county roads in the vicinity or the nearby county park are more suitable dog exercise areas.

Daily supervision of increasing numbers of visitors is beyond what can be expected by the present caretaker arrangement. Public visitation hours are subject to change depending on the traffic loads and may be restricted in the future if visitor use becomes great enough to conflict with the property’s designation as a biological preserve for the protection of native flora, fauna and habitats. Restricted access to some areas within the Preserve might be one way to cope with increasing traffic, but would be very difficult to enforce or patrol with a part-time caretaker.

## SHAW ISLAND, ITS COMMUNITY, AND RELATIONSHIP TO CEDAR ROCK PRESERVE

Shaw Island is located at the center of the San Juan Archipelago. It is the smallest of the four ferry-served islands, with a land mass of 7.7 square miles or 4937 acres (Shaw Island Subarea Plan, 2002). It is covered with a mix of forests and open pastures and the topography is of rocky outcroppings and rolling hills. Most of the island shoreline is craggy basalt rock, resulting in numerous small coves and several deeply indented bays. The resident population of Shaw Island is approximately 235 (U.S. Census 2000), up from 163 in 1990 (Shaw Island Subarea Plan); the island is largely residential and agricultural.

The University of Washington owns approximately 866 acres on Shaw Island, which is a little more than one-sixth of the island. These properties, gifted in pieces to the University of Washington beginning in the 1970s, separately, by Robert Ellis and by Fred and Marilyn Ellis, are located in four large, separate areas and have quite different environmental histories. The Cedar Rock Preserve, part obtained from Bob Ellis in 1975 (274 acres) and most of the remainder upon his death in 1983 (with two small adjacent parcels purchased by the University and added to the Preserve in 1986) is composed of ten contiguous parcels which together comprise 370 acres (about 1/13 of the island) on the central, south shore of Shaw Island, and is the largest of the university's contiguous pieces on Shaw Island.

The Cedar Rock Preserve is presently open to public day use on foot. It is valued by the community and visitors for its rocky coastal prairie knolls, gravel pocket beaches, its patchwork of open fields and forests, and wildlife. The open vistas that are remnants of its agricultural past are otherwise rather scarce on Shaw Island and for that reason take on additional value.

Figure 6. Oregon manroot (*Marah oreganus*), characteristic of the Cedar Rock area, but not generally abundant in the San Juan Islands, at the top of a shoreline bluff in Stand Number 23. Photograph by Claudia Mills, August 2006.



THE SAN JUAN COUNTY COMPREHENSIVE PLAN  
AND THE SHAW ISLAND SUBAREA PLAN

San Juan County, Washington, operates under a long-range planning document known as the San Juan County Comprehensive Plan. The Comprehensive Plan currently in effect was first adopted on December 20, 1998 and revised December 31, 2002. The most recent version can be found online at <http://www.sanjuanco.com/planning/compplan.aspx>. The Comprehensive Plan is codified as county law in the Uniform Development Code (UDC) of San Juan County, Title 18 of the San Juan County Code. The San Juan County Code is available online in searchable form through the county website at <http://www.sanjuanco.com/index.aspx> - choose "Government" in the right-hand column, and then "County Code."

An additional planning document, known as the Shaw Island Subarea Plan, was adopted in 1994 by the San Juan County Board of County Commissioners after a long series of public meetings on Shaw Island in the early 1990s and support ultimately by a majority "survey vote" of Shaw Island residents and property owners. This plan was amended in 2001 and 2002. The stated purpose of the Shaw Island Subarea Plan is "to protect the existing character and qualities of Shaw Island through goals, policies, and regulations which add to and are more specific to the needs and interests of the Shaw Island community than those contained in the County Comprehensive Plan, Unified Development Code, and Shoreline Master Program."

This Subarea Plan constitutes Chapter 16.45 of the San Juan County Code, where it states "The existing small-scale, agricultural, and rural residential character of Shaw Island should be considered in every application for a commercial, industrial, and/or institutional use." The Plan endeavors to protect the quiet, rural environment that results from limited commercial activity and a limited transportation network, and to ensure that demand does not exceed the present or planned capacity of infrastructure and public services. Transient accommodations, food-service facilities, and "institutional uses" are discouraged. The Plan also contains an island-specific shoreline designation prohibiting commercial transient use docks not otherwise in effect elsewhere in San Juan County. It is available online at <http://www.sanjuanco.com/index.aspx> - choose "Government" in the right-hand column, and then "County Code," then search for "Shaw Island Subarea Plan."

The Shaw Island Subarea Plan is subject to modification by the San Juan County Council (which has replaced the Board of County Commissioners as the governing body of the county) at any time in the future.

## THE SAN JUAN COUNTY MARINE STEWARDSHIP AREA PLAN

In addition to the San Juan County Comprehensive Plan (see above), which governs terrestrial matters in San Juan County, there is now a San Juan County Marine Stewardship Area Plan, adopted by the San Juan County Council in July 2007, the purpose of which is to guide activities in the marine waters of San Juan County. This plan is available online at [http://www.sjcmrc.org/programs/msaplan\\_files/MSA\\_plan\\_02-Jul-2007\\_Final.pdf](http://www.sjcmrc.org/programs/msaplan_files/MSA_plan_02-Jul-2007_Final.pdf).

The county was declared a Marine Stewardship Area by the Board of County Commissioners in January 2004, following a recommendation to do the same by the citizens' advisory committee known as the Marine Resources Committee. The Marine Stewardship Area designation and associated Plan were made in response to an understanding that Puget Sound, the Strait of Georgia and the waters between them, variously known at the Northwest Straits or the Salish Sea, are impacted by "human activities resulting in habitat loss, toxins in the water and marine life, climate change, chronic small oil spills, and numerous other stresses to the marine system ... as the human population in Puget Sound grows and expands to rural areas" (MSA Plan, p. 1). The Marine Resources Committee guided a two-year public planning process resulting in the 2007 MSA Plan, which is voluntary and seeks to effect change through education, community stewardship, management and planning, coordination and research.

The University of Washington properties in San Juan County are all biological preserves with both upland and shoreline portions, allowing for better stewardship of the shoreline and marine waters by careful management of the terrestrial uplands. The Cedar Rock Preserve has 2.3 miles of shoreline adjoining 370 upland acres.

To date, no new regulations concerning marine waters have been established for the Marine Stewardship Area. The initial map guiding the development of the SJC MSA Plan shows existing Washington State Marine Preserves, National Wildlife Refuges, San Juan County Bottomfish Recovery Zones and Whalewatch Exclusion Zone, and sensitive eelgrass areas in the county. It is available online at [http://www.sjcmrc.org/programs/stewardship\\_MPAs.htm](http://www.sjcmrc.org/programs/stewardship_MPAs.htm). It should be noted that the shoreline of the Cedar Rock Preserve has no special designation, but that shorelines of the University of Washington properties on San Juan Island associated with the Friday Harbor Laboratories, False Bay, and Argyle Lagoon, as well as the Point George portion of the Fred and Marilyn Ellis Biological Preserve on Shaw Island were designated in 1990 by Washington State as portions of the San Juan Islands Marine Preserve and have been closed to all shellfish and bottomfish harvesting activity (except for crabbing in Parks Bay) since 1990. They are mapped and their status published annually by the Washington Department of Fish and Wildlife in the Washington State Fishing Regulations, available online at <https://fortress.wa.gov/dfw/erules/erules/index.jsp>.

## ENVIRONMENTAL AND CULTURAL HISTORY OF THE CEDAR ROCK PRESERVE

The Cedar Rock Preserve, like many other properties in the San Juan Islands, long-touched by civilization, but largely “undeveloped,” provides a landscape that reflects its history. In trying to decide the future for a property like this, it sometimes becomes difficult to separate the natural landscape and the cultural landscape when trying to protect the values for which it was established, in this case the donor’s mandate that it “shall be kept in its natural state without disturbance of the native plant, bird and animal populations and habitat.” Use of the word “kept” in this case, implies that the donor felt that the property was already in some kind of natural state. Following is a history of the properties that make up the Cedar Rock Preserve, which is provided to help the reader understand how it came to look as it does today.

Figure 7. Exposed ancient shoreline midden on low coastal bluff. Photograph by Claudia Mills, August 2006.



Middens occur along the shoreline of the property in several places, indicating longtime occupation at least seasonally by native people, for centuries before the arrival of European settlers. Archaeologists dating prehistoric sites in the San Juan Islands have found the earliest occupation to have been 3690-3170 years before present (BP), although perhaps only one site in the archipelago is dated so long ago. The numbers of sites visited by Native Americans slowly increased after this early visitation and native people seem to have come to Shaw Island between 1800 and 500 years BP, with a vast increase in visits there and elsewhere in the archipelago between 700 and 500 years ago (Stein, 2000; Taylor and Stein, 2007).

The pre-European settlement condition of the landscape on Shaw Island was not one of mature, high-value forests with enormous old trees. Schroeder (2001-2008) gives a detailed history of European exploration of the region, including notes on the landscapes, vegetation and geomorphology observed, beginning with Capt. George Vancouver’s visit in 1792. Boundary tensions present in the region (the “Pig War”) led to terrestrial explorations on the islands from 1855-1860 by a US Boundary Commission. Schroeder (2001-2008) quotes from one of these documents, about Shaw Island: “*The timber, consisting of fir and cedar, is small and scattered. Valleys are small and generally very swampy, and are rendered almost impassable by thorny bushes everywhere heaped up in tangled masses,*” further summarizing “*The forests of Shaw Island were described as young and inferior, although fire was not specifically mentioned as a factor ... many such remarks about inundated wetlands and streams derived from reconnaissances conducted in late winter months when the ground water level was of course high, soils were saturated, and temporary streams were running.*”

Once the Pig War was settled in 1872 and the future of the San Juan Islands as American rather than Canadian territory was established, the land was officially surveyed and the General Land Use Survey of San Juan County was published in 1874. Schroeder (2001-2008), who notes that the observations by the land surveyors predate logging in the county by about 20 years, quotes J.T. Sheets' Government Land Office (GLO) Field Notes from November 1, 1874 for Township 35 North, Range 2 West, which includes most of Cedar Rock Preserve: "*The land in this Township is generally second rate soil with small pieces of good land. It is best fitted for sheep pasture.*"

At the time of the 1874 land survey, there were twelve settlers on Shaw Island (J.T. Sheets, Oct. 30, 1874, GLO Field Notes, p. 307, cited by Schroeder, 2001-2008). One or two of those twelve settlers appear already to have been living on lands that became the Cedar Rock Preserve, as is described below.

In order to portray the "pre-settlement condition" and to get an idea what the property might become again if allowed to reforest, in the paragraphs that follow, I summarize early descriptions of some of the land that is now part of the Cedar Rock Preserve, from the original US Homestead Applications and Proving Up papers, copies of which have been obtained from the US Federal Government and are on file in the Shaw Island Historical Society. These papers include interviews with the homesteader as well as with one or two witnesses (often neighbors), who could vouch for the applicant's activities in building a house and clearing and fencing some ground. An additional extremely useful document for visualizing early settlement patterns is an 1895 hand-drawn topographic map known as T-sheet Number 2230 (1895 - one of a series drawn for most of the American West coast by the US Coast and Geodetic Survey), part of which is reproduced here as Figure 8 (Bottom), which shows the vegetation and homestead activities of early settlers on Shaw Island in great detail. [If you are reading this management plan as a pdf file, note that you can enlarge this and other figures and see great detail.] Further historical notes were obtained from the management plan written as a class report for Landscape Architecture 406 by Burroughs (1978) and are cited here as such; the origin of these historical notes is not otherwise described, but might have come from interviews with Robert Ellis.

Land that eventually became the Cedar Rock Preserve was initially part of five homesteads (Figure 8 (Top)) claimed in the 1870s and 1880s, although nearly all of the Preserve was within the homestead claims of four pioneers: Hugh Park (159.71 acres including the NW corner of the Preserve bounded now by Hoffman Cove Road and Squaw Bay Road, as well as most of the non-Preserve property between Hoffman Cove and Hicks Bay), Archibald Rader (151.45 acres comprising the southeast third of the Preserve); James Ross (160 acres in the center of the present Preserve and bordering the south side of Squaw Bay), and Newton Jones (51.40 acres in the southwest corner of the Preserve including the "Cedar Rock" site). A small amount of the southeastern edge of the homestead of Oliver O'Hara is also now part of the Preserve along Squaw Bay Road.

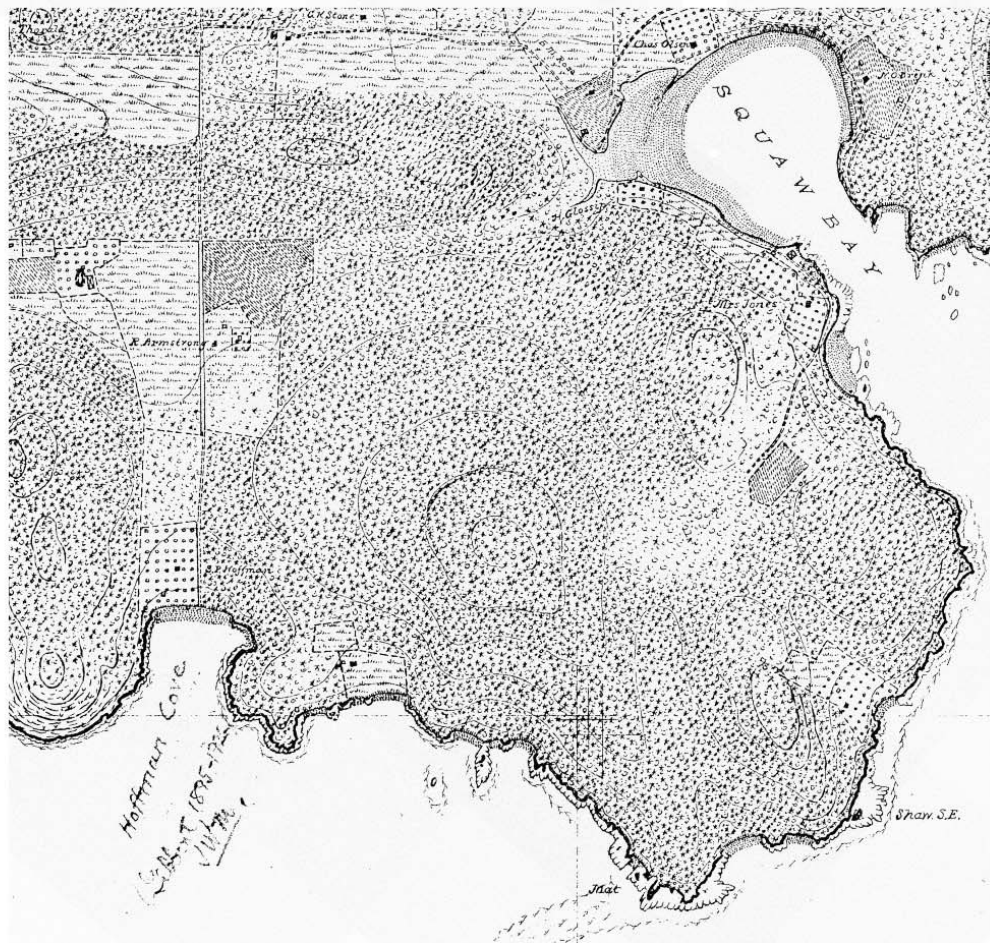
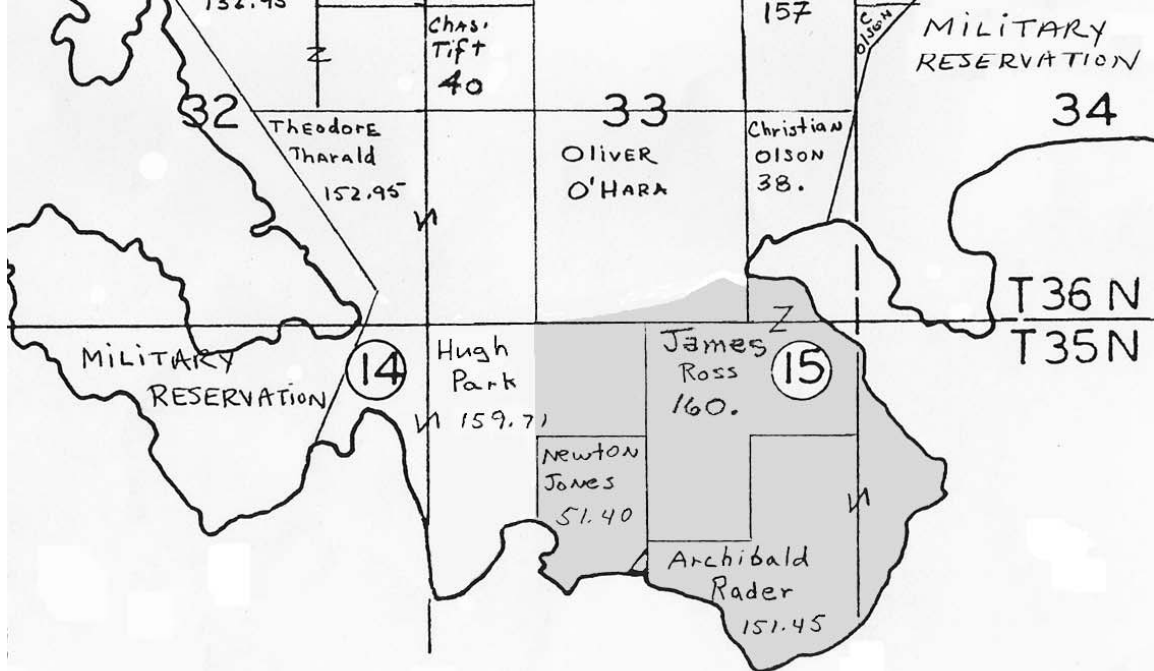


Figure 8. Early European settlement at the Cedar Rock Preserve. (Top) Undated homestead map of south Shaw Island circa 1890, obtained from the Shaw Island Historical Museum. (Bottom) U.S. Coast and Geodetic Survey Topographic Sheet (T-sheet) Number 2230 from 1895, with hand-drawn vegetation, obtained from the internet at <http://riverhistory.ess.washington.edu/tsheets.php>. [Accuracy of the

vegetation drawings has been discussed in a study by Tom Schroeder for Yellow Island in the San Juans (<http://www.rockisland.com/~tom/Yellow.html>).]

