Conservation Action Planning Report for the

YELLOW ISLAND PROJECT AREA

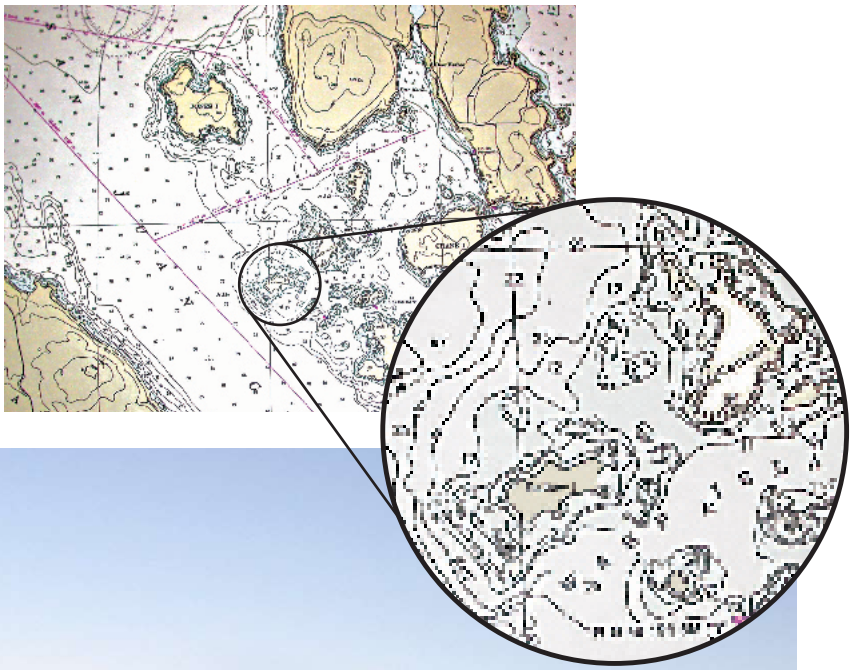
The Nature Conservancy of Washington

The Nature Conservancy

SAVING THE LAST GREAT PLACES ON EARTH

VISION

THE YELLOW ISLAND PROJECT AREA includes both Yellow Island and the Marine Protected Area (MPA) surrounding Yellow and Low islands. It is located within the small Wasp Island group in San Juan Channel between the larger islands of Orcas, Shaw, and San Juan. The Nature Conservancy's Yellow Island Preserve will be managed to retain and enhance the grasslands and savannahs as outstanding examples of these north Puget Sound ecosystems. The MPA around Yellow and Low islands is cooperatively approved and managed by multiple agencies and tribal authorities and will serve as a reference for natural coastal and nearshore systems with negligible human disturbance. The Conservancy will assist the managers of the MPA to retain appropriate levels of native biodiversity and necessary ecological functions.



RIGHT Wasp Island group and enlargement for MPA

BELOW Yellow Island from the east

ABOVE Rhinoceros auklets forage in the MPA

THE YELLOW ISLAND PROJECT AREA

Yellow Island

Yellow Island, which The Nature Conservancy purchased in 1980, is considered a showcase for the Conservancy's restoration and protection work. It is a narrow island oriented in a southwest to northeast direction, approximately 10.5 acres in size. The central third is a Douglas-fir/Pacific madrone savannah, while the northeast and southwest ends are native grasslands overlooking sand/gravel spits. The plant communities present on Yellow are:

- EAST MEADOW: A meadow dominated by Roemer's fescue (*Festuca roemeri*), giant camas (*Camassia leichtlinii*), and buttercup (*Ranunculus occidentalis*). This meadow is in good condition (see Table A, page 5) and has had only minimal restoration activities, consisting primarily of several prescribed burns.

- SOUTH MEADOW: Less than an acre, this is the historic garden site of Lew and Tib Dodd, the original settlers of Yellow Island. Restoration in this area has included mechanical removal of shrubs, prescribed burning, herbicide treatments, and manual removal of invasive species. Currently it is dominated by non-native plants, including common velvetgrass (*Holcus lanatus*) and orchardgrass (*Dactylis glomerata*). Natives in this area include *Camassia leichtlinii, Ranunculus occidentalis,* and blue wildrye (*Elymus glaucus*).

- WEST MEADOW: The meadow is complex; overall, Roemer's fescue is not dominant. Instead, *Camassia leichtlinii* is abundant in many areas, with two grasses, Alaska brome (*Bromus sitchensis*) and *Elymus glaucus,* conspicuous in places, along with both *Festuca roemeri* and red fescue (*Festuca rubra*). Eradication of shrubs and trees, followed by some restoration, including planting of fescue plugs and prescribed burning, has left a mixture of relatively low-diversity, somewhat seral vegetation types.