Washington Territory achieved statehood on November 11, 1889. By 1895, much of the land in these original homesteads seems already to have changed hands, as evidenced by the names recorded to be occupying the farms on the 1895 T-sheet No. 2230 (Figure 8 (Bottom); U.S. Coast and Geodetic Survey, 1895).

In 1872, the year following the arbitration of the US / Canada boundary dispute known as the Pig War, assigning the San Juan Islands to the United States, Hugh Park, a single 33-year old man and native of Canada, selected a homestead on south Shaw Island. Arriving in October 1872, Park eventually built a log house, barn and other outbuildings, planted an orchard, and fenced and ditched about 16 acres, about half of which was on the Preserve at the corner of Hoffman Cove Road and Squaw Bay Road - the other half being just across Hoffman Cove Road to the west. Park likely began clearing and draining the marsh at the NW corner of the Preserve in the winter of 1872-1873 (Hilen, 1978). Park filed his application in 1876 for a 160 acre homestead including about 40 acres at the NE corner of the Preserve, but most of Park's homestead was west of the Preserve between Hoffman Cove and Hicks Bay). Having become a naturalized US citizen in 1881, Park received his final homestead certificate in 1882.

Witnesses Louis Cayou and Kenneth McDonald testified at that time that Park had raised crops there each year since 1874, that he had fenced 15 acres, and had 8 of 15 acres under cultivation. Parks had "*the best improved farm on the island. Last season he harvested about 30 tons of hay and sold 1000 pounds of timothy seed. His farm is well stocked with cattle*" (May 19, 1883, *Anacortes Northwest Enterprise* newspaper, via Hilen, 1978). In a horrible tragedy in 1885, by-then unsociable and isolated Park was declared to be mentally deranged, but the arresting party turned into a many-day posse siege on Park's home in which Park shot and killed a neighbor and finally Park's house was fired because he would not respond. When the wreck cooled, Park was found to have been killed inside by a shot to the head. The Park homestead was auctioned in probate in 1888 for \$1250 to Louis Hix (Hilen, 1978).



Figure 9. View looking northeast across the ancient apple orchard in the northwest corner of Cedar Rock Preserve in Stand Number 14. Photograph by Claudia Mills, August 2006.

The Hoffman family secured Park's land prior to 1892 according to Burroughs (1978), and planted extensive orchards on the south part of the property (adjacent to the Preserve) at the head of Hoffman Cove. The 1895 T-sheet shows the name R. Armstrong written onto the north-eastern part of what had been Park's property, some of which is now within the Cedar Rock Preserve. That 1895 hand-drawn map shows the orchard that still exists at the NE corner of the Preserve (shown today in Figures 9 and 10; presumably



planted by Park, Hix, Hoffman or Armstrong), and the NW corner wetland ditched, fenced, and under cultivation, with fenced grassland surrounding the orchard. An interview with Claire Tift on record at the Shaw Island Historical Museum tells that the Armstrong family sold the property in 1905 or 1906 to the Glossip brothers, and moved to Canada. Daughter May Glossip lived on the NW corner property with her first husband Mathews, who died, and then with husband Cecil Coleman. May Coleman sold the 39-acre NW corner of the Cedar Rock Preserve (parcel # 250421 001000) to the Ellis family in the late 1930s – it was at that time known as the “Mathews-Coleman place” (Fred Ellis Sr., personal communication), and moved to Friday Harbor with her mother Ella Glossip after the house burned down. The Mathews barn became “all sagged in” and was removed eventually by Bob Ellis (Burroughs, 1978, and Fred Ellis Sr., personal communication).

Oliver O’Hara, a 52-year old American, settled north of the Cedar Rock Preserve in 1872 on a 160 acre homestead. A small portion of his property running along the present Squaw Bay Road ended up within the Preserve, but the log house and fencing and ditching of 40 acres of his homestead were well north of Squaw Bay Road, according to the T-sheet of 1895. In 1883, neighbor Theodore Tharold said of his own property, which was adjacent to O’Hara’s, running west to Parks Bay and probably of similar quality, *“There is some scrubby timber, but it is of no value.”*



Figure 10. Pear tree of unknown variety in the old orchard in the northwest corner of Cedar Rock Preserve in Stand Number 14. Photograph by Claudia Mills, April 2007.

Archibald Rader, a 58-year old logger from Port Madison on Bainbridge Island whose household included a wife and grown son, filed his homestead application in 1882 for 151 acres on the southwest corner of the Preserve (see Figure 8), having built a lumber house with seven rooms, planted an orchard and two acres of vegetables (including tobacco), and slashed, fenced, and ditched 10 acres and seeded it in grass, since he came to the property early in 1880. He described the land: *“I call it brush land ... I would not call it timber land. There has not been any cut - only for my own use and in clearing the ground.”* A witness (neighbor), Jeremiah Griswell, said about Rader’s land, *“it is land better than average for Shaw Island ... part alder grove and part fir growth ... it is what we term agricultural land ... farming and grazing land ... it is not timber land ... homesteader uses it for home, farming and grazing.”* By 1887 in his final affidavit, Rader had cleared and seeded in grass 40 acres, and had 100 Cotswold sheep, three hogs, one cow, and 24 chickens on his property. The 1895 T-sheet map (Figure 8) shows Rader’s house, orchard and fenced grassland to be near the shoreline, in what has presumably remained open ever since, now the lower, sloping, reaches of the “airstrip field”; all other portions of Rader’s claim are drawn in 1895 as forested. An interview with Claire Tift on record at the Shaw Island Historical Museum tells that Rader’s home was sided with 1” x 12” vertical boards and battens; this home was acquired by Carl Stewart, who married his neighbor Linnie

Jones (daughter of Mrs. Jones of Squaw Bay on the 1895 T-sheet) and moved away to become a minister.

James Ross, at that time a 30-year old single man and citizen of Great Britain, filed his homestead application in 1884 for 160 acres of what became much of the central portion of the Preserve, including most of the south shoreline of Squaw Bay (see Figure 8). He first settled on the property the previous year in 1883, at which time he purchased a house already built there, from Martin Thomas. By 1884, Ross had cleared about 12 acres (preparatory to burning it) and cut a road. Witnesses Joseph Nelson and John Hamlinson in 1889 concurred that (by-then naturalized) Ross had slashed and fenced 12 acres and made a road and that the “*land was not in cultivation because it is in timber.*” An interview with Claire Tift on record at the Shaw Island Historical Museum tells that Ross sold his homestead in about 1890 to civil war veteran Isaiah Jones, who had four sons and a daughter. Indeed, on the 1895 T-sheet hand-drawn map, Ross’s homestead is occupied by two families – the name H. Glossip is written in at the head of Squaw Bay where there was a building, orchard and fenced field, and a Mrs. Jones was living further south along the bay where a house, barn, shed, large fenced orchard and grassy field is shown, with a road leading to a cultivated field just south of the present-day caretaker’s house, on lower ground. Remnants of those orchards mapped in 1895 still exist, one in fairly good condition and still fenced, along the driveway near the hexagonal pump house, and the other represented now only by a few old trees in the brushy near-shore vegetation at the head of Squaw Bay.

Newton Jones, a 24-year old American carpenter from Port Townsend, filed his homestead application in 1888 for 51 acres at the Cedar Rock portion of the present Preserve (Figure 8), having first settled it earlier that year. He said at the time of his homestead application that his land “*is ordinary agricultural land, best for agricultural purposes ... most black sandy loam ... it is not timber land.*” By the time his application was approved in 1891, Jones had built a 3-room house for himself, a wife and small child, a chicken house for 60 chickens, had one cow, slashed and burned 7 acres, and had an acre plowed and under cultivation and all fenced with “*80 rick of rail fence.*” Witness and neighbor Christianson Olsen said about Jones’ property that it was “*ordinary agricultural land, some alder bottom land ... farming and fruit land ... not timber land.*” Only four years later, in 1895, the T-sheet map (Figure 8) shows only the name S.P. Hoffman, associated with forested parts of Jones’ claim east of the-now Hoffman Cove Road, at the shoreline entrance to the Preserve, with a large orchard across Hoffman Cove Road, some of which remains, well-tended today. An interview with Claire Tift on record at the Shaw Island Historical Museum tells that Del Hoffman Sr. built a brick house just off the Preserve on Hoffman Cove around the turn of the century.

According to Burroughs (1978), a man named Mathison bought (all of) the ~51-acre Jones original homestead in 1910 and farmed it until he sold this property to Robert Ellis in 1958 (parcel # 250424 001000). Mathison, who was a fisherman as well as a farmer, built a barn and a house near the water on his property. The house was occupied by caretakers in the 1970s and 1980s, but was in poor condition and was donated for a controlled fire department practice-burn in the late 1980s (Jack Temple, personal

communication). Mathison's very beautiful old barn fell down in the late 1980s (Judy Moody, 6-year resident of the Mathison house, personal communication). Newton Jones' original fenced fields just east of Cedar Rock remain largely open today, and have probably been hayed annually for most of the last 115 years. The brushy edges of those fields still contain some old fruit trees (Figure 25), yet no orchard is drawn for that area onto the 1895 T-sheet, so those fruit trees are either volunteers or were planted after 1895.

The author of this document has not pursued the environmental history of the rest of the Cedar Rock Preserve properties between the turn of the twentieth century and the gradual amalgamation of the properties by the Ellis family, but presumably additional clearing of forests continued along the pattern established by the earliest settlers. Much of the following history about the Ellis family ownership derives from a conversation between Claudia Mills and Fred Ellis Sr. on August 18, 2006:

Robert Ellis Sr. and his wife Blanche Day first came to Shaw Island as summer visitors from Portland, Oregon in about 1915; they had three sons Henry, Robert (Bob) and Fred, born in 1911, 1914 and 1916, respectively, and a daughter Elizabeth, born in 1919. The first Ellis purchase of land on Shaw Island was the Tharald Homestead on Parks Bay in 1937, which was selected because of the protected boat moorage that it offered in Parks Bay. Fred Ellis accompanied his father on that trip, when Robert Ellis Sr. declared to his son that this land was too special and unique to be destroyed, thus beginning the family conservation ethic on Shaw Island. The first Ellis purchase of land that ultimately became part of the Cedar Rock Preserve was in the late 1930s – the “Mathews-Coleman place” in the NW corner, part of Hugh Park's original homestead (see above). In the 1950s, Bob Ellis purchased more property that was ultimately added to the Cedar Rock Preserve. He built the main house (now the caretaker's residence) in the 1950s and the beach house in the early 1960s.

The three Ellis brothers ran cattle on their properties on south Shaw in the 1950s and 1960s until part of Cedar Rock Preserve was ceded to the University of Washington in 1975; the cattle were eventually removed to Lopez Island. Fred Ellis reports that they did little clearing on their properties beyond whatever had been cleared at the times of purchase of the various parcels. Burroughs (1978) reports that “In the early 1960s much of the cultivated land [owned by Robert Ellis] was subsoiled to a depth of three feet.” She also states that all of the cultivated areas except the orchard were grazed in rotation until 1976. Bob Ellis dug a pond on the property in about 1971 (see white scar in Figure 21 (Bottom) the new pond site in 1971, with raw soil extending out into Stand Number 16) and stocked it with water lilies purchased from a nursery – some of these plants were later transferred to Fred's much larger new pond near Park's Bay in the late 1980s. An airstrip was cleared in the largest field, south of the house (in Stand Number 18) in the late 1950s, showing already as a narrow line in 1960 and 1971 aerial photos, and showing more prominently by a change in the vegetation in the aerial photos from 1977 to 1998 (Figures 15, 16, 21, 22). Caretaker Jack Temple regularly mowed this airstrip, accounting for its prominence in aerial photos taken after the university took ownership of the property. It has nearly disappeared in the aerial photos after the year 2000, at which time annual mowing had become sporadic.

For two to three years in the early 1970s, Bob Ellis allowed a camp for groups of about 30 underprivileged youth from Portland, Oregon, to set up on his Cedar Rock property under the supervision of John Angel of the Couch School and its associated Metropolitan Learning Center in Portland (Malcolm Lea – Cedar Rock Camp support and present resident of Shaw Island, personal communication). There were six, ten-day sessions in 1972, serving a total of 180 students, who slept under the stars except in inclement weather and experienced the rural San Juan lifestyle with small boats, fishing, farm animals and gardening (Aug. 7, 1972 OREGONIAN). The camp, including a myriad of tents, was located in the fields closest to the Hoffman Cove Road entrance to the Preserve, around the old Mathison House. As well as campers and counselors, it attracted an entourage of visiting parents who found it as appealing as did their children. Ultimately seen by Bob Ellis as more than the land should bear, the short-lived Cedar Rock Camp provided a marvelous experience for those who attended.



Figure 11. Composite of oblique shoreline photographs showing the northeastern edge of Cedar Rock Preserve along Squaw Bay and in the area of the caretaker's house, beach house and dock, taken by the Washington State Department of Ecology, obtained online at <http://apps.ecy.wa.gov/shorephotos/> (1995 photos) and [http://www.ecy.wa.gov/programs/sea/SMA/atlas\\_home.html](http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html) (1977 and 2002 photos). The images shown here are numbers 1977-290, 1995-329, 2002-580.

Figure 12. Composite of oblique shoreline photographs showing the southwest corner



of Cedar Rock Preserve and Hoffman Cove, taken by the Washington State Department of Ecology, obtained online at <http://apps.ecy.wa.gov/shorephotos/> (1995 photos) and [http://www.ecy.wa.gov/programs/sea/SMA/atlas\\_home.html](http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html) (1977 and 2002 photos). The images shown here are numbers 1977-286, 1995-420, 2002-572 and 2002-673.

The Ellis brothers had many discussions about what agency to leave their properties in the care of, and which would offer the best, permanent protection. In the end, both Bob and Fred decided to leave large portions of their estates in the care of the University of Washington, which they believed would not sell the properties, as could happen with other recipients. Henry chose instead to leave his property to nuns in the Benedictine Congregation of the Catholic Church, who are still resident there on the 300 acres he owned adjacent to the north of the Cedar Rock Preserve.

The University of Washington took possession of much of Bob Ellis' property in 1975 by a statutory quitclaim deed of gift and obtained most of the remainder of the Cedar Rock Preserve including the two houses, in 1983, upon his death. Two small non-adjacent parcels, each approximately an acre, at the NE corner of the Preserve, which were mostly surrounded by the Cedar Rock Preserve, were purchased by UW in 1986 from Merle and Virginia Adlum and were added to the Preserve.



Figure 13. Composite of oblique shoreline photographs showing the southeast corner of Cedar Rock Preserve (Upright Point) and the large field at one time containing the air strip, taken by the Washington State Department of Ecology, obtained online at <http://apps.ecy.wa.gov/shorephotos/> (1995 photos) and [http://www.ecy.wa.gov/programs/sea/SMA/atlas\\_home.html](http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html) (1977 and 2002 photos). The DOE images shown here are numbers 77-288, 1995-326, 2002-578. The 2006 photo was taken by Ken Sebens in July 2006.

A series of aerial photographs is presented in this report for the reader to follow changes in the vegetation of the Cedar Rock Preserve properties since 1960. Oblique photographs are set up in 4 plates as Figures 11, 12, 13 and 14; images on each plate represent approximately the same viewpoint, using Washington State Department of Ecology shoreline photos from 1977, 1995 and 2002, and a single aerial photo taken by Ken Sebens in 2006. Vertical aerial photographs, also from the Washington State Department of Ecology for the years 1960, 1971 and 1983, along with additional vertical aerial photos from 1998 and 2004 are provided here for comparison in Figures 15, 16, 21 and 22. The reader should note that the resolution of these aerial images is retained quite well if the reader chooses to review the photos on a computer in the pdf version of this management plan, using several increases in the level of magnification, whereas a printed paper copy will not reveal many of the details.



Figure 14. Composite of oblique shoreline photographs showing the South Point area of Cedar Rock Preserve, taken by the Washington State Department of Ecology, obtained online at <http://apps.ecy.wa.gov/shorephotos/> (1995 photos) and [http://www.ecy.wa.gov/programs/sea/SMA/atlas\\_home.html](http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html) (1977 and 2002 photos). The images shown here are numbers 1977-287, 1995-325, 2002-576.

A new set of very informative high resolution oblique shoreline photographs was taken by the Washington State Department of Ecology on August 15, 2006. Those images were made available to San Juan County in CD form in 2007. Both low and high resolution versions can now be seen online via the Department of Ecology's Coastal Zone Atlas at [http://www.ecy.wa.gov/programs/sea/SMA/atlas\\_home.html](http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html) where the viewer must first locate Shaw Island, and then choose "View Photo" at the top of the screen to pick the year of interest, and then select a "point" on the map to show the appropriate photo. Photos of Cedar Rock Preserve from 2006, 2002, 1995, and 1977 can all be seen at this website, and can be opened together on one's computer screen for comparison from any single point of view.

## AQUIFERS AND SOILS

Aquifer recharge rates in the San Juan Islands are unusually low and average annual aquifer recharge on Shaw Island is among the lowest. Trees and vegetation on the ground may in general use up to 50% of the rainfall through interception loss and evapotranspiration, and only some portion of the remaining rainfall actually contributes to aquifer recharge. Elsewhere in western Washington, aquifer recharge may be around 40% of the total annual rainfall, so a place near Bellingham with 40" of rain per year may get as much as 16" of aquifer recharge per year. In the San Juans, the Olympic rainshadow reduces the annual rainfall by about one-half of that on the mainland and because of steep slopes, exposed rock surfaces, poor soils and the proximity of bedrock to the surface, we end up with only 1/4 of the average aquifer recharge rate. These two factors combine to give San Juan County a total recharge rate approximating one-eighth that of mainland western Washington (Steve Hussey, San Juan Conservation District, personal communication; Orr *et al.*, 2002).

Taking into account vegetation types, soil types and rainfall, combined with samples in six regions on four islands, Orr *et al.* (2002) calculated average annual aquifer recharge, with values of approximately 1.44" per year for Shaw Island, 1.46" on Orcas Island, and 1.99" on San Juan Island; Lopez Island, with the best soils for aquifer recharge, gets an average of 2.49" of aquifer recharge per year (Orr *et al.*, 2002). The low development rate and high percentage of conservation lands on Shaw Island seem to nevertheless give it one of the best prognoses for future aquifer preservation and well-being.

A soil survey was completed for San Juan County in 1962 in which many holes were dug, the soil analyzed, and then in conjunction with aerial and topographic maps, polygons were drawn to show the extent of the various soil types on each island. Since the number of soil samples analyzed is limited, topographic and vegetation patterns are given a fair amount of weight by cartographers in deciding how to draw these polygons. The very tight correlation between soil types and vegetation that can be seen on p. 34 in Figure 15 (Top) and (Bottom) reveals partly the importance of the aerial photos and topographic maps in drawing up the soil maps (Patrick Kirby, surveyor in San Juan County, personal communication). A new soil survey was undertaken in 2004-2006 and additional information gained by many new sampling locations has been used to further refine the map created in 1962 that is presented here. That updated San Juan County soil survey is now available through the U.S. Department of Agriculture Natural Resources Conservation Service website at <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.

On the 370-acre Cedar Rock Preserve, it can be seen (Figure 15) that the soil picture is complex, with many fingers of different soils of glacial origin. Whereas some parts of the county have fairly large areas of one soil type, according to the 1962 Soil Survey of San Juan County, the Cedar Rock Preserve has nine different soil types,



defined also by slope, interlocking into what resembles an approximately 25-piece jigsaw puzzle.

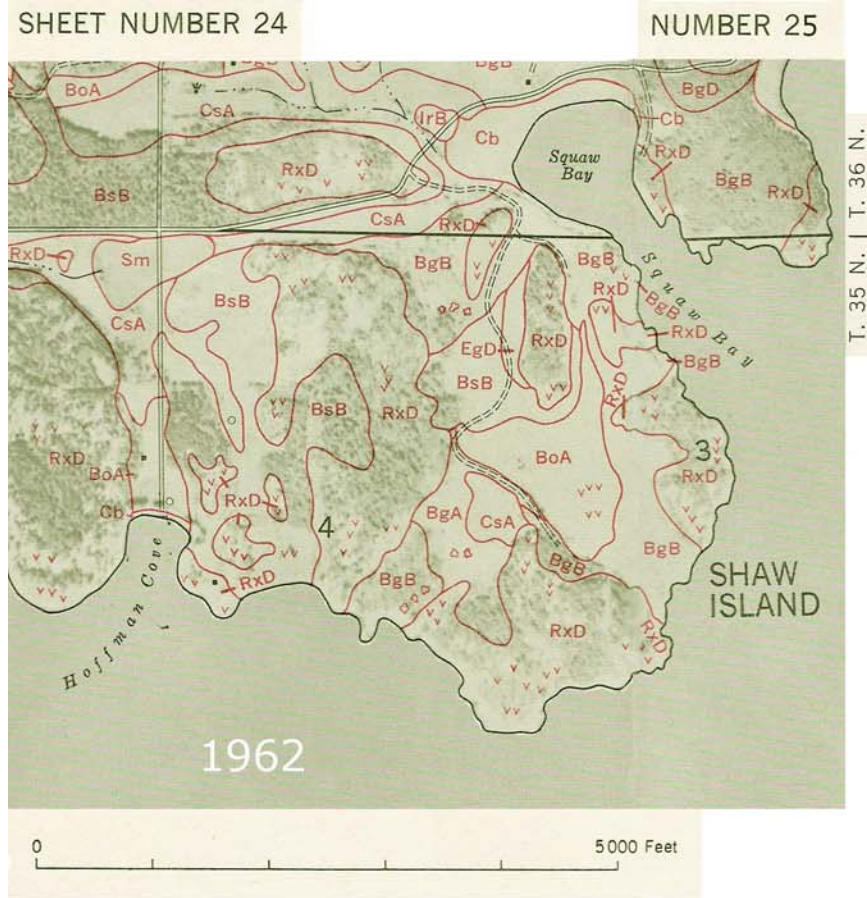
As is common elsewhere in the San Juans, the Cedar Rock Preserve has glacially-derived soils mostly of the Bow, Roche and Coveland series. Figure 15 (Top) here has been scanned and merged from Sheets number 24 and 25 of the 1962 Soil Survey for San Juan County, Washington. Figure 15 (Bottom) is a Washington State Department of Natural Resources (DNR) aerial photo from 1983, sized to match the soil survey image, for comparison.

The soil types represented on the Preserve and shown in Figure 15 (Top), in alphabetical order are: **BgA** – Bow gravelly silt loam 0-3% slope; **BgB** – Bow gravelly silt loam 3-8% slope; **BsB** – Bow stony silt loam 3-8% slope; **BoA** – Bow silt loam 0-3% slope; **Cb** – Coastal beach; **CsA** – Coveland silt loam 0-3% slope; **EgD** – Everett gravelly sandy loam 8-30% slope; **RxD** – Roche-Rock outcrop complex 30-70% slope; **Sm** – Semiahmoo muck. The final letter designations A,B,(C) and D in these soil type abbreviations represent increasing slopes in the terrain (there are no “C” soils in this figure).

Soil types are discussed here moving more or less from north to south on the property and from west to east. All statements that follow about the qualities of the soils are combined from the 1962 Soil Survey of San Juan County and the 1983 Soil Survey Report for the Northwest Area, Forest Land Management Division. Further details can be devined from the updated San Juan County soil survey that is now available at <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.

On next page:

Figure 15. Vertical aerial photographs of Cedar Rock Preserve: 1962 soil map compared with vegetation photographed from the air in 1983. (Top) Compiled soil maps scanned directly from Sheets Number 24 and 25 of the 1962 Soil Survey of San Juan County. (Bottom) Aerial vertical photo of the Cedar Rock Preserve taken by Washington Department of Natural Resources 5-12-83, obtained from Judy Moody of San Juan Island.



Semiahmoo muck (**Sm**) is located only in the NW corner of the Preserve in a wetland area south of the intersection of Hoffman Cove Road and Squaw Bay Road. Semiahmoo muck is an organic material overlying silt and clay that resides in basins, depressions or flats and is very poorly drained; it is usually greater than 60" deep, with rooting depth of 20-30". It is not considered suitable for commercial species of trees. The Semiahmoo muck area is now covered with standing water in the winter and has been largely invaded by reed canary grass, both on the Preserve and across Hoffman Cove Road to the west. Burroughs (1978) noted that this once-marsh was already overgrown thirty years ago with reed canary grass, at which time it was generally "a large tangle of willows, spirea and tall grasses." Snipes, blackbirds and various ducks are regular inhabitants of this area, especially when there is standing water (Betty Gilson, personal communication). It is very likely that this Semiahmoo muck area was ditched and drained by the original homesteader, as it is shown to be a cultivated field on the 1895 T-sheet (Figure 8, p. 23), with what is likely a straight ditch running south where Hoffman Cove Road now runs to the sea. In the late 1980s, the Hilen family did substantial resculpting of their part of this wetland, west of Hoffman Cove Road, so that much more water is retained now, and Hoffman Cove Road seems to effectively dam water on the University side into this corner of the Cedar Rock Preserve. Burroughs (1978) says that this marsh area was farmed until 1930.

A tongue of Coveland silty loam of 0 to 3% slope (**CsA**) runs NE from the patch of Semiahmoo muck and corresponds quite closely to the pasture running alongside Squaw Bay Road (the shrubby border along the roadside masking this pasture in places is growing in Bow stony silt loam soil which extends from the north, just crossing Squaw Bay Road). This pasture holds standing water into the early summer some years and mallard ducks, which frequent the area in the spring, have even successfully nested there some years (Betty Gilson, personal communication).

A second small piece of Coveland silty loam is found in the center of the Preserve immediately west of the former airstrip – this small, central area is a wetland, flooded in winter, and has become surrounded by young forest to the west and a rose thicket to the east. Coveland silty loam is an imperfectly drained soil of broad basins and depressions in the San Juan Islands; it has a black silty loam surface and is slow to drain out in the spring. This soil type is not considered suitable for commercial species of trees.

A very small area of Coastal beach (**Cb**) sediment at the head of Squaw Bay lies within the Preserve.

Most of the presently-open portions of the Preserve are covered with soils of the Bow series, varying from Bow silt loam (**BoA**), to Bow stony silt loam (**BsB**), to Bow gravelly silt loam (**BgA** and **BgB**). The Bow soils are described as imperfectly drained soils of uplands (whereas the often-adjacent Roche soils are considered moderately well-drained), of varying slopes, which formed in fine-textured glacial till and glacial-lake sediments; the organic surface layer is 0-11", rooting depth 6-18", and soil depth to 60". The Bow soils are considered suitable for hay, pasture, crops or timber, and if forested,

are likely to support Douglas fir and alder. Areas of **BgA** are good for hay, pasture or stands of Douglas fir, but tree growth is slow, regeneration is slow, and the trees are subject to windthrow. The more-sloping **BgB** areas are considered fairly well-suited for crops. Areas of **BsB** soil are generally considered to be better for trees than for pasture, partly because they contain enough stones to interfere with plowing; they are typically associated with Roche silt and often near areas of rockland. **BoA** areas can grow Class 4 Douglas fir forest. Bow series soils have medium windthrow potential, medium drought potential, and high compaction potential. The small, man-made pond on the property is located in **BgB** soil at the margin of the Roche-Rock complex in the north central Preserve.

Most of the presently-forested portions of the Preserve lie on combined regions of Roche soil and rock outcrop complex (**RxD**). These soils usually have 8-30% slopes, bear rocks and stones at the surface ranging from 12 to 24" in diameter with 15-50% of the complex consisting of rock outcrop. Roche soils have moderate natural fertility with slow to medium surface runoff, and are better suited to trees than to pasture or tilled crops. Douglas fir is the dominant tree on these soils, which have an organic layer 1-3" deep, soil depth 20-40" deep, and are moderately well drained, have high drought potential, medium windthrow potential, and high compaction and puddling potential.

A small elongate area of Everett gravelly sandy loam (**EgD**) borders the forested "island" that is ringed by roads that access the caretaker's house. This soil is described as morainic in origin from glacial outwash terraces, with a 0-1" surface organic layer and rooting depth to 60" or more. It is slow-draining, droughty in summer and better suited to Douglas fir trees than pasture. On the Preserve, this small patch seems to be open, mostly underlying the road and possibly running up the west side of the forested "island" north of the caretaker's house.

As a final comment on soils, it should be noted that soil capabilities can be altered by use. The open, airstrip field, which is composed of Bow silt loam (**BoA**) toward the center of the Preserve and Bow gravelly silt loam (**BgB**) as it slopes down to the shoreline, was "subsoiled" or plowed deeply to the subsoil and turned, with the rocks removed, in the 1960s or 70s and most likely has lost some of its original character. It is unclear to the author how many of the other open fields were also "subsoiled".

## STAND DESIGNATIONS

Mills *et al.* made plant surveys of the Cedar Rock Preserve 2001-2004 (summarized in Appendix B), incorporating all previous observations into baseline inventory species lists. In the process of doing those surveys, Mills divided the property into a number of small stands, defined by changes in vegetation. For the purposes of this report, about 30 of those “Stands” will be described, as follows (see text and Figure 16, below).

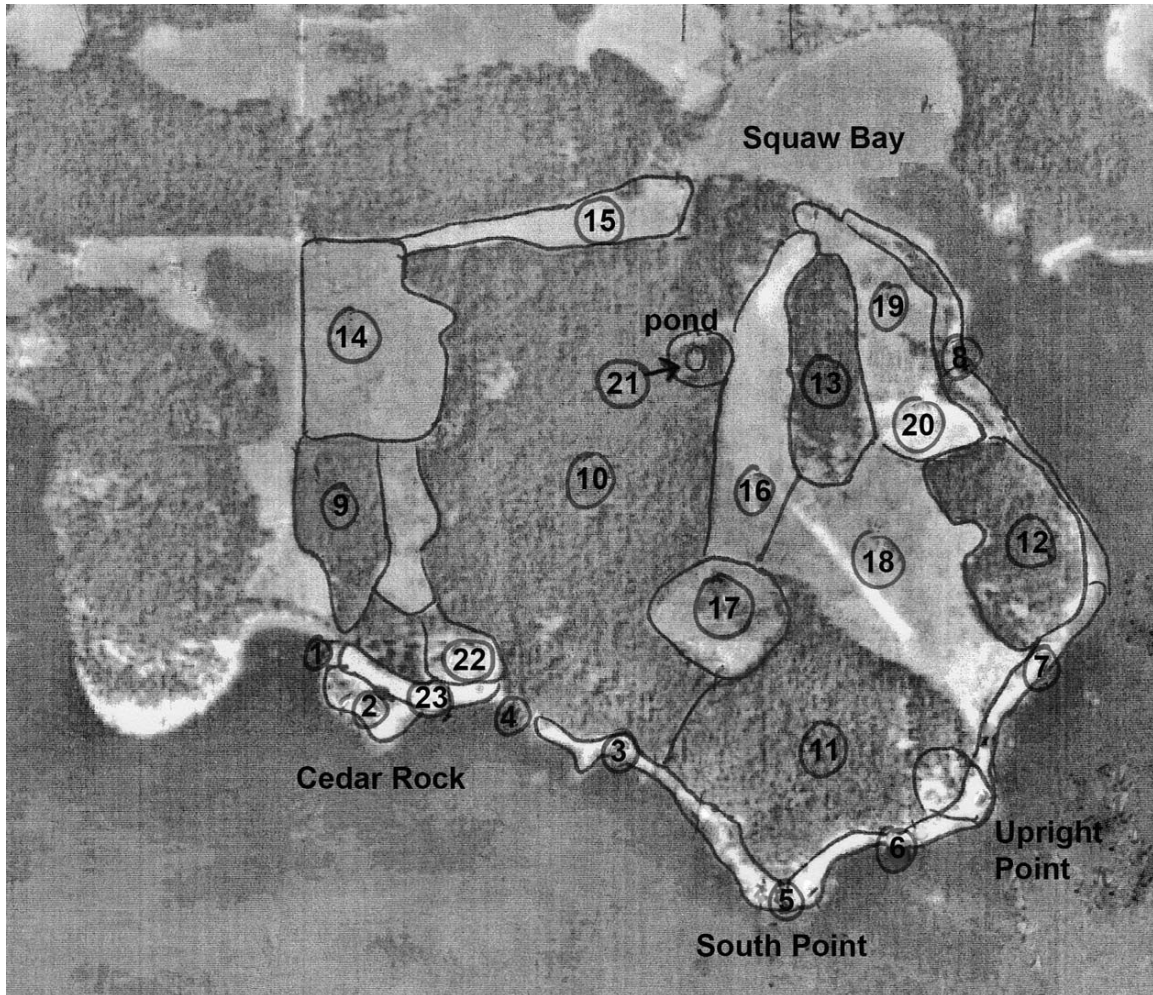


Figure 16. Circa 1995 aerial photo showing numbered “Stands” for management purposes and plant species localizations.

Coastal sections include (1) shoreline west of the “Cedar Rock” bunkhouse knoll (these knolls are coastal prairie) to Hoffman Cove Road, (2) shoreline knoll south of the bunkhouse known commonly as “Cedar Rock”, (3) other SW-facing shoreline knolls from “Cedar Rock” east to “South Point”, (4) other shoreline between “Cedar Rock” and “South Point” (not knolls), (5) “South Point” shoreline knoll, (6) shoreline east of South

Point to Upright Point, (7) SE-facing shoreline from the dock to Upright Point, (8) shoreline along Squaw Bay to the dock.

Non-shoreline portions of the property can be divided into open and forested portions. The forested portions include (9) forested SW corner along Hoffman Cove Road, terminated by NW corner orchard and field and to the east by connecting field running down to the Cedar Rock knoll, (10) a large central forested area running nearly the length of the property north/south, (11) the slightly less-dense forested area between “South Point” and the airstrip, bordered to the NE by an old field now largely growing in with young conifers, (12) a forested section on the east side of the property near the mouth of Squaw Bay, including “East Point”, and bounded to the west by the open area containing the old airfield, (13) the forested ridge immediately west of the caretaker’s house.

Remaining (largely open) portions of the property include (14) the NW corner marshy field and orchard (15) narrow east-west-oriented field along the north central property line adjacent to Squaw Bay Road, (16) narrow north-south-oriented field along west drive, bounded to its west by the central forest and pond and to the south by (17) the partially grown-in field south of this open area, near the center of the preserve, distinguished in the soil map (Figure 15, p. 34) as containing a small patch of Coveland silty loam soil, and holding standing water in the winter (18) large open area oriented NW to SE, containing airfield and sloping down to the SE shoreline, (19) the open area in NE corner of the Preserve along the eastern loop of road, containing a fenced orchard near the caretaker’s house, (20) open area surrounding the caretaker’s house (“the yard”), (21) the pond and its forested island, (22) remnant orchard just north of “Cedar Rock”, (23) grassy fields near the southern shore between the bunkhouse and visitor’s entrance at SW corner.