- CENTRAL SAVANNAH: On the south side the savannah is dominated by Pacific madrone (*Arbutus menziesii*) with scattered large Douglas-firs (*Pseudotsuga menziesii*). The savannah on the middle and northern side of the island is dominated by Douglas-firs with a few scattered madrones. This area largely converted to forest over the last century due to encroachment by shrubs and trees, after periodic ignitions by Native Americans ceased.

BELOW Pacific madrone/Roemer's fescue savannah

The Conservancy, which has a full-time steward on Yellow, allows people to visit the island between 10 a.m. and 4 p.m. seven days a week, and donors and volunteers are occasionally brought to the island for special field trips and work parties. As a result, it is a well-known place among kayakers and other boaters in the San Juans and is a particularly favorite stop in the spring, when the wildflowers are vibrant. It also provides important opportunities for the Conservancy to reach out to a number of key constituencies, engaging them in the importance of the Conservancy's mission and biodiversity conservation.

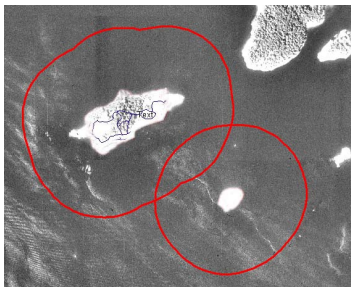
BELOW Kayakers on southeast beach

INSET Spring wildflowers

Yellow and Low Islands MPA

The Yellow and Low islands MPA consists of a 300-yard buffer surrounding both islands with the area being a no-take zone for everything except salmon. Low Island and the reefs west and southwest of Yellow are owned by the U.S. Fish and Wildlife Service (USFWS) and are part of the San Juan Islands National Wildlife Refuge (SJINWR). The islands in the Yellow Island Project Area include sandy spits, gravel and rocky beaches and bluffs, and sandy and rocky subtidal areas. The waters surrounding Yellow Island contain eelgrass (*Zostera marina*) meadows and kelp (*Nereocystis luetkeana*) forests. Numerous other algae are abundant on the rocky substrate. Bottomfish—including lingcod (*Ophiodon elongatus*), kelp greenling (*Hexagrammos decagrammos*), quillback rockfish (*Sebastes maliger*), copper rockfish (*Sebastes caurinus*), and Puget Sound rockfish (*Sebastes emphaeus*)—are found in appropriate high relief habitats. Primary large subtidal marine invertebrates include red sea urchins (*Strongylocentrotus franciscanus*), California sea cucumbers (*Parastichopus californicus*), and Dungeness crab (*Cancer magister*), three species that are commercially harvested in non-restricted areas of the San Juans. Pinto abalone (*Haliotis kamtschatkana*) were once common in the San Juans but are now rare within the MPA.

BELOW MPA delineated by circles



CONSERVATION TARGETS

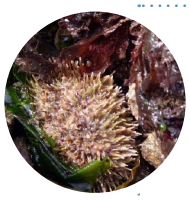
To achieve the ecological vision, five focal conservation targets were selected to capture the biodiversity and ecological processes of the Yellow Island Project Area: grasslands and savannahs on the terrestrial side and, in the nearshore marine environment, beach-dependent fauna, submerged vegetation, and large invertebrates and bottom-dwelling fish.

1 GRASSLANDS

The native grasslands of Yellow are one of the most diverse and high-quality examples of fescue prairie in Western Washington. The plant list for the Yellow Island prairies includes 29 of the 100 plants listed in the Willamette Valley-Puget Trough-Georgia Basin Ecoregional Assessment as grassland-dependent species, all within a mere seven acres.

2 SAVANNAH

Widely spaced, fire-scarred old-growth Douglas-firs indicate that savannahs were a feature historically maintained by Native Americans, particularly in the central six acres. Recent restoration efforts, including mechanical removal of woody plants, replanting of native understory species, and the reestablishment of a regular fire regime, have helped move the savannah system toward the historical condition present in 1900.



3 LARGE MARINE INVERTEBRATES & BOTTOM-DWELLING FISH

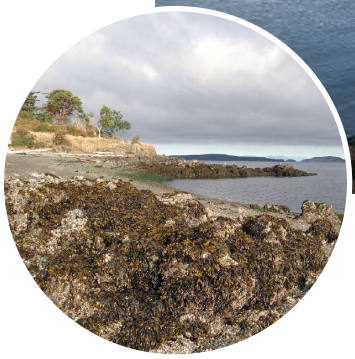
The condition of this target, which includes sea cucumbers, sea urchins, pinto abalone, and bottomfish, is largely unknown in the MPA around Yellow Island. The Washington Department of Fish and Wildlife (WDFW) and tribal authorities manage all harvestable species in marine waters, such as sea urchins and sea cucumbers. Currently, there are very little data on these species' abundance and distribution. Abalone and some bottomfish species, meanwhile, are thought to be heavily depleted throughout the San Juans.