Figure 17. Natural reforestation in Stand Number 17. Photograph by Ken Sebens, July 2006.

Other areas of particular note are (24) the shrub interfaces between fields and forest throughout the property, (25) the open woodlands/interior knolls within some of the forested areas, (26) some small forested wetlands scattered throughout the property, (27) the mowed trails throughout the property, and (28) remnants of several other historic orchards, now mostly in the shrub/forest interfaces.

## VIEW CORRIDORS

The Cedar Rock Preserve is distinguished from the other large University of Washington-owned properties in the San Juan Islands (the Fred and Marilyn Ellis Biological Preserve properties on Shaw Island and the Friday Harbor Laboratories Biological Preserve on San Juan Island) by its more than one hundred year agricultural history, which has left the property approximately half in open fields, most of which stretch to the shoreline and look out in all directions from the southwest around to the east. These view corridors now constitute one of its most pleasant features.

In addition to the biological values of the property, including biological diversity and as a haven and nexus for native plants and animals, the Cedar Rock Preserve was created and deeded to the University to be “*held, used and maintained as a nature preserve*” to protect its aesthetic values. The UW San Juan Islands Preserves Committee agreed that the view corridors on the property are of high value, passing without opposition the following motion on September 15, 2006: “*The open fields have some biological and cultural values. The most important values in the judgment of the committee are aesthetic. Therefore we recommend a prioritization of the aesthetic values of the viewsheds, the results of which will be incorporated into the management plan.*”

Sue Burroughs, a UW Landscape Architecture student, completed an initial management study for the property in 1978 (at which time some of the Preserve was still under Bob Ellis’s ownership), in which she discussed the values of the open fields and vistas in detail in the Visual Analysis chapter (pp. 43-53) of her study. Burroughs pointed out that the fields “*offer expanses of view, clearly defined by forest, sea, or road*” ... with “*a progression of spatial experiences – intimate, sweeping, closed, narrow, expanding*” and then went on to further describe some of these spatial experiences. She also placed value on the internal views in some of the open woodlands, contrasting these intimate, limited, and private views with the bold, spectacular views from the open fields.

Burroughs’ 1978 recommendations with regard to view corridors continue to be valid thirty years later, and I concur with Burroughs that all of the openings and view corridors are important. I include here her well-thought-out comments to guide the present management plan, acknowledging the vegetation changes that have occurred in the subsequent thirty years. Burroughs felt, as do most of those intimately familiar with the property, that the openings and view corridors provide context to the rest of the Preserve and to the visitor’s experience there:

(Burroughs, p. 53) *Even though the fields do not have the variety within, which other landscape units possess, they are a most important visual component of the total landscape. Their substantial extent allows access to a variety of views; sets contrasts with other units; and provides spatial experiences. Should all of the fields or even most of the fields be allowed to succeed to forest, the visual quality of the Preserve would be greatly reduced in terms of internal views, variety and space. Changes around the edges of the fields would have the least negative impacts on*

*their spatial qualities. In fact, careful management of the shrub edge could produce greater naturalness of feeling in the fields where edge conditions are presently too harsh or too uniform.*

*The shore has the highest visual quality of any unit in the Preserve; it is also one of the more sensitive to visual impacts. Given the intent of the Preserve, it is unlikely that any disturbances such as construction of buildings, jetty, or docks would occur. If such plans should ever be considered, more detailed studies of the visual sensitivities of the shore must be conducted prior to and in conjunction with evaluation of site possibilities.*

Burroughs went on to offer management advice for softening what she saw in 1978 as harsh, unnatural edges between forested areas and the fields; she was looking at the property only a couple of years after it had been actively farmed for decades. Her advice for annual mowing but leaving boundary areas and corners unmowed to create more natural transitions seems to have worked well in the ensuing thirty years, whether by actively following her guidelines, or just by natural processes, but one is not struck now by unpleasantly unnatural transition zones. Burroughs recommended in part:

*(p. 57) Retain as much field area as is reasonably possible by annual mowing to inhibit vegetation succession of woody plants; to maintain habitat diversity; and to reduce fire hazard of dry grasses. ... Leave unmowed field areas of exceptionally rocky or rough terrain eventually to create islands of shrubs in the fields. ... Leave permanently unmowed areas along roads, ditches and fence lines. Mow irregularly, not parallel, to fences. Leave fenced corners unmowed. ... Cut back shrub community where connections between fields are overgrown. ... Retain the orchards.*

*The northern and seaside fields have the greatest view resources as well as exposure to viewing from without. These fields have high priority for maintaining an open character. ... The enormous expanse of the [field containing the airfield] is unique on the island. From a visual consideration, as much of the openness of this field should be preserved with only edge modification. The hay field along the county road is aesthetically uncomfortable. The straight edges between the field and the forest should be vegetatively softened by encouraging more shrub growth. ^*

In the thirty years since Burroughs' study, there has been much growth of native shrubs, especially along the edges of the fields, creating the sorts of naturalized softening that she recommended. Since approximately 2001, the mowing program has been greatly reduced in the Preserve, mostly for a shortage of willing manpower, but it is anticipated that mowing in the open fields will return to an annual program. It would be good to keep in mind Burroughs' recommendations for soft, natural transitions between the forests and the fields as this mowing program is put into effect. Not mowing cleanly to the roads and fences, or forest edges, and with somewhat irregular boundaries will additionally save time for the tractor operator. It may be desirable to reopen connecting corridors between some fields by mowing and removal of brush or small trees.



(on p. 58) Burroughs stated: *The interior fields can stand a great deal more forest closure; however, open areas should be maintained to provide edges and connections between fields. The resulting variation of spaces should create a progression through the interior fields and set greater visual contrast and impact on entering either the northern or seaside fields. ... The pocket field [Stand Number 17, p. 36] can tolerate some forest closing and isolation from the main field on the Ellis property; however a large part of this field should be kept open.*

In fact, the pocket field (see Fig. 18, right, below) has largely closed in with young trees and a new wetland in the last decade and perhaps at this point, with limited manpower available, should be allowed to run the natural succession process. Elsewhere, the corridor of fields running north-south near the west edge of the Preserve should be reconnected by mowing through the brushy barriers that have grown up between them.



Figure 18. Aerial views of the eastern portion of Cedar Rock Preserve, looking southeast, taken from radio-controlled airplane by Andrew Behm, spring 2005. Photos abut over the old airfield. The caretaker's house is hidden by trees to the left of the semi-circle of grayish Atlas cedars in the left-hand photo. Note stand of young trees growing up behind the circular wetland in Burroughs' "pocket field," center of right-hand photo.

A final consideration with respect to view corridors is that in some places along the shoreline, substantial shrub barriers or even new Douglas fir forests are developing and blocking the final marine outlooks of the open expanses. For example, the view out from the covered porch of the caretaker's house is now filling with tall Douglas firs along the shoreline. Without some attention, the shorelines will continue to grow in, effectively truncating the view corridors to interior views. It is recommended to remove some of the crowded shoreline shrubs and evergreen trees in line with the open fields in order to maintain the long, distant views looking out into the channels and at other islands.

## BUILDING AND EQUIPMENT INVENTORY

The Cedar Rock Preserve has a number of buildings on it of various ages and in various states of repair. There is no budget for major repair or replacement of any of these structures at this time, although approximately \$2,200 per year is available from the UW Office of Research for use on the Shaw properties. Caring for these buildings or their replacement with similar, but sound structures, should be a high priority if extra funds are raised in the future, and would be fundamental for encouraging classes and researchers to use the Preserve with any kind of regularity. It is estimated that several hundred thousand dollars might be needed for repair and/or replacement or relocation of the present structures and the dock. Recently, small groups of visiting researchers or students have been encouraged to camp at the nearby County Park, which has better facilities for overnight stays.

There is a one story, three bedroom, one bath, house that was built in the 1950s and originally occupied by Bob Ellis and is now used as the caretaker's residence at the northwest corner of the property, reached by a loop driveway off Squaw Bay Road. This house received a substantial clean-up and refurbishment in the summer of 2007, accomplished by maintenance staff from the Friday Harbor Laboratories. Another room and bathroom are located across the driveway in a shed attached to the carport. Another shed not far to the north of this main house contains a wooden water storage tank and pressure tank; electricity also runs to this water storage shed.

There is a second small house on the property, known as the "beach house", which was built in the early 1960s for guests. It consists of two rooms (one with a full kitchen) and a bathroom. The beach house is located very close to the water above Squaw Bay.

Next to the beach house is a decrepit dock consisting of a pier and float, which is presently out of use until repairs can be financed and accomplished. Repair costs are estimated to be on the order of tens of thousands of dollars.

A hexagonal-roofed, round, cinderblock well-house is located just off the driveway on the way to the beach house. This contains a drilled well that is about 200 feet deep. Water lines from this well-house run down to the beach house and up to the wooden water storage tank that serves the main house; there is also a complete underground water system that runs to the nearby fenced garden and orchard, although its present condition is unknown. The fenced garden has a small shed in one corner and a large, roofed cattle feeder nearby that is also being used for covered storage. The water pipes that serve the beach house are exposed beneath the house and vulnerable to freezing.

Near the driveway-entrance to the property off Squaw Bay Road there is a large cement slab, where a barn once stood, until it was burned by an arsonist in the late 1960s (along with six other Shaw Island buildings on the same night). Just behind this large slab there is still a small wooden storage shed with a concrete base, which caretaker Jack Temple used to store a tractor.

All power lines on the Preserve have been undergrounded, running down the left side of the entry road as you drive to the main house.

At the southwest corner of the property, not far from the entrance on Hoffman Cove Road, which led for years to the “old Mathison house” and barn, four rustic buildings remain. Nearest to the shoreline is a fairly large storage shed with horizontal red-painted siding, white trim and a shake roof. This shed has been used to store scientific supplies and equipment and has a large padlocked door on one end. Beside it is a large covered wooded cattle feeder holding a small amount of old lumber. The old house that used to be situated nearby had fallen into great disrepair and was removed in the late 1980s by being bulldozed out from under a large healthy madrona and then burned by the fire department (the madrona has survived). This house was served by a drilled well that had largely failed by the mid-1970s, suffering from both salt water intrusion and contamination by iron-fixing bacteria, so that the water was orange and unsuitable as drinking water (Judy Moody, personal communication), in a small well-shed with red-painted horizontal siding and white trim and a shake roof that enclosed the well head. This shed, nearest to the red-painted barn, has a concrete floor and the old dug well’s square concrete casing seems to be filled in with dirt. Also at Cedar Rock, near the red-shed, but a little farther from the shoreline, there is an unpainted, shingled bunkhouse with a sagging roof of composite shingles; this bunkhouse has a kitchen and a relatively large, low, uncovered, rectangular cedar deck. The deck is in fairly good condition, but the associated building and (especially) its roof are in need of repair and or replacement. There is another empty shed near the bunkhouse, with vertical cedar siding and a silver-gray metal roof. The primitive, outdoor pit toilet that used to serve these structures was dismantled in the early 2000s.

Additionally, there is a small log cabin on the west side of the Preserve near Hoffman Cove Road. A planked-over dug well is located just to the west of this cabin (which may be a well dug by homesteader Hugh Parks). Burroughs (1978) reports this well to be about 15 feet deep and yielding a small amount of water year round. This well has not been seen recently.

Although the author could find no one who knew of such (having asked Judy Moody, Jack Temple and Fred Ellis Sr.), it seems likely that there could be more dug wells on the Preserve since most homesteaders put in a well; alternatively, old wells might have been filled in. The most likely locations would be associated with original homesteads, so additional dug wells may exist at the base of the airstrip field near the shoreline (site of the Archibald Rader homestead), near Cedar Rock (site of the Newton Jones homestead), along the south edge of Squaw Bay (site of James Ross’ homestead and the farms of H. Glossip and Mrs. Jones), or perhaps even near the cultivated field shown in 1895 to be not far from Bob Ellis’ house. Burroughs (1978) mentions a second dug well “in the center of the middle pasture.”

The Preserve is bounded on two sides by roads, and by salt water on all other edges. The Preserve is fenced with four-foot high metal livestock fencing along both roads, although the fencing is old and has a few breaks. About half-way along the

western boundary formed by Hoffman Cove Road, there is a metal gate into the orchard. There is another (wooden) gate at the SW corner of the Preserve at the base of Hoffman Cove Road, which serves at the public entrance to the property. The fence line along Hoffman Cove Road has at least one break, in a wooded section closer to the entrance than to the orchard. The wire fence then continues, unbroken, to border the Preserve along Squaw Bay Road, and there is another metal gate about midway along this section of road.

A network of scenic, old split rail fences in various states of disrepair runs throughout the property, some defining the edges of present fields and others now running through the woods.

In 2005 the University purchased a John Deere model 790 tractor with John Deere model 300 front loader and a John Deere rotary deck cutter/mower for use at any or all of the UW San Juan Islands Preserves. This tractor is generally kept at the Cedar Rock Preserve for use by the caretaker in mowing fields and other heavy chores.

In 2004, Jack Temple (former caretaker) located an old, heavy-duty brush-hog-type mower which he purchased and gave to the University, and had delivered on loan to Shaw Island resident Jack Rawls for repair and to be used on the Preserve by Mr. Rawls on a contract basis.



Figure 19. Public entrance at the southwest corner of Cedar Rock Preserve for day use, including parking for one or two cars and small “house” containing the visitor book. Photograph by Claudia Mills, April 2007.

## AGENTS OF CHANGE AT THE CEDAR ROCK PRESERVE

Many natural ecological processes will cause changes over time at the Preserve. Some of these can be prevented or addressed, once identified, and others will be more difficult to direct. Items on the lists below have emerged from discussions in the UW San Juan Islands Preserves Committee meetings and by the author's reading other recent management plans for conservation properties in the San Juan Archipelago. (The Nature Conservancy presently uses a complicated, many step "Enhanced 5-S" process, through which experts and stakeholders are involved in management and conservation planning, and threats are identified. The author has participated in the 5-S process twice in the past few years and believes that the list of agents of change below are among those likely to come out of a more expensive effort such as TNC is able to use in arriving at management plans for its properties.)

- ON TERRESTRIAL PORTIONS OF THE PRESERVE

- 1) Uncontrolled browsing by deer.
- 2) Increased numbers of invasive plants.
- 3) Unintended succession out of meadows and into reed canary grass, brushland, or forest.
- 4) Growth of large, long-lived species of trees in places that block view corridors.
- 5) Inappropriate recreational use and trampling of fragile ecosystems.
- 6) Fire, enhanced by excess fuel in the forests. Campfires by unauthorized campers or boaters. (Shaw Island does have a Volunteer fire department with trucks and other equipment, but its efficacy would be limited in the event of a severe wildfire.)
- 7) Global climate change and a major shift in the flora because of regional changes in temperature and rainfall.
- 8) Deterioration of present buildings and insufficient funding to repair them.



Figure 20. Young, 2 m tall, self-seeded Atlas cedars near the caretaker's house. Photograph by Claudia Mills, August 2006.

- ON MARINE PORTIONS OF THE PRESERVE

- 1) Inappropriate recreational use – camping, beach fires, toilet stops by kayakers and other boaters.
- 2) Overharvesting of marine plants and animals.
- 3) Marine pollution (oil spills, etc).
- 4) Terrestrial pollution encroaching on shorelines from the uplands.
- 5) Changes in sea level resulting from global climate change.

## SPECIFIC GOALS AND MANAGEMENT PRESCRIPTIONS

## • THE ENTIRE PRESERVE – TERRESTRIAL OVERVIEW

This property was given to the University of Washington with conditions including that the premises “*shall be kept in their natural state without disturbance of the native plant, bird and animal populations and habitat.*” Appendices A and B provide inventory lists of the animals and plants known to be living in the Preserve, for without some knowledge of the native plants, birds and animals, it will be difficult indeed to measure to what extent they are being kept in, or restored to, their natural state. It would be helpful to obtain a more complete set of bird observations.

The Cedar Rock Preserve, encompassing both extensive uplands and just over two and one quarter miles of marine shoreline below them, offers opportunities for stewardship of these linked terrestrial and marine habitats.

The mixed forest and open field aspect of the Cedar Rock Preserve is one of its greatest assets. Whereas the other University of Washington holdings on Shaw Island, known cumulatively as the Fred and Marilyn Ellis Biological Preserve, are largely forested, the Cedar Rock Preserve with its naturalized and now-unfenced agricultural fields, offers more accessible and longer viewsheds, and higher general biodiversity because of its wider range of habitats.

Maintenance of the fields by annual or biennial mowing will preserve the open aspects of the property. The areas now open were slashed and burned early from non-spectacular indigenous forest, according to the homesteaders’ “proving up” papers (see Environmental and Cultural History of the Cedar Rock Preserve, p. 21). Without the benefit of a modern soil survey, the European pioneers and their successors in the vicinity of Cedar Rock divined the qualities of the various soils and made use of appropriate areas for crops, hay fields, and orchards, leaving other areas forested, as the soils and topography dictated. The distribution of these open fields, amongst a forested backdrop so typical of the San Juan Islands, offers a large amount of “edge” habitat which is used especially by a wide variety of birds, including neotropical migrators who are facing massive habitat destruction globally, and for which the Cedar Rock Preserve can offer some small amount of undeveloped suitable habitat, with limited human presence.

One cost of maintaining the open fields is an enhanced deer population. Black-tailed deer prefer open, over forested habitats, and will continue to thrive on the Preserve (and elsewhere on Shaw Island) unless culled by hunters. Arranging for approximately annual harvests of deer could be key to the maintenance of high native floral biodiversity over time.



Figure 21. Vertical aerial photographs of Cedar Rock Preserve. (Top) 1960 aerial photograph scanned from paper copy at the San Juan County Assessor's Office; transects flown by Pacific Aerial Surveys, Inc., undated. (Bottom) 1971 aerial photograph scanned from paper copy at the San Juan County Office of Community Development and Planning; transect flown by Walker & Associates, Inc., 5-3-71.



Figure 22. Vertical aerial photographs of Cedar Rock Preserve. (Top) 1998 aerial photograph digital ortho photo dated July 21, 1998 from <http://data.geocomm.com>; (Bottom) 2004 aerial photographs stitched together using Photoshop from images available on the San Juan Assessors Office website, showing also roads (in red) and parcel boundaries (delineated in black).



- COASTAL EDGE AREAS (Stands No. 1–8)

The property includes numerous rocky knolls, especially along the shoreline where they are also recognized as coastal prairie, but some open rocky areas also persist into the nearshore forests. This rather fragile coastal prairie is highly valued for its diversity of spring and summer wildflowers, native grasses, and mosses, but is now increasingly subject to invasion by non-native grasses and other plants. Trampling by visitors on these attractive areas, combined with overgrazing by deer, is undoubtedly contributing to loss of native diversity and increase of hardier non-native species. Control of visitors by education and signing may be helpful in maintaining diversity in the limited shoreline coastal prairie areas. Control of invasive plants in these areas is of high priority but will require work parties, since the job is larger than can be expected of the part-time caretaker working alone. Removal of invasive species may leave open soil vulnerable to further invasion by the same or new species, so should be done with sensitivity and minimal disturbance of remaining native plants, and with frequent returns to monitor succession.

Old middens exist in several areas along the shoreline, some of them under well-established shoreline paths. Since middens sometimes contain human remains as well as shells and other evidence of prehistoric community uses of the area, it seems reasonable and respectful to turn paths away from the midden areas in order to reduce trampling and to slow the inevitable erosion processes.

- FORESTED AREAS (Stands No. 9–13)

A little more than one-half of the Cedar Rock Preserve is forested, with evidence by review of both oblique and vertical aerial photos from 1960, 1971, 1983, 1995, 1998, 2002 and 2004, of some amount of reforestation occurring without any specific efforts to accomplish this. In some areas, such as at edges of the large field once encompassing an airstrip, extensive deer browsing is preventing healthy growth of the young trees and stunting them at about one meter in height, but in other areas young trees by various accidents, such as growing up within rose thickets, have escaped browsing by deer and are growing into promising young specimens of some height with undamaged crowns.



Figure 23. Natural reforestation between Stands Number 10 and 16. Photograph by Claudia Mills, August 2006.

The forested portion of the Cedar Rock Preserve should be managed for the goal of creating a multi-age stand of native species with diverse structure, species composition, and old-growth attributes. Although a detailed forest management plan, beyond the scope of this document and expertise of its author, would be useful to guide future forestry activities, certain general recommendations that follow can be made here with respect to management of the forests.

All large healthy trees should be left standing; some standing snags and fallen rotting logs are also valuable wildlife habitat and should remain. Fuel reduction could be gradually accomplished by piling fallen branches and other tree debris on the ground and burning small piles during the wet season. Tree removals in overly crowded stands should be carried out in a manner specified by, and concordant with, a more detailed forest management plan developed to further enhance the goal of a multi-age stand with old-growth attributes. It should be noted that removal of trees on some of the soil types may lead to increased windfall in those areas. Appropriate practices may include removal of some, but not all, fallen trees, and thinning of severely crowded young stands, or tree removal in other locations as specified by a management plan. Non-native invasive species in the forest such as English holly, English ivy, and Himalayan blackberry should be removed to the extent practical. In the event of severe damage due to high winds, fire or disease, active replanting of native species could be attempted, as specified in the forest management plan, again with the goal of retaining diversified structure, age, and species composition, and to speed up natural reforestation, which is likely on the soils present. Old split rail fencing at the edges and within some of the forests is a cultural remnant and considered scenic by many; removal of fallen trees and branches that come to lie across these old fences will help to preserve them.

[Parts of the San Juan Historical Park at both American Camp and British Camp on San Juan Island have an agricultural history quite similar to that of the Cedar Rock Preserve and are being allowed to reforest according to the management plan for these properties. Areas with forest soils have converted back to forest in a relatively short time, without special plantings of seedlings; young trees need thinning and/or pruning or they will grow in very crowded (a condition sometimes referred to as “doghair”) and have poor structure. Voles were a problem for young tree growth at the San Juan Historical Park only in years following a serious decline in rabbits, when the vole population soared; in general, voles have not been a serious problem in the establishment of young seedlings, although deer browsing is a problem at the historical park, as it is on Shaw Island and throughout the San Juans (Peter Dederich, San Juan National Historical Park Superintendent, personal communication).]

- OPEN AREAS (Stands No. 14–23)

About one-third of the Cedar Rock Preserve is comprised of open areas that were once agricultural fields, through which livestock were rotated until the University received the property in the mid 1970s. Most of these areas were mowed annually for hay from the time when the University took ownership into the late 1990s, but mowing has become sporadic in the last half-decade.

The fields should be mowed annually or biennially to keep them open and to reduce the fire hazard of tall, dry grass in the late summer. A trade-off exists between waiting for ground-nesting birds to fledge their young (probably mid- to late July) and cutting fields for hay, which usually means cutting by the Fourth of July. If birds are deemed more important, the feed quality of hay is lost and mowing will fall to the caretaker. If it is seen to be more important to produce good-quality hay for animal fodder, it should be arranged well ahead of time to find someone who is willing to mow in exchange for keeping the hay. Hay is a valuable commodity in the San Juans and is in demand for cattle, sheep, lamas, alpacas, and horses, and sale of the hay should be sufficient to compensate someone mowing the fields (the author paid \$7 per bale on San Juan Island in winter 2007-2008). Fields suitable for haying include areas 15 (which may need some repair from ruts created in about 2003 by vandals in a vehicle), 16, parts of 18(?), 19, 22, 23. Most of the fields not suitable for hay should also be mowed annually or biennially to keep the roses and exotic invasives like reed canary grass down, including areas 14, 17(?), and parts of 18(?). Stand Number 17, near the center of the Preserve, has largely lost its open field character and might best be left to revert back to wetland and forest, but forest margins along some of the open fields are seeding many small firs that are so deer-browsed as to have no future as trees and should be brush-hogged to remove these meter-high fir hedges, which are neither field nor forest. Advice for mowing, yet leaving soft, naturalized transitions between forest and field or alongside fences and roads, is given in the View Corridor section of this management plan (pp. 39-41).

Among and beside the old fields are the remnants of several orchards, in various states of disrepair. The orchard at the northwest corner of the property is harvested one day annually by students, faculty and staff from the Friday Harbor Laboratories, but otherwise receives no special attention other than occasional small-scale harvesting by other visitors to the Preserve. Part of an orchard near the northeast corner of the property is fenced and in relatively good condition; a few nut trees were added to this orchard into the 1990s by caretaker Jack Temple. Other old orchard trees are still evident along the shore of Squaw Bay and along the south-west shore of the Preserve, but those trees are becoming largely encroached by shrubs and forest. With infinite labor, it might be nice to prune and restore at least the two largest old orchards, at the northeast and northwest



Figure 24. Patches of reed canary grass (in right foreground and bright green clumps at mid-range) are becoming established in Stand Number 15, parallel to Squaw Bay Road. Photograph by Claudia Mills, August 2006.

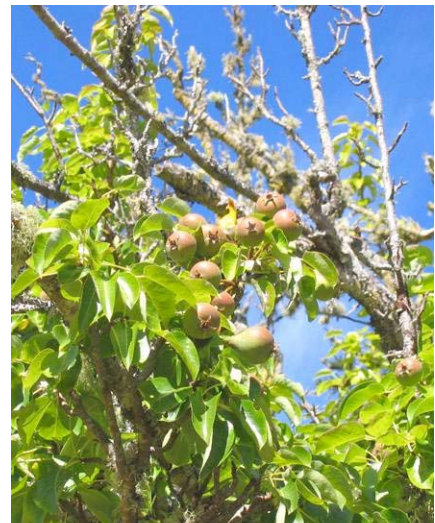


Figure 25. Ancient unidentified pear tree in the shrub interface just north of Cedar Rock in Stand Number 22. Photograph by Claudia Mills. August 2006.

corners of the property, but without such a labor force, they should at least not be removed, but left as cultural remnants with old varieties of fruit (not presently identified). Annual mid-to-late summer mowing beneath these old fruit trees would be helpful as a bare minimum of attention to discourage small rodents and fungal growth.

There is a pond in the north central portion of the property on the interface between forest and field. At the waterline, the pond is ringed by non-native yellow flag iris, it also contains non-native water lilies, and has a stand of robust bamboo growing along one of its edges. The pond was created about 1971 (see new pond and fill outlines on the land in 1971 aerial photos, Figure 21 (Bottom)) and these plants might be seen to have long-term cultural or aesthetic value. In any case, the iris and water lilies are not likely to escape and colonize other portions of the property and so might be ranked rather low for removal. The bamboo, which has higher potential for spreading, should probably be actively and entirely removed by the caretaker or a work party. Burroughs (1978) recommends allowing the forest to encroach around both northern and southern edges of the pond, so that it is more fully integrated into the landscape as a forest-opening feature, with a much smaller clearing that opens out into the field to its east. That process has been partially accomplished in the last three decades, presumably largely through neglect.



Figure 26. Aerial views of the north and west portions of Cedar Rock Preserve, looking northwest, taken from a radio-controlled airplane by Andrew Behm, spring 2005. The left-hand photo shows Hoffman Cove Road running down the entire western edge of the Preserve to Hoffman Cove and the characteristic patchwork of forested and open areas. The right-hand photo shows the caretaker's house in the trees on the right edge, the ex-airfield occupies the lower center of the image, and the freshwater pond, well-integrated now into the landscape, is an elongate black spot on the upper edge of the cleared field above and to the left of the caretakers house.

- MARINE AREAS

The marine margins of the Cedar Rock Preserve include small coves and bays, gravel beaches and intertidal rocky outcrops, rocky bluffs, and a small portion of the mud flat at the north end of Squaw Bay. (Although the driveway to Cedar Rock Preserve off Squaw Bay road passes by the muddy stream inlet at the north end of Squaw Bay, this inlet is not on University property.) Protection of the uplands at the Cedar Rock Preserve offers simultaneous protection of the 2.3 miles of shoreline.

Intertidal communities are representative of the region and appear to have changed little over the last half century, although non-native species including the Pacific oyster (*Crassostrea gigas*) and the brown alga *Sargassum muticum* now are present or abundant at some sites within the Preserve. Wildlife including mink, river otters, and sea birds regularly use the shores.

In general these shorelines receive relatively few visitors, and visitor impacts currently appear to be minimal. Researchers and students from the UW Friday Harbor Laboratories occasionally use intertidal areas for purposes of research and teaching, but this is infrequent and not likely to cause long-term impacts at the current rates of usage. Intertidal communities are subject to regional stressors including water quality, climate change, sea level rise, and changes in alkalinity. Regional stressors and impacts are described in detail by Klinger *et al.* 2006 ([http://www.nature.nps.gov/water/watershed\\_reports/SAJH\\_FinalReport.pdf](http://www.nature.nps.gov/water/watershed_reports/SAJH_FinalReport.pdf)).

The shorelines of the Cedar Rock Preserve are State-owned from either the government meander line or ordinary high tide to extreme low tide, and are therefore open to the public for fish, shellfish, and algae harvesting as governed by Washington State fishing regulations. [There are places along the Cedar Rock Preserve shoreline where UW actually owns some of the intertidal – this is only on parcels “proved up” by homesteaders prior to statehood, where the government meander line is seaward of ordinary high tide (see discussion p. 12).] The entire shoreline of the preserve lies within the San Juan County Marine Stewardship Area, for which a management plan has been developed ([www.sjcmrc.org](http://www.sjcmrc.org) and see p. 20 above). Management of shorelines within the Preserve should be consistent with the San Juan County Marine Stewardship Area Management Plan. Additional protections could be added by 1) acquiring leases of the adjacent marine bedlands from Washington Department of Fish and Wildlife, or requesting that the bedlands be withdrawn from leasing; 2) requesting that San Juan County establish additional protections of the shoreline, intertidal, and subtidal areas under the Marine Stewardship Area Management Plan; 3) requesting that the Washington Department of Ecology designate shorelines within the preserve as sensitive areas under the State Oil Spill Contingency Plan Rule, to be prioritized for protection and response in the case of an oil spill; 4) developing and implementing an invasive species management plan; 5) developing and implementing a visitor use plan; and 6) managing upland areas to reduce negative impacts to intertidal areas and to preserve sources of beach nourishment.

- CULTURAL RESOURCES

The San Juan Archipelago has for thousands of years been a site of visitation and occupation by Native American peoples and is riddled with shoreline middens and other evidence of this pre-European history. Some, but not extensive, research has been done in the last century to begin to elucidate this ancient local culture.

From 2005 to 2008, Dr. Julie Stein and PhD student Amanda Taylor of the University of Washington have collected samples from middens at several sites in the San Juan Islands including on the Cedar Rock Preserve, for research to better understand the timing and nature of Native American occupation of the region. Samples are being analyzed at the UW archaeological laboratory and will be added to the collections of the Burke Museum archaeology division with the permission of the landowners.

The cultural resources on this and other properties in the San Juan Archipelago have high value to the Native American peoples who have inhabited the area for many hundreds of years before European settlement. A cultural resources management plan (Richards, 2007) has been constructed for this property and must be consulted prior to any ground-disturbing activities. To review this plan, contact the Director of the Friday Harbor Laboratories, University of Washington, or his Administrative Assistant.

- PHYSICAL PLANT AND GROUNDS GUIDELINES FOR REPAIR AND CONSTRUCTION OF NEW BUILDINGS OR ROADS

The buildings on the Cedar Rock Preserve have been inventoried earlier in this document. Even without any plans to expand the facilities, a source of capital funds needs to be identified in order to keep the present structures safe, sound, and adequate to encourage research and educational uses of the property. It may be desirable to establish a Friends of the Cedar Rock Preserve group, including some Shaw Island residents, as an aid for fund raising, and for work parties to assist the caretaker in projects such as control of invasive plants and beach clean-ups. Such a "Friends" group would operate under the supervision of the UW San Juan Islands Biological Preserves Committee.

Projects undertaken during the wet months will cause soil compaction and should be avoided or minimized. Any construction projects in the future should preserve all possible topsoil and minimize damage to nearby tree roots and bark. Topsoil should be sequestered on the property (to avoid importation of topsoil from elsewhere with an unwanted seed bank) at the beginning of the project for use in restoring grounds at the end of the project; soil should not be mounded up on the bases and trunks of adjacent trees during construction projects, as this can lead to unnecessary soil compaction around trees not otherwise damaged. Non-native invasive plants that come in with construction should be controlled immediately so as not to become a source of exotic species to the rest of the property. Revegetation should be accomplished with native plants preferably from a Shaw Island source. Use of commercial "wildflower" seed mixes is prohibited during restoration projects, as these are likely to include non-native and invasive species. Any new culverts installed should be black, to minimize their visual impact.

## MANAGEMENT OF NON-NATIVE AND INVASIVE PLANTS

In a perfect world with infinite funding, it might be desirable to control all invasive and non-native species on the Cedar Rock Preserve. A plan written by Dr. Sarah Reichard's UW class in 2002 for management of invasive plants on the 470-acre Friday Harbor Laboratories Terrestrial Preserve property, prioritizes between highly-invasive species and those that are non-native, but not particularly disruptive. This 85-page document with specific recommendations is available with details of how this can be effected, given more manpower than is presently available at the 370-acre Cedar Rock Preserve (or at the Friday Harbor Labs Preserve).

Mills *et al.* have identified approximately 40 non-native plants (see Appendix B) in the Cedar Rock Preserve, exclusive of fruit trees in the orchards and without identifying more than a few of the European grasses that dominate the fields. Of the non-native plants found on the Preserve, only a relatively small number constitute an invasive threat that is either unusual to the Preserve (as opposed to present and naturalized throughout San Juan County), or which appear to be in some way controllable with a reasonable amount of effort. Invasive plants of high priority for removal at the Cedar Rock Preserve include the Atlas cedars (*Cedrus atlantica*) planted by Bob Ellis in the 1960s or 1970s south and SE of the caretaker's house and presently successfully reproducing many young trees in the same area. Scotch broom (*Cytisus scoparius*) is said by Paynter (2001) to have arrived on Shaw Island only sometime after 1976. It has been continually and fairly conscientiously removed from the shoreline near "Cedar Rock" over the past two or three decades and continues to require periodic (annual) eradication efforts. The small amount of Himalayan blackberry (*Rubus discolor*) and evergreen blackberry (*Rubus laciniatus*) could be removed without too much difficulty throughout the property before they become more widespread and a small amount of English holly (*Ilex aquifolium*) has recently appeared in the forests and should be removed on a continual basis. Reed canary grass predominates in the wet fields in the NW corner and is encroaching along Squaw Bay Road, although the likelihood of permanently eradicating this increasingly pervasive wetland plant seems daunting; adjacent wetlands not under University ownership or control are also now dominated by reed canary grass and will serve as a continual seed source for recolonization on the Preserve. Small patches of reed canary grass in some of the old fields might be controllable by mowing or application of herbicide or black plastic. A large number of Canada thistles (*Cirsium arvense*) in the fields are not being controlled at present and could use some attention.



Figure 27. Canada thistle (foreground) nootka rose (mid range) in Stand Number 16, which has received little mowing in the past five years. Photograph by Claudia Mills, August 2006.