4 BEACH-DEPENDENT FAUNA

The intertidal areas, which include Yellow Island's beaches and spits, along with the rocky shores of Low Island and the USFWS reefs, are foraging areas for birds such as black oystercatchers (*Haematopus bachmani*). In addition, these habitats provide resting and birthing sites for more than 150 harbor seals (*Phoca vitulina*). Both species are near the top of the food chain and therefore are indicators of the health of the local marine environment. Native intertidal invertebrates provide food for many species and compete for space on rocks and cobbles with marine algae and each other. Their community structure is sensitive to changes in the environment, predation, and competition from non-native species.

5 SUBMERGED VEGETATION

Eelgrass meadows provide habitat for a variety of species and foraging areas for fish and crabs. These meadows also stabilize the soft sand/mud substrate they grow in. Kelp habitats in general are also used by a variety of organisms, from salmon to surf smelt to marine invertebrates that serve as prey for a variety of fish. Bull kelp, besides being a primary producer, is fed upon directly by isopods and urchins. These forests of the sea also help reduce beach erosion by dampening the force of waves hitting the shoreline.



ABOVE Near high tide at Yellow Island's east spit

INSET Rockweed exposed at low tide

The ecological status of the Yellow Island conservation targets is variable. The grasslands are in good condition* and, with continued burning and invasive species control, are likely to remain healthy. The condition of the savannah is only fair*, due to decades without fire. The system will improve to a good condition with periodic burning, active restoration of understory species, control of invasives, and manual removal of shrubs and Douglas-firs. However, the long-term viability of the grasslands and savannah will always be somewhat constrained due to their small size. The status of the subtidal marine targets is currently unknown and is the subject of inventories and assessments. The other marine target, beach-dependent fauna, appears to be in very good condition*.
*See Table A

TABLE A Viability Assessment of Conservation Targets, Yellow Island Project Area

OVERALL VIABILITY SUMMARY — YELLOW / WASP ISLANDS

	CONSERVATION TARGETS	LANDSCAPE CONTEXT	CONDITION	SIZE	VIABILITY RANK
1	GRASSLANDS	GOOD	FAIR	...	GOOD
2	SAVANNAHS	GOOD	FAIR	...	GOOD
3	LARGE MARINE INVERTEBRATES & BOTTOM-DWELLING FISH	...	?	?	?
4	BEACH-DEPENDENT FAUNA	...	GOOD	VERY GOOD	VERY GOOD
5	SUBMERGED VEGETATION	...	?	?	?

SITE BIODIVERSITY HEALTH RANK: GOOD

CRITICAL THREATS TO OUR CONSERVATION AREA

ABOVE Mossy chiton—abundant in the intertidal

The major ongoing threats to the terrestrial targets are posed by existing non-native plants, succession by native plant species, and unmanaged recreational use, which can lead to the introduction of new species and trampling of the meadows. Discontinuation of the historic anthropogenic fire regime also negatively affected the grasslands and savannah. Regular prescribed burning since 1996 has reduced this threat.

On the marine side, the major threats to the large invertebrates and bottom-dwelling fish are illegal harvesting and pollution in the MPA. Sea urchins and sea cucumbers have been subject to illegal commercial harvest in the MPA. Pinto abalone are now protected by law but may not have a viable population in the MPA. Copper and quillback rockfish were suggested for listing under the Endangered Species Act in 1999 due to decreased populations in Puget Sound, thought to be caused by overharvesting. In addition, derelict fishing gear has been implicated in the deaths of marine fish, marine mammals and marine birds in Puget Sound. Threats to the beach-dependent fauna come primarily from unmanaged