Some invasive recent-arrivals to the San Juan Islands which have not yet established at the Cedar Rock Preserve, but which should be removed as soon as they appear, include foxglove (*Digitalis purpurea*), spurge laurel (*Daphne laureola*), English ivy (*Hedera helix*), St. John's wort (*Hypericum perforatum*), common teasel (*Dipsacus sylvestris*) and purple loosestrife (*Lythrum salicaria*). Tansy ragwort (*Senecio jacobaea*), is present in very low numbers on the preserve and has usually immediately been removed by the caretaker or visitors; this species became well-established in the 1990s in places throughout the San Juans, tracked in during clean-ups with heavy equipment following big wind storms two years in a row. Tansy ragwort is a problem elsewhere on Shaw including the "Fowler" section of the Fred and Marilyn Ellis Biological Preserve, where a road was built prior to UW ownership using heavy construction equipment which probably carried tansy ragwort seeds on the tires. Foxglove has invaded forests throughout Blakely Island to the extent that Dr. Tim Nelson, botanist and Director of the Seattle Pacific Field Station on Blakely, believes that it is beyond human control at this point on Blakely Island. Spurge laurel has invaded large areas of forested lands in southern British Columbia, where it is seen to be as troublesome as Scotch broom (Dr. Eric Higgs, School of Environmental Studies, University of Victoria, personal communication) and has appeared on the Friday Harbor Laboratories Preserve as isolated specimens in the early 2000s. English ivy is a problem in several locations in the San Juans and throughout western Washington. St. John's wort occurs along many roadsides on San Juan Island, but in numbers small enough that eradication may still be possible with a concerted effort; teasel is also locally abundant on San Juan Island, and spreading. Purple loosestrife has been found in small numbers in the San Juans and should be removed from wetlands immediately if it appears, as it can outcompete and replace all native wetland vegetation.

A number of non-native species that have fairly thoroughly naturalized throughout the San Juans and generally in western Washington are also found on the Cedar Rock Preserve; it is questionable whether efforts to eradicate these species would be worth the very considerable effort and constant vigilance needed thereafter. Such species include cat's ear (*Hypochaeris* spp. ) and dandelion (*Taraxacum officinale*), yellow-and-blue forget-me-not (*Myosotis discolor*), plantains (*Plantago major* and *Plantago lanceolata*), dock (*Rumex* spp.), and a variety of planted European grasses in the open fields, which are now encroaching on the coastal prairie.

Non-native species that might be considered to have cultural significance on the property include daffodils, narcissus, and a few tulips marking the homestead site at "Cedar Rock" and in or near the northwest and northeast orchards, a row of planted poplars near the Atlas cedars by the caretaker's residence, but which seem to have no invasive potential, water lilies in the pond, and even the otherwise invasive yellow flag iris (*Iris pseudacorus*) in the pond, which are unlikely to spread anywhere else on the Preserve. The orchard trees planted over the past century by residents are of course non-native, but offer no invasive threat, and are of considerable cultural significance, revealing some of the old homestead sites otherwise no longer marked with original buildings.



## MANAGEMENT TARGETS FOR 2004-2006

The University of Washington San Juan Islands Preserves Committee was established in May 2004 and in a series of three meetings in 2004 and 2005 (7/11/04, 3/26/05, 10/22/05) prescribed an initial list of management objectives to be accomplished by the Cedar Rock Preserve caretaker in 2004 to 2006. These included:

1. The network of access paths within the property should be mowed regularly during the growing season, both for visitor use and fire access.
2. Maintenance and restoration efforts in the shoreline native prairie areas consisting of rocky knolls should include removal of encroaching shrubs, both native and non-native, including nootka rose, snowberry, young Douglas fir, scotch broom, and any blackberry except the native dewberry. Of secondary concern is removal of smaller invasive plants in the shoreline prairies including cat's ear, thistles, velvet grass and orchard grass, as time allows.
3. A program of annual summer mowing of the large open fields should be reestablished, in part to slow the invasion of the fragile, adjacent coastal prairie regions by non-native grasses that predominate in the old agricultural fields. It is hoped that annual mowing of these fields will also help to protect the remaining native plants within these fields by keeping them from being overgrown. In the best possible situation, mowing of the fields would be timed so as not to interfere with ground-nesting birds and flowering and seed production by the native plants, which would preclude mowing between March and late July. However, cutting for hay is best done in June or early July and mowing prior to June most years will allow enough regrowth to require a second and later cut, so some time compromises may be necessary.



Figure 28. Scotch broom growing near Cedar Rock in Stand Number 2. Photograph by Claudia Mills, August 2006.

Many of the fields are suitable for haying, and in the past, the arrangement has been to give the hay to whoever mows the fields, in exchange for their labor. If no one on Shaw Island is interested in mowing these fields for the hay, that option should be more widely advertised to be sure that the mowing is carried out annually. The University's tractor and rotary mower is able to mow most areas, should no one want the hay, but because of the many hours of labor involved, outsourcing the mowing in exchange for hay is preferable. If cut with the Preserve's rotary mower, the finely-chopped grass is no longer suitable for hay.

4. Isolated patches of reed canary grass have become established in the old airfield in the past decade. These and any other small patches of reed canary grass should be controlled by mowing, use of weighted black plastic, or use of herbicide; care should be taken not to transfer reed canary grass seed to other sites. Reed canary grass in the orchard(s) should be mowed in mid to late summer to control seed spread.
5. The edges of some of the fields are becoming heavily encroached with short, very crowded, deer-browsed, Douglas firs. These should be removed using a heavy duty mower. Since the University does not own a tractor heavy enough for this process, the initial job should be contracted out, probably to Jack Rawls of Shaw Island, who currently has on loan the old brush hog mower that Jack Temple recently purchased and gave to the University in 2004. These areas can most likely subsequently be kept open using the University's lighter equipment.

Some Douglas firs near the edges of fields have escaped deer predation because they are growing in the midst of dense stands of nootka rose. These well-formed and widely spaced Douglas firs, already beyond the size that can be taken out by a brush hog, should be left for now until a decision is made about the future of these areas. It may be best to leave "islands" of these native roses surrounding the well-formed regenerating firs, while for the most part mowing the increasingly large stands of native roses in the old fields.

6. The half-ring of Atlas cedars near the house should be removed because the trees are non-native and are reproducing and spreading out into the adjacent field. All of the small self-seeded Atlas cedars should be removed immediately and the large trees can be felled gradually over several years, being cut up and used for firewood by the caretaker or elsewhere at the University. All of the yucca plants on the property (near the house) should also be removed.
7. The stand of (invasive and non-native) bamboo near the pond should be eradicated. The pond is being encroached by numerous small firs growing around the open eastern margin, which should be cut down.
8. Forest management could include control of excess fuel on the forest floor by stacking and burning of branches less than 6 inches in diameter in piles in the wet months. As such burn sites become focal points for invasive plants, they should subsequently be monitored and non-native invasive plants removed.



Figure 29. Oblique aerial photo showing caretakers house and partial ring of Atlas cedars. Photograph by Ken Sebens, July 2006.

9. Overgrazing of vegetation by deer is seen as an enormous problem at the Cedar Rock Preserve, as elsewhere in the San Juans. A hunt at the Preserve, possibly including other properties on south Shaw Island, should be arranged, if possible, with the assistance of Washington Department of Fish and Wildlife; preferably allowing the take of does as well as bucks. The efficacy of the first hunt and any resulting community concerns should be evaluated in determining the frequency of future hunts on the University properties in the San Juan Islands.

10. Barbwire along fence lines is no longer serving any explicit purpose and could be removed, thus removing a hazard to visitors and an unsightly detail.

11. Gates should be repaired and locks should be obtained for any gates that are normally closed and can be locked, so as to prevent vandalism by motor vehicles as has occurred in the recent past, and unauthorized camping. Keys to these locks should be given to both the resident caretaker and to Fred Ellis, Jr., maintenance supervisor at FHL and resident of Shaw Island.



Figure 30. Typical deer-browsed young fir, less than one m tall, near Cedar Rock. Photograph by Claudia Mills, August 2006.

12. If volunteers are available, they should initially be directed, depending on their interests, toward maintenance and restoration of coastal prairie in specific areas, where native plants are still abundant, or toward beach clean-up. The rocky knolls near the shore are among those with the highest priority and the present scotch broom population should be removed first. Other tasks include removal of small trees (such as firs), shrubs (nootka rose, snowberry, scotch broom, blackberry, holly), and smaller invaders such as orchard grass, velvet grass, and cat's ears. Regeneration from stumps of shrubs can be reduced by painting the cut stump with an herbicide such as Roundup, or by cutting in the dry season.

13. Signs and/or brochures explaining what a biological preserve is and what behaviors are appropriate at the Cedar Rock Preserve should be designed and posted at the two entrances used by visitors. Permission for groups larger than six will be required. Dogs will not be allowed, as their presence is incompatible with the goals of a biological preserve: dog owners can be redirected to quiet unpaved county roads in the vicinity or to the nearby county park as more suitable dog exercise areas. Informal signs will probably remain in place longer than forbidding formal signs.

### MANAGEMENT TARGETS FOR 2007-2009

1. Unfinished items in the 2004-2006 target list should be dealt with. This particularly includes some effort (written or verbal) to educate visitors on the differences between a biological preserve and a park. Some signage or brochures should be available near the day-use entrance on Hoffman Cove Road.
2. The plumbing in the beach house should be brought up to county standards so that the beach house can be used as overnight visitor housing.
3. Some sort of bathroom facility needs to be provided for researchers or classes in residence for short periods of time on the Preserve. Possibly there is enough soil to meet county regulations in places for a new outhouse, or alternatively, either a composting toilet or vault privy could be installed somewhere. Options otherwise available to overnight visitors include the “garage-bedroom” with toilet by the caretaker’s house, and the beach house (but see #2, above).
4. Because middens sometimes contain human remains and in some cases may have been the sites of intentional prehistoric burials (Lena Tso, Tribal Historic Preservation Office of the Lummi Nation, personal communication), it is recommended that nearshore paths that cross middens be redirected back some distance from the shoreline to reduce trampling and erosion in these sites.
5. A Friends of Cedar Rock group should be formed, with roots in the Shaw Island community, for purposes of fundraising for capital improvements and for work parties (invasive plant pulls, beach clean-ups, etc.).
6. Maintenance of the coastal prairie areas as well as inland knolls dominated by native plants is viewed as a high priority. Would individual “friends” of Cedar Rock want to take on individual small, high priority areas to maintain?
7. Investigate whether there would be any advantages in placing a conservation easement or other means of protection over the two Adlum parcels (those purchased in 1986, totaling just over two acres) to afford them the same level of protection as the rest of the Cedar Rock Preserve.

## VISION FOR THE FUTURE OF CEDAR ROCK PRESERVE

- IN 5 YEARS

The Preserve will look very much as it does today. Annual or biennial cutting of grass and harvest of hay will have been reinstated for most of the fields in early summer. The large central (ex-landing strip) field will be mown, with most of the nootka roses removed approximately annually. The edges of the fields will have been cleared of the present hedge of young, heavily deer-browsed trees. Most of the Atlas cedars near the main house will have been removed and the large ones used as firewood by the caretaker.

One or two autumn deer hunts on southwest Shaw Island will have taken place under the auspices of the Washington Department of Fish and Wildlife or by one or more of the Indian tribes with an interest in the San Juan Islands and the deer population is lower, though nowhere close to zero. Deer browsing continues to reduce the numbers of native plants, especially on the narrow strips of coastal prairie.

There is little significant change in the physical plant of the Preserve. A single caretaker or caretaker family is living in the recently-refurbished main house and looks in occasionally on the other UW preserve properties on Shaw Island.

- IN 10 YEARS

The fields will have remained largely open, but the individual and isolated Douglas firs that took hold within rose thickets around the turn of the millennium will be getting quite tall. The numbers of thistles and other invasive plants in the open areas have been reduced. Unfortunately, the numbers of native wildflowers in the coastal prairies continue to dwindle from too much deer browsing and human traffic. A few large firs have been taken down in places near the shoreline to preserve certain view corridors.

The forests will not have changed much. Some wet-season pile burning will have reduced the fuel load in places and some removal or limb pruning of young crowded trees will have taken place to open up areas that are reforesting naturally.

With any luck, the pier and dock have been rebuilt. Most students and researchers who use the Preserve stay in housing at FHL on San Juan Island and visit the Preserve by boat, but there is a small amount of on-site housing available for visitors. The well and water storage facility for the caretaker's house is in good repair, and both the main house and the beach house have been refurbished in the last decade.

The Preserve visitor load will have gradually increased, but is still not negatively impacting the property and should still be within the control of a single full-time resident caretaker. Shaw Island remains off the beaten track and is not receiving an inordinate amount of tourist traffic, although the Puget Sound/Georgia Basin area in general is experiencing rapid, nearly unrestrained growth. The San Juans are an ever-increasingly

popular getaway, but Shaw Island has no hotels or motels because of its Subarea Plan, and a few of its residents have put conservation easements on much of the land, so Shaw is spared much of the development boom that is gradually changing forever the rural quality of other portions of the San Juan Islands.

- IN 100 YEARS (THE UPBEAT VERSION)

One hopes that the University of Washington has been wise enough to retain ownership of this property for another century, or if not, that the Cedar Rock Preserve has remained, as intended by Robert Ellis, in the hands of a land preservation organization.

It is very likely that global climate change will have had some effect on the Preserve in one hundred years. A sea level rise of one or two meters will change the shoreline, but probably not substantially reduce the overall property size, since much of it has high, bedrock bank; the gravel beaches will have changed and cut back into some of the open fields. An overall change in precipitation or shift into the now-predicted wetter winters and drier summers for this area are likely in turn to shift the species composition of plants on the Preserve, the nearshore coastal prairies being probably the most vulnerable.

Major winds cycle through many properties in NW Washington every 100-300 years or so. Either some of the forests of the Preserve have been hit quite hard during the last century and are beginning to recover in the early stages of succession, or stands of unharmed trees have been tended and the forests thinner, with fewer but larger trees.

The large unspoiled open vistas continue to be the signature draw of the property for most visitors; intentional tree removals over the past century have been targeted to the preservation of these view corridors on the Preserve, which are considered to be one of its most valuable assets. The Preserve is one of a series of much-loved and respected upland and marine biological preserves in the San Juan Islands, which have otherwise become largely suburbanized. Shaw Island remains the least-developed of the ferry-served islands, with the highest percentage of protected land.

Caretaker/stewards are paid fulltime to supervise the Preserve and its visitors. The Cedar Rock Preserve is well known as a research and education facility and its unspoiled island habitat attracts students and researchers to stay in the rustic dormitory and work in the modest study center. The facility is a refreshing model of simple, light-on-the-land living for visitors.

Enormous old rockfish and ling cod inhabit the kelp beds and rocks just beyond the rocky south-central shores of the Preserve, where they are joined by both river- and sea otters who inhabit the same shoreline. Black oystercatchers continue to patrol the low intertidal for food, while healthy runs of salmon pass through shallow waters on their way back to the Fraser River. Humpback whales and orcas live in these waters. Occasionally a visitor is lucky enough to see one of the eagles that still nest on the Cedar Rock Preserve catch a salmon in nearby surface waters that is too big to lift, and swim it back to the shore by paddling with its wings.

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APPENDIX A. ANIMAL LIST FOR THE CEDAR ROCK PRESERVE, INCLUDING TERRESTRIAL UPLANDS AND ADJOINING MARINE WATERS.

The bird list below derives largely from Burroughs (1978), whose list came from inventory forms for the Experimental Ecological Reserve – Squaw Bay and Upright Point. Species lacking an “identifier” are likely to be found in or adjacent to the Cedar Rock Preserve, but are not known to have been identified there. Actual citations are followed by the initials of the person who has observed the bird – it is intended that this list will be refined over time with all birds on the list verified. The marine mammal list was put together with the assistance of Jonathan Stern, PhD, and Kari Koski, who have spent an enormous amount of time out on the marine waters of San Juan County studying marine mammals. The terrestrial mammals, reptiles and amphibian list were put together by Claudia Mills, Genavie Thomas, and Nigel and Robin Thomas specifically for this report. No attempt has yet been made to inventory marine animals (invertebrates) on the shoreline. Persons verifying the presence of various animals are SB = listed on Experimental Ecological Reserve Inventory forms (Burroughs, 1979), BG = Betty Gilson, TH = Tom Hahn, CEM = Claudia Mills, DM = Douglas Moody, GO = Gordon Orians, GT = Genavie Thomas, NT & RT = Nigel and Robin Thomas (child-naturalists who have been frequent Preserve visitors for years), ML & FS = Mark Lewis and Fred Sharpe (1987).

SCIENTIFIC NAME	COMMON NAME	IDENTIFIED BY
<b>BIRDS</b>		
<b>Family Gaviidae (Loons)</b>		
<b>Family Podicipedidae (Grebes)</b>		
<i>Podiceps auritus</i>	Horned grebe	SB
<i>Podiceps grisegena</i>	Red-necked grebe	SB
<b>Family Phalacrocoracidae (Cormorants)</b>		
<i>Phalacrocorax auritus</i>	Double-crested cormorant	SB
<i>Phalacrocorax pelagicus</i>	Pelagic cormorant	SB
<b>Family Ardeidae (Hérons and Bitterns)</b>		
<i>Ardea herodias</i>	Great blue heron	SB, NT & RT
<b>Family Anatidae (Swans, Geese and Ducks)</b>		
<i>Anas platyrhynchos</i>	Mallard	BG
<i>Branta canadensis</i>	Canada goose	NT & RT
<i>Bucephala albeola</i>	Bufflehead	SB
<i>Bucephala clangula</i>	Common goldeneye	SB
<i>Histrionicus histrionicus</i>	Harlequin duck	SB
<i>Lophodytes cucullatus</i>	Hooded merganser	SB
<i>Mergus merganser</i>	Common merganser	SB
<i>Mergus serrator</i>	Red-breasted merganser	SB
<b>Family Cathartidae (Vultures)</b>		
<i>Cathartes aura</i>	Turkey vulture	GO, NT&RT

**Family Accipitridae** (Kites, Hawks and Eagles)

<i>Accipiter cooperii</i>	Cooper's hawk	SB
<i>Accipiter striatus</i>	Sharp-shinned hawk	SB
<i>Aquila chrysaetos</i>	Golden eagle	NT & RT
<i>Buteo jamaicensis</i>	Red-tailed hawk	SB, NT&RT
<i>Haliaeetus leucocephalus</i>	Bald eagle	SB, NT&RT

**Family Pandionidae** (Ospreys)

<i>Pandion haliaetus</i>	Osprey	SB, NT&RT
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**Family Falconidae** (Caracaras and Falcons)**Family Phasianidae** (Quails, Partridges and Pheasants)

<i>Callipepla californica</i>	California quail	SB
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**Family Rallidae** (Rails Gallinules and Coots)

<i>Fulica americana</i>	American coot	
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**Family Charadriidae** (Plovers)

<i>Charadrius vociferus</i>	Killdeer	SB
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**Family Haematopodidae** (Oystercatchers)

<i>Haematopus bachmani</i>	Black oystercatcher	CEM
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**Family Scolopacidae** (Sandpipers, Woodcocks and Snipes)

<i>Calidris melanotos</i>	Pectoral sandpiper	ML & FS
<i>Gallinago gallinago</i>	Common snipe	BG

**Family Phalaropodidae** (Phalaropes)

<i>Phalaropus lobatus</i>	Red-necked phalarope	SB
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**Family Laridae** (Gulls, Terns, Jaegers, Skuas and Skimmers)

<i>Larus canus</i>	Mew gull	SB
<i>Larus glaucescens</i>	Glaucous-winged gull	SB
<i>Larus heermanni</i>	Heermann's gull	
<i>Larus philadelphia</i>	Bonaparte's gull	SB
<i>Sterna hirundo</i>	Common tern	SB

**Family Alcidae** (Alcids)

<i>Brachyramphus marmoratus</i>	Marbled murrelet	SB
<i>Cephus columba</i>	Pigeon guillemot	SB
<i>Cerorhinca monocerata</i>	Rhinoceros auklet	SB
<i>Fratercula cirrhata</i>	Tufted puffin	
<i>Uria aalge</i>	Common murre	SB

**Family Columbidae** (Pigeons and Doves)**Family Tytonidae** (Barn Owls)**Family Strigidae** (All other Owls)

<i>Bubo virginianus</i>	Great horned owl	SB
<i>Otus kennicottii</i>	Western screech owl	

**Family Trochilidae** (Hummingbirds)

<i>Selasphorus rufus</i>	Rufous hummingbird	
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**Family Alcedinidae** (Kingfishers)

*Ceryle alcyon* Belted kingfisher SB

**Family Picidae** (Woodpeckers)

*Colaptes auratus* Northern flicker SB, NT&RT

*Dryocopus pileatus* Pileated woodpecker SB, NT&RT

*Picoides pubescens* Downy woodpecker NT&RT

*Picoides villosus* Hairy woodpecker SB

**Family Tyrannidae** (Tyrant Flycatchers)

Flycatchers unidentified SB

**Family Vireonidae** (Vireos)

Virios unidentified SB

**Family Corvidae** (Jays, Crows, and their allies)

*Corvus caurinus* Northwestern crow

*Corvus corax* Common raven SB, NT & RT

**Family Hirundinidae** (Swallows)

*Hirundo rustica* Barn swallow NT & RT

*Tachycineta bicolor* Tree swallow

*Tachycineta thalassina* Violet-green swallow

**Family Paridae** (Chickadees and titmice)

*Poecile rufescens* Chestnut-backed chickadee SB

**Family Sittidae** (Nuthatches)

*Sitta canadensis* Red-breasted nuthatch SB, GO

**Family Certhiidae** (Creepers)

*Certhia americana* Brown creeper SB

**Family Troglodytidae** (Wrens)

*Troglodytes bewickii* Bewick's wren GO

*Troglodytes troglodytes* Winter wren SB

**Family Regulidae** (Kinglets)

*Regulus satrapa* Golden-crowned kinglet SB

**Family Sylviidae** (Old World Warblers and Gnatcatchers)**Family Turdidae** (Thrushes, Solitaires and Bluebirds)

*Catharus ustulatus* Swainson's thrush SB

*Ixoreus naevius* Varied thrush SB

*Turdus migratorius* American robin SB, NT & RT

**Family Sturnidae** (Starlings and Mynas)

*Sturnus vulgaris* European starling SB

**Family Bombycillidae** (Waxwings)

*Bombycilla cedrorum* Cedar waxwing

**Family Parulidae** (Wood-warblers)

Warblers unidentified SB

**Family Thraupidae** (Tanagers)

*Piranga ludoviciana* Western tanager

**Family Cardinalidae** (Cardinals, Grosbeaks and Buntings)

*Pheucticus melanocephalus* Black-headed grosbeak

**Family Emberizidae** (Emberizine Sparrows and their allies)

*Junco hyemalis* Dark-eyed (Oregon) junco SB  
*Melospiza melodia* Song sparrow GO  
*Passerculus sandwichensis* Savannah sparrow  
*Pipilo maculatus* Spotted towhee SB  
*Zonotrichia leucophrys* White-crowned sparrow SB, TH, GO

**Family Icteridae** (Meadowlarks, Cowbirds, Blackbirds, Grackles and Orioles)

*Agelaius phoeniceus* Red-winged blackbird SB, BG  
*Molothrus ater* Brown-headed cowbird SB

**Family Fringillidae** (Finches)

*Carduelis pinus* Pine siskin  
*Carduelis tristis* American goldfinch SB, NT & RT  
*Carpodacus mexicanus* House finch SB  
*Loxia curvirostra* Red crossbill TH  
*Pinicola enucleator* Pine grosbeak

**Family Passeridae** (Old World Sparrows)

*Passer domesticus* House sparrow SB

**MAMMALS - MARINE**

California sea lion	<i>Zalophus californianus</i>	DM
Dall's porpoise	<i>Phocoenoides dalli</i>	
Gray whale	<i>Eschrichtius robustus</i>	
Harbor porpoise	<i>Phocoena phocoena</i>	
Harbor seal	<i>Phoca vitulina</i>	SB
Humpback whale	<i>Megaptera novaeangliae</i>	
Killer whale	<i>Orcinus orca</i>	DM
Minke whale	<i>Balaenoptera acutorostrata</i>	
Northern elephant seal	<i>Mirounga angustirostris</i>	
River Otter	<i>Lutra canadensis</i>	CEM
Steller sea lion	<i>Eumetopias jubatus</i>	

**MAMMALS – TERRESTRIAL**

Bats	unidentified genus and species	
Black-tailed deer	<i>Odocoileus hemionus columbianus</i>	GT
Common house cat	<i>Felis domesticus</i>	GT
Deer mouse	<i>Peromyscus maniculatus hollisteri</i>	
Domestic dog	<i>Canis lupus familiaris</i>	GT
Fox	<i>Vulpes</i>	GT
Meadow mouse (vole)	<i>Microtus townsendii pugeti</i>	
Mink	<i>Mustela vison energumenos</i>	GT
Muskrat	<i>Ondatra zibethicus</i>	
Raccoon	<i>Procyon lotor pacificus</i>	GT
Rat	<i>Rattus sp.</i>	DM
River Otter	<i>Lutra canadensis pacifica</i>	CEM
Wandering shrew	<i>Sorex vagrans vagrans</i>	GT

**AMPHIBIANS**

Pacific tree frog	<i>Hyla regilla</i>	GT, NT & RT
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**REPTILES**

Northwestern fence lizard	<i>Sceloporus occidentalis occidentalis</i>	CEM
Northwestern garter snake	<i>Thamnophis ordinoides</i>	CEM
Striped garter snake	<i>Thamnophis sirtalis</i>	

## APPENDIX B. PLANT LIST FOR THE CEDAR ROCK PRESERVE UPLANDS.

The list below includes plants identified on the Cedar Rock Preserve 2000-2006, including the source of each identification. AR = Annaliese Ritchie [UW undergraduate student spring 2002]; CEM = Claudia Mills; PD = Peter Dunwiddie; EH = Eliza Habegger; EL = Estella Leopold; GT = Genavie Thomas; KP = Kristen Paynter; RR = Rusty Rodriguez; VW-E = Victoria Wyllie-Echeverria; x = found without associated name in one of the reports on Cedar Rock Preserve. Katherine Glew of the UW Herbarium generated a list of approximately 20 lichens found on the property in the 1990s, which is not included here, per her request. An asterisk \* preceding the scientific name indicates that the species is considered to be non-native (see also Appendix C). A more detailed form of this list in the possession of the author gives approximate locations of each species by Stand.

SCIENTIFIC NAME	COMMON NAME	IDENTIFIED BY
<b>KINGDOM PLANTA</b>		
<b>DIVISION ANTHOPHYTA</b>		
<b>Aceraceae</b> (Maple Family)		
<i>Acer macrophyllum</i>	Bigleaf maple	CEM & VW-E
<b>Amaryllidaceae</b> (Daffodil Family)		
* <i>Narcissus</i> sp.	Yellow daffodil	CEM & VW-E
* <i>Narcissus</i> sp.	Domestic white Narcissus	CEM & VW-E
<b>Apiaceae (=Umbelliferae)</b> (Parsley Family)		
<i>Lomatium nudicaule</i>	Naked desert parsley/Indian celery	CEM & VW-E
<i>Osmorhiza chilensis</i>	Mountain sweet cicely	CEM & VW-E
<i>Sanicula crassicaulis</i>	Pacific sanicle	CEM & VW-E
<b>Aquifoliaceae</b> (Holly Family)		
* <i>Ilex aquifolium</i>	English holly	CEM
<b>Asteraceae (=Compositae)</b> (Aster Family)		
<i>Achillea millefolium</i>	Yarrow	CEM & VW-E
<i>Adenocaulon bicolor</i>	Pathfinder/Trailplant	CEM & VW-E
* <i>Cirsium arvense</i>	Canada thistle	CEM & VW-E
* <i>Cirsium vulgare</i>	Bull thistle	CEM & VW-E
<i>Grindelia "integrifolia var. macrophylla"</i>	Gumweed	CEM & VW-E
* <i>Hypochaeris radicata</i>	Hairy cat's ear	CEM & VW-E
* <i>Lactuca muralis</i>	Wall lettuce	CEM & VW-E
* <i>Leucanthemum vulgare</i>	Ox-eye daisy	CEM & VW-E
* <i>Senecio jacobaea</i>	Tansy ragwort	GT
* <i>Senecio vulgaris</i>	Old-man-in-the-spring	CEM & VW-E
* <i>Sonchus oleraceus</i>	Common sow-thistle	CEM & VW-E
* <i>Taraxacum officinale</i>	Dandelion	CEM & VW-E
<b>Berberidaceae</b> (Barberry Family)		
<i>Berberis aquifolium</i>	Tall Oregon grape (glossy)	CEM & VW-E
<i>Berberis nervosa</i>	Long-leaved Oregon grape (dull)	CEM & VW-E

<b>Betulaceae</b> (Birch Family)		
<i>Alnus rubra</i>	Red alder	CEM & VW-E
<b>Boraginaceae</b> (Borage Family)		
* <i>Myosotis discolor</i>	Yellow-and-blue forget-me-not	CEM & VW-E
<b>Brassicaceae</b> (=Cruciferae) (Mustard Family)		
<i>Cardamine hirsuta</i>	Hairy bitter cress	CEM & VW-E
<b>Caprifoliaceae</b> (Honeysuckle Family)		
<i>Linnaea borealis</i> var. <i>longiflora</i>	Twinflower	x
<i>Lonicera ciliosa</i>	Orange honeysuckle	CEM & VW-E
<i>Lonicera hispidula</i>	Pink (hairy) honeysuckle	CEM & VW-E
<i>Symphoricarpos albus</i>	Snowberry	CEM & VW-E
<b>Caryophyllaceae</b> (Pink Family)		
<i>Cerastium arvense</i>	Field chickweed	CEM & VW-E
* <i>Cerastium glomeratum</i>	Sticky mouse-eared chickweed	CEM & VW-E
* <i>Dianthus armeria</i>	Deptford pink	PD
* <i>Stellaria media</i>	Chickweed	CEM & VW-E
<b>Convolvulaceae</b> (Morning-Glory Family)		
* <i>Convolvulus arvensis</i>	Field morning glory	CEM
<b>Crassulaceae</b> (Stonecrop Family)		
<i>Sedum lanceolatum</i>	Lance-leaved stonecrop	CEM & VW-E
<i>Sedum spathulifolium</i>	Broad-leaved stonecrop	CEM & VW-E
<b>Cucurbitaceae</b> (Cucumber Family)		
<i>Marah oreganus</i>	Oregon manroot	CEM & VW-E
<b>Cyperaceae</b> (Sedge Family)		
<i>Carex obnupta</i>	Slough sedge	CEM & VW-E
<b>Eleagnaceae</b> (Oleaster Family)		
<i>Shepherdia canadensis</i>	Soapberry/Soopalallie	CEM & VW-E
<b>Ericaceae</b> (Heath Family)		
<i>Arbutus menziesii</i>	Madrona	CEM & VW-E
<i>Gaultheria shallon</i>	Salal	CEM & VW-E
<b>Euphorbiaceae</b> (Spurge Family)		
* <i>Euphorbia cyparissias</i>	Cypress spurge	EH
<b>Fabaceae</b> (=Leguminosae) (Pea Family)		
* <i>Cytisus scoparius</i>	Scotch broom	CEM & VW-E
<i>Lathyrus japonicus</i> (=L. <i>maritimus</i> )	Japanese beach pea	x
<i>Lotus micranthus</i>	Small flowered lotus	CEM & VW-E
* <i>Lotus corniculatus</i>	Birdsfoot treefoil	CEM
<i>Lupinus bicolor</i>	Bicolored lupine	CEM & VW-E
* <i>Trifolium dubium</i>	Least hop clover	CEM & VW-E
* <i>Trifolium repens</i>	White clover	CEM & VW-E
<i>Trifolium subterraneum</i>	Subterranean clover	CEM & VW-E
<i>Trifolium willdenovii</i> (=T. <i>tridentatum</i> )	Tomcat clover	CEM & VW-E
* <i>Vicia hirsuta</i>	Tiny/Hairy vetch	CEM & VW-E
* <i>Vicia sativa</i> var. <i>angustifolia</i>	Common vetch	CEM & VW-E



unidentified pea/vetch	pea or vetch	CEM & VW-E
<b>Geraniaceae</b> (Geranium Family)		
* <i>Erodium cicutarium</i>	Filaree	CEM & EH
* <i>Geranium dissectum</i>	Cut-leaved geranium	CEM & VW-E
* <i>Geranium molle</i>	Dovefoot geranium	CEM & VW-E
<b>Grossulariaceae</b> (Gooseberry Family)		
<i>Ribes divaricatum</i>	Straggly gooseberry	CEM & VW-E
<i>Ribes lacustre</i>	Swamp gooseberry	CEM & VW-E
<i>Ribes</i> sp.	Unidentified gooseberry	CEM & VW-E
<i>Ribes sanguineum</i>	Red-flowering currant	CEM & VW-E
<b>Iridaceae</b> (Iris Family)		
* <i>Iris pseudacorus</i>	Yellow flag iris	CEM & VW-E
<b>Juglandaceae</b> (Walnut Family)		
* <i>Juglans</i> sp. 1	Walnut	CEM
* <i>Juglans</i> sp. 2	Walnut	CEM
<b>Juncaceae</b> (Rush Family)		
<i>Juncus effusus</i>	Common rush	CEM & VW-E
<i>Luzula campestris</i>	Field woodrush	CEM & VW-E
<b>Lamiaceae (=Labiatae)</b> (Mint Family)		
<i>Prunella vulgaris</i>	Self-heal	CEM & VW-E
<i>Satureja douglasii</i>	Yerba buena	CEM & VW-E
<b>Liliaceae</b> (Lily Family)		
<i>Allium acuminatum</i>	Hooker's onion	x
<i>Camassia quamash</i>	Purple camas	CEM & VW-E
<i>Erythronium oregonum</i>	White fawn lily	CEM & VW-E
<i>Fritillaria lanceolata</i>	Chocolate lily	CEM & VW-E
* <i>Muscari</i> sp.	Grape hyacinth	CEM & VW-E
* <i>Scilla</i> sp.	Domestic bluebell	CEM & VW-E
* <i>Tulipa</i> spp.	Tulip	CEM
<i>Zygadenus venenosus</i>	Death camas	CEM & VW-E
<b>Loranthaceae</b> (Mistletoe Family)		
<i>Arceuthobium tsugense</i>	Dwarf mistletoe	AR
<b>Nymphaeaceae</b> (Water-lily Family)		
*? <i>Nuphar lutea</i> spp. <i>polysepalum</i>	Yellow water lily/Indian pond-lily	CEM & VW-E
*? <i>Nymphaea odorata</i>	American water lily?	CEM & VW-E
<b>Orchidaceae</b> (Orchid Family)		
<i>Calypso bulbosa</i>	Calypso/Fairy slipper	CEM & VW-E
<i>Corallorhiza maculata</i>	Spotted coral-root	CEM & VW-E
<i>Goodyera oblongifolia</i>	Rattlesnake plantain	CEM & VW-E
<i>Listera cordata</i>	Heart-leaved twayblade	CEM & VW-E
<i>Spiranthes romanzoffiana</i>	Ladies' tresses	x
<b>Orobanchaceae</b> (Broomrape Family)		
<i>Orobanche californica</i>	California broomrape	EL; CEM