TABLE B Overview of Threats, Yellow Island Project Area

SUMMARY OF THREATS — YELLOW / WASP ISLANDS

PROJECT-SPECIFIC THREATS	GRASSLANDS	SAVANNAHS	LARGE MARINE INVERTEBRATES & BOTTOM-DWELLING FISH	BEACH-DEPENDENT FAUNA	SUBMERGED VEGETATION
1 ILLEGAL HARVEST	...	...	VERY HIGH	...	...
2 INCREASED INVASIVES	MEDIUM	LOW	...	...	MEDIUM
3 RECREATIONAL USE	MEDIUM	LOW	...	LOW	LOW
4 FAILURE TO MAINTAIN CULTURAL FIRE REGIME	MEDIUM	MEDIUM	...	...	...
5 CHEMICAL POLLUTANTS	...	...	LOW	HIGH	MEDIUM
6 DERELICT FISHING GEAR	...	...	LOW	LOW	...
7 EXCESSIVE BROWSING & PREDATION	LOW	LOW	MEDIUM	LOW	...
8 SUCCESSIONAL DYNAMICS	LOW	LOW	...	...	...
9 OVERFISHING OR OVERHUNTING	...	...	...	LOW	...
10 NUTRIENT LOADING	...	...	...	...	LOW
THREAT STATUS FOR TARGETS & SITE:	MEDIUM	LOW	HIGH	LOW	MEDIUM

ABOVE Dogfish remains on beach

recreational use and pollution. Disturbance by boaters and hikers during nesting and pupping season for oystercatchers and seals, for instance, can have a major impact on breeding success. Visitors to the shoreline can also trample and kill intertidal invertebrates and marine vegetation. Pollution comes in two forms—chronic pollution from boats and terrestrial sources and the possibility of a catastrophic event such as an oil spill. The major threats to the submerged vegetation are boat anchors, invasives, and again, pollution. Boat anchors can cause a "circle of death" in eelgrass and kelp beds. Fensholt (*Sargassum muticum*) is a non-native algae currently invading some eelgrass and native algae beds. Pollution is not currently known to be a problem but has the potential to become one. Illegal harvesting, unmanaged recreational use, and boats anchoring are all current stresses on the system. For the marine environment in general, there are several other non-natives that are establishing footholds in Puget Sound—the green crab (*Carcinus maenas*) and an invasive tunicate (*Didemnum sp.*), both of which have the potential to negatively impact the ecosystem.

Terrestrial Threats

1. INCREASED INVASIVES
2. UNMANAGED RECREATIONAL USE

Marine Threats

1. POACHING
2. UNMANAGED RECREATIONAL USE
3. POLLUTION

BELOW Boat strandings may cause oil spills

CONSERVATION GOALS AND OBJECTIVES

CONSERVATION TARGETS

TERRESTRIAL

1 **GRASSLANDS**

2 **SAVANNAHS**

MARINE

3 **LARGE MARINE INVERTEBRATES & BOTTOM-DWELLING FISH**

4 **BEACH-DEPENDENT FAUNA**

5 **SUBMERGED VEGETATION**

Our conservation goal for the terrestrial ecosystems is to maintain the prairies and savannahs as outstanding examples of these north Puget Sound habitats. For the waters surrounding Yellow and Low islands, the goal is to assist in maintaining an MPA that promotes natural levels of biological diversity and a healthy marine environment. To achieve this, we plan to enhance the viability of each conservation target while abating the threats.

For grasslands and savannahs, the primary focus of our management activities is to restore the structure, diversity, and abundance of native species where these attributes have been compromised, maintain them using fire and other appropriate strategies where they currently are in good condition, and reduce the impact of native and non-native invasive species wherever possible.

The viability of beach-dependent fauna is already very good. Therefore, the conservation goal for this target is to maintain the population status quo of the nested targets—black oystercatchers, harbor seals, and intertidal invertebrates—by educating the public about these species' specific needs. This educational strategy will also serve the broader programmatic objective of reducing human impacts to this target throughout the region.

Because our understanding of the status and context of the marine systems is less complete, our conservation objectives are not as comprehensive as in the terrestrial systems. Initially, we will assist in the achievement of MPA goals by characterizing and quantifying the status of marine conservation targets. With this information, the managers of the MPA will be better positioned to determine whether the Yellow/Low Island MPA is meeting the expectation that underlies MPA designation as a conservation strategy, namely, that protected populations will rebound and expand beyond the boundaries of the MPA. This goal is particularly directed towards the large marine invertebrates and bottom-dwelling fish, whereby the nested targets with suboptimal populations increase and expand into neighboring waters.

BELOW Buttercups blanket Yellow Island's east meadow in spring

We also know little about the health of the submerged vegetation within the MPA. The conservation goal is to maintain this vegetation in a healthy state. However, as with the large marine invertebrates and bottom-dwelling fish, an initial objective is to characterize and quantify the current health of the eelgrass meadows and kelp beds. Once the status is better understood, the focus would shift to reducing key threats, most likely including restoring the structure and abundance of native species by controlling invasive non-native species and preventing anchoring in sensitive areas.