**Plantaginaceae** (Plantain Family)

* <i>Plantago lanceolata</i>	Buckhorn plantain	CEM & VW-E
* <i>Plantago major</i>	Common plantain	CEM & VW-E

**Plumbaginaceae** (Plumbago Family)

<i>Armeria maritima</i>	Sea thrift	x
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**Poaceae (=Gramineae)** (Grass Family)

<i>Bromus sitchensis</i>	Alaska brome	PD
* <i>Dactylis glomerata</i>	Orchard grass	CEM & EH
<i>Elymus glauca</i>	Blue wild rye	PD
<i>Festuca idahoensis</i>	Idaho fescue	EL & KP
<i>Festuca rubra</i>	Red fescue	EL & KP
* <i>Holcus lanatus</i>	Velvet grass	CEM & VW-E
<i>Leymus mollis</i> subsp. <i>mollis</i>	Dune grass	RR
* <i>Lolium arundinacea</i>	Tall fescue	CEM & EH
* <i>Lolium perenne</i>	Perennial ryegrass	PD
* <i>Phalaris arundinacea</i>	Reed canarygrass	CEM & VW-E
* <i>Phleum praetense</i>	Timothy grass	PD
unidentified blue-green shoreline/high intertidal	fescue	CEM & VW-E
*unidentified bamboo	unidentified bamboo	CEM & VW-E

**Polemoniaceae** (Phlox Family)

<i>Linanthus bicolor</i> var. <i>minimus</i>	Bicolored linanthus	CEM & VW-E
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**Polygonaceae** (Buckwheat Family)

* <i>Rumex acetosella</i>	Sheep sorrel	CEM & VW-E
* <i>Rumex crispus</i>	Curly-leaved dock	CEM & VW-E

**Portulacaceae** (Purslane Family)

<i>Claytonia parviflora</i>	Small-flowered montia	CEM & VW-E
<i>Claytonia perfoliata</i>	Miner's lettuce	CEM & VW-E
<i>Claytonia sibirica</i>	Siberian miner's lettuce	CEM & VW-E

**Primulaceae** (Primrose Family)

<i>Trientalis latifolia</i>	Starflower	CEM & VW-E
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**Ranunculaceae** (Buttercup Family)

<i>Ranunculus occidentalis</i>	Western buttercup	CEM & VW-E
<i>Ranunculus uncinatus</i>	Small-flowered buttercup	CEM & VW-E

**Rosaceae** (Rose Family)

<i>Amelanchier alnifolia</i>	Serviceberry	CEM & VW-E
* <i>Crataegus monogyna</i>	One-seed hawthorn	CEM & EH
<i>Fragaria vesca</i> var. <i>crinita</i>	Woodland strawberry	CEM & VW-E
<i>Geum macrophyllum</i>	Large-leaved avens	x
<i>Holodiscus discolor</i>	Ocean spray	CEM & VW-E
* <i>Malus X domestica</i>	Domestic apple	CEM
* <i>Malus X domestica</i>	Domestic crabapple	CEM
<i>Oemleria cerasiformis</i>	Indian plum / Osoberry	CEM (?)
<i>Potentilla anserina</i> ssp. <i>pacifica</i>	Pacific cinquefoil	CEM & VW-E
<i>Prunus emarginata</i> var. <i>mollis</i>	Bitter cherry	CEM & VW-E
* <i>Prunus</i> sp.	Domestic plum	CEM
<i>Pyrus fusca</i>	Pacific crabapple	CEM & VW-E
* <i>Pyrus</i> spp.	Domestic pear	CEM & VW-E
<i>Rosa gymnocarpa</i>	Bald-hip rose	CEM & VW-E

<i>Rosa nutkana</i> var. <i>nutkana</i>	Nootka rose	CEM & VW-E
* <i>Rubus discolor</i>	Himalayan blackberry	CEM & VW-E
* <i>Rubus laciniatus</i>	Evergreen blackberry	CEM & VW-E
<i>Rubus leucodermis</i>	Blackcap	CEM & VW-E
<i>Rubus parviflorus</i>	Thimbleberry	CEM & VW-E
<i>Rubus spectabilis</i>	Salmonberry	CEM & VW-E
<i>Rubus ursinus</i>	Trailing blackberry/Dewberry	CEM & VW-E
<i>Spiraea douglasii</i>	Hardhack	CEM
<b>Rubiaceae</b> (Madder Family)		
<i>Galium</i> spp.	Bedstraws	CEM & VW-E
<b>Salicaceae</b> (Willow Family)		
* <i>Populus nigra</i> ?	Lombardy poplar?	CEM
<i>Salix lasiandra</i>	Pacific willow	CEM & VW-E
<i>Salix scouleriana</i>	Scouler's willow	CEM & VW-E
<i>Salix sitchensis</i>	Sitka willow	CEM & VW-E
<b>Saxifragaceae</b> (Saxifrage Family)		
<i>Heuchera micrantha</i>	Small-flowered alumroot	CEM & VW-E
<i>Lithophragma parviflora</i>	Small flowered prairie star	CEM & VW-E
<b>Scrophulariaceae</b> (Figwort Family)		
<i>Collinsia parviflora</i>	Blue-eyed Mary	CEM & VW-E
<i>Triphysaria pusilla</i>	Dwarf owl-clover	CEM & VW-E
<b>Urticaceae</b> (Nettle Family)		
<i>Urtica dioica</i> ssp. <i>dioica</i>	Stinging nettle	CEM & VW-E
<i>Urtica dioica</i> ssp. <i>gracilis</i>	Stinging nettle	CEM & VW-E
<b>Valerianaceae</b> (Valerian Family)		
<i>Plectritis congesta</i>	Sea blush/Corn salad	CEM & VW-E
* <i>Valerianella locusta</i>	European corn salad	CEM & VW-E
<b>DIVISION PINOPHYTA</b>		
<b>Cupressaceae</b> (Cypress Family)		
<i>Juniperus maritima</i>	Seaside juniper	CEM & VW-E
<i>Thuja plicata</i>	Western red cedar	CEM & VW-E
<b>Pinaceae</b> (Pine Family)		
<i>Abies grandis</i>	Grand fir	CEM & VW-E
* <i>Cedrus atlantica</i>	Atlas Cedar	CEM
<i>Pinus contorta</i>	Shore pine, Lodgepole pine	CEM & VW-E
<i>Pseudotsuga menziesii</i>	Douglas-fir	CEM & VW-E
<i>Tsuga heterophylla</i>	Western hemlock	CEM & VW-E
<b>Taxaceae</b> (Yew Family)		
<i>Taxus brevifolia</i>	Pacific yew	CEM & VW-E

**DIVISION PTERIDOPHYTA****CLASS EQUISETOPSIDA (Horsetails)****Equisetaceae** (Horsetail Family)

<i>Equisetum arvense</i>	Common horsetail	CEM & VW-E
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**CLASS PTEROPSIDA (=FILICOPSIDA) (Ferns)****"Polypodiaceae** (includes **Adiantaceae, Asplenaceae, Blechnaceae, and Dennstaedtiaceae**) (Common Fern Family)"

<i>Athyrium filix-femina</i>	Lady fern	x
<i>Polypodium glycyrrhiza</i>	Licorice fern	CEM & VW-E
<i>Polystichum munitum</i>	Sword fern	CEM & VW-E
<i>Pteridium aquilinum</i>	Bracken fern	CEM & VW-E

APPENDIX C. NON-NATIVE TERRESTRIAL PLANT SPECIES ON THE CEDAR ROCK PRESERVE, with prescriptions for control priorities and ultimate goals for each species.

The species below are a subset of Appendix B (where their scientific names have been preceded with an asterisk), identified by Mills *et al.* (See Appendix B) and determined to be non-native by consulting Atkinson and Sharpe (1993) or Kozloff (2005); the grasses have not been very thoroughly inventoried. The abbreviations for goals in the righthand column are: CE = complete eradication; R = gradually reduce major infestations; P/L = prevent new infestations/limit expansion; CI = control if opportunities arise. Knockout and Roundup are trade names of chemicals that can effectively be used to kill some of these plants.

Species name	Common Name	Priority	Control	Goal
<i>Cytisus scoparius</i>	Scotch broom	1	pull	CE (eradication)
<i>Senecio jacobaea</i>	Tansy ragwort	1	pull	CE (eradication)
<i>Rubus discolor</i>	Himalayan blackberry	1	pull	CE (eradication)
<i>Rubus laciniatus</i>	Evergreen blackberry	1	pull	CE (eradication)
<i>Ilex aquifolium</i>	English holly	1	pull	CE (eradication)
unidentified bamboo	unidentified bamboo	1	pull	CE (eradication)
<i>Cedrus atlantica</i>	Atlas Cedar	1	cut down	CE (eradication)
<i>Crategus monogyna</i>	<sup>1</sup> One-seed hawthorne	1	cut down	CE (eradication)
<i>Euphorbia cyparissias</i>	<sup>2</sup> Cyprus spurge	2	pull	CE (eradication)
<i>Cirsium arvense</i>	Canadian thistle	2	pull/Knockout	R (gradually reduce)
<i>Cirsium vulgare</i>	Bull thistle	2	pull/Knockout	R (gradually reduce)
<i>Phalaris arundinacea</i>	Reed canary grass	2	mow/pull/Roundup	P/L
<i>Dactylis glomerata</i>	Orchard grass	3	pull	R, CI
<i>Holcus lanatus</i>	Velvet grass	3	pull	R, CI
<i>Lolium arundinacea</i>	Tall fescue	3	pull	R, CI
<i>Hypochaeris radicata</i>	Hairy cat's ear	3	pull	R, CI
<i>Taraxacum officinale</i>	Dandelion	3	pull	R, CI
<i>Senecio vulgaris</i>	Common groundsel	3	pull	R (gradually reduce)
<i>Sonchus oleraceus</i>	Common sow-thistle	3	pull	R (gradually reduce)
<i>Rumex crispus</i>	Curly-leaved dock	4	pull	R (gradually reduce)
<i>Rumex acetosella</i>	Sheep sorrel			
<i>Stellaria media</i>	Chickweed			
<i>Cerastium glomeratum</i>	Sticky mouse-eared chickweed			
<i>Leucanthemum vulgare</i>	Ox-eye daisy			
<i>Trifolium dubium</i>	Least hop clover			
<i>Trifolium repens</i>	White clover			
<i>Lotus corniculatus</i>	Birds-foot trefoil			
<i>Valerianella locusta</i>	<sup>3</sup> European corn salad			
<i>Vicia hirsuta</i>	Hairy vetch			
<i>Vicia sativa</i>	Common vetch			
unidentified vetch	<sup>4</sup> unidentified vetch			
<i>Myosotis discolor</i>	Yellow-and-blue forget-me-not			
<i>Cardamine hirsuta</i>	Hairy bitter cress			
<i>Plantago major</i>	Common plantain			
<i>Plantago lanceolata</i>	Buckhorn plantain			
<i>Lactuca muralis</i>	Wall lettuce			

## APPENDIX C. Continued.

Species name	Common Name	Priority	Control	Goal
<i>Erodium cicutarium</i>	Filaree			
<i>Geranium dissectum</i>	Cut-leaved geranium			
<i>Geranium molle</i>	Dovefoot geranium			
<i>Dianthus armeria</i>	Deptford pink			
<i>Convolvulus arvensis</i>	Field morning glory			
<i>Narcissus</i> spp.	Daffodil and narcissus	-	leave	cultural remnant
<i>Tulipa</i> spp.	Tulip	-	leave	cultural remnant
<i>Populus nigra</i> ?	Lombardy poplar?	-	leave	cultural remnant
<i>Iris pseudacorus</i>	Yellow flag iris	-	leave?	cultural remnant
? <i>Nymphaea odorata</i>	Water lily	-	leave?	cultural remnant

**Invasive species not yet observed at Cedar Rock, but on Shaw Island or elsewhere in San Juan County, and deemed highest priority for removal if they appear:**

Species name	Common Name	Priority	Control	Goal
<i>Daphne laureola</i>	Spurge laurel	1	pull	CE: P/L (eradication)
<i>Digitalis purpurea</i>	Foxglove	1	pull	CE: P/L (eradication)
<i>Dipsacus sylvestris</i>	Teasel	1	pull	CE: P/L (eradication)
<i>Hedera helix</i>	English ivy	1	pull	CE: P/L (eradication)
<i>Hypericum perforatum</i>	Common St. John's wort	1	pull	CE: P/L (eradication)
<i>Lythrum salicaria</i>	Purple loosestrife	1	pull	CE: P/L (eradication)

**Notes**

<sup>1</sup> near Cedar Rock, to the east

<sup>2</sup> above shoreline near Cedar Rock

<sup>3</sup> in slender field east of pond

<sup>4</sup> along Shoreline of Squaw Bay

## APPENDIX D. INVENTORY OF AERIAL PHOTOGRAPH SETS OF SAN JUAN COUNTY.

Below are listed various sets of aerial photographs that have been located to date, some of which have been used to form the time series for examining changes on the Cedar Rock Preserve.

## A. ON THE INTERNET

1. 1995 Washington State Department of Ecology oblique shoreline aerial photos at <http://apps.ecy.wa.gov/shorephotos/> The Washington State Department of Ecology acquired oblique aerial photography of the state's entire 2,500 miles of marine shoreline taken between 1992 and 1997 and all are available online at the above address. A series of 10 oblique color shoreline photos were taken August 23, 1995 of the Cedar Rock Preserve. These images can also be retrieved at the Department of Ecology's Washington Coastal Atlas site at [http://www.ecy.wa.gov/programs/sea/SMA/atlas\\_home.html](http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html)).
2. 1977 Washington State Department of Ecology oblique shoreline aerial photos can be seen at the Department of Ecology's Washington Coastal Atlas site at [http://www.ecy.wa.gov/programs/sea/SMA/atlas\\_home.html](http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html)). A series of 4 oblique color shoreline photos were taken June 9 and 28, 1977 of the Cedar Rock Preserve. High and low resolution choices are both available online.
3. 2002 Washington State Department of Ecology oblique shoreline aerial photos can be seen at the Department of Ecology's Washington Coastal Atlas site at [http://www.ecy.wa.gov/programs/sea/SMA/atlas\\_home.html](http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html)). A series of 10 oblique color shoreline photos were taken June 13, 2002 of the Cedar Rock Preserve. High and low resolution choices are both available online.
4. 2006 Washington State Department of Ecology oblique shoreline aerial photos can be seen at the Department of Ecology's Washington Coastal Atlas site at [http://www.ecy.wa.gov/programs/sea/SMA/atlas\\_home.html](http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html)). A series of 17 oblique color shoreline photos were taken August 15, 2006 of the Cedar Rock Preserve. High and low resolution choices are both available online.
5. Terraserver at <http://www.terraserver.com/> –aerial and satellite maps available online, unwatermarked images available by subscription. Although dated 2008 on the onscreen image, the metadata to the left of the images suggests that the image of Cedar Rock Preserve is actually from July 22, 2006.
6. Google Earth at <http://earth.google.com/> – free download of viewing program and 2006 aerial maps licensed only for personal recreational use.





envelope says Dept. of Geology 10-1-63 and 6-16-69

4. B/W Prints 1:18,000 9x9" ~5-10-1971 Walker & Assoc  
entire county, "71-2647" on each photo
5. Color Prints 4x6" 1973? "Wolf Bauer"  
~50x, oblique, accompanies "Class I Beach Inventory" (CEM couldn't find these)
6. Color Prints 9x9" 6-6-1977 WA DOE  
vertical, shoreline only, entire county?
7. Color Prints 9x9" 6-9-28-1977 WA DOE  
oblique, shoreline only, entire county?
8. InfraRed Prints 1:24,000 9x9" 8-13-1983 WA DOT  
not complete county
9. Color Prints 1:12,000 9x9" ~5-12-1983 from WA DOT  
(Shaw Island also set in possession of Judy Moody, who ordered them years ago from DNR.  
CEM digitized 7 of those 9 photos, which cover all of Shaw Island but Neck Point.)
10. Color Prints 1:12,000 9x9" 6-23-1986 from DOT  
oblique, shoreline only, entire county?
11. Color Prints 1:12,000 9x9" 9-10-1991 from DOT

D. SAN JUAN COUNTY CONSERVATION DISTRICT OFFICE (as of May 12, 1999)

1. B/W Prints 1:12,000 17x17" 1990 from DOA  
Nat'l Aerial Photo Project (on permanent loan from NRCS), full county

E. FRIENDS OF THE SAN JUAN'S OFFICE – has several sets of digitized aerial photos  
(as of August 7, 2006, including:)

1. Color Prints 4x6" 1973? "Wolf Bauer"  
~50x, oblique, accompanies "Class I Beach Inventory"

F. US DEPARTMENT OF AGRICULTURE, Aerial Photo Field Office (as of May 12, 1999)  
Customer Sales and Service, Salt Lake City, UT, phone 801-975-3500

1. B/W Prints 1:20,000 9x9" 1963 partial
2. B/W Prints 1:40,000 9x9" 1979 full county
3. IR Prints 1:60,000 9x9" 1980 full county  
NAPP (Nat'l Aerial Photo Project), DOA with Dept. of Interior, USGS
4. B/W Prints 1:40,000 9x9" 1990 full county
5. prior to 1950 (if any) stored in Ft. Worth office

G. OTHER

1. A set of digital aerial photographs was taken of the Cedar Rock Preserve from a small, radio-controlled model airplane in spring 2005 by Andrew Behm, CD available from Scott Schwinge, FHL administrator.
2. B/W Prints 1:20,000 9x13" 1946 from USDA  
Soil Survey, San Juan County (low quality); original negatives possibly in Salt Lake City repository; call Jim McClinton, NRCS, Spokane 509-323-2983