CONSERVATION OBJECTIVES

1 Improve the grassland and savannah ecosystems elevating their condition rank to "good" or "very good."

2 Conserve bottom-dwelling fish and deepwater habitats that support them by protecting their habitat and increasing fish abundance and size from "fair" to "very good" by 2017.

3 Maintain a reference area in the context of a no harvest MPA with surveys of urchins, sea cucumbers, bottom-dwelling fish, kelp, eelgrass, and *Sargassum muticum* as frequently as every three years and no less than every five years.

4 Stabilize healthy populations of oystercatchers and harbor seals at 2006 levels.

We designed five strategies to achieve our conservation objectives in the Yellow Island Project Area.

STRATEGIC ACTION 1

Improve Condition of Grassland and Savannah Ecosystems

Continue the burn plan initiated in 2002 and subsequent restoration activities.

PRIMARY ACTION STEPS:

- Burn each portion of the island every two to five years .
- Control invasive non-native species in the fall following a burn and in the spring as new invasives germinate.
- Seed/plant areas cleared of invasives with native species.
- Conduct regular surveys for new weed infestations.

STRATEGIC ACTION 2

Reduce Poaching in MPA

Continue to work with WDFW enforcement agents.

PRIMARY ACTION STEPS:

- Report all commercial infractions to WDFW enforcement agents.
- Inform sport fishermen of local closures.
- Support the county Marine Resources Commitee (MRC) advertisement of MPA's on the back of fishing regulations.

STRATEGIC ACTION 3

Limit Human Disturbance in MPA

Engage visitors and other key constituencies, providing opportunities for them to learn about the ecological significance of beach-dependent fauna and ensuring they understand the recreational use guidelines.

PRIMARY ACTION STEPS:

- Make informational signs and have educational brochures available.
- Continue to have an on-site steward on Yellow Island who oversees recreational use and, as time allows, engages visitors about the island and the MPA's ecological significance.
- Talk to individuals causing disturbances.

STRATEGIC ACTION 4

Establish baseline data for intertidal and subtidal areas

Contract with Friday Harbor Labratory (FHL) to do intertidal and subtidal surveys.

PRIMARY ACTION STEPS:

- Contract with FHL to do bottomfish, marine invertebrate, intertidal and subtidal vegetation surveys.
- With FHL, establish future monitoring needs and protocols to track the condition of intertidal and subtidal areas.

STRATEGIC ACTION 5

Share the science, research, and management lessons with partners, key constituencies, and the general public

Engage the scientific and local communities through publication and presentation of research and findings.

PRIMARY ACTION STEPS:

- Publish scientific articles in peer-reviewed journals
- Present findings at scientific meetings.
- Place news stories in local newspapers and elsewhere about the importance of these habitats, the species they support, and their ecological sensitivity.

All strategies have been either fully or partially implemented. Strategic Action 4, recently undertaken, is a result of our enhanced commitment to the health of the marine environment in the Project Area. Ensuring that these Strategic Actions are carried out is an ongoing responsibility of the preserve steward and other staff.

MEASURES AND MONITORING

ABOVE Illegal harvesting of sea cucumbers

In the Yellow Island Project Area we are fortunate that we have identified only one critical threat—poaching by both commercial and sports fishermen of large marine invertebrates and bottom-dwelling fish. For the other targets, our assessment showed no threats were considered to be of high severity, large scope, or great urgency. Further, the viability of our terrestrial targets is good to very good. This provides us with more time to focus on improving our understanding of the status and long-term viability of our marine targets, where our current knowledge is poor. However, even low-level threats can have a cumulative impact over time, and need to be monitored.

To measure the success of our conservation strategies, the following monitoring protocol has been established. The terrestrial monitoring is conducted annually during the first two weeks of May. Detailed protocols and timing have yet to be established for the marine environment. Some actions, such as watching for poaching by commercial or sport fishers, are part of the daily duties of the on-site preserve steward who then follows a WDFW protocol for addressing the situation.

ABOVE The rocky intertidal—where land and sea meet

TERRESTRIAL ECOSYSTEM

THREAT MONITORING		INDICATORS
1	**NON-NATIVE SPECIES ABUNDANCE**	• Percent non-native forb cover • Percent non-native graminoid cover • Non-native herbaceous species richness
2	**SUCCESSIONAL DYNAMICS**	• Percent woody plant cover

VIABILITY MONITORING		INDICATORS
LANDSCAPE CONTEXT		
3	**ANTROPOGENIC FIRE REGIME** (timing, frequency, intensity, extent)	• Fire return interval
CONDITION		
4	**NATIVE SPECIES ABUNDANCE**	• Percent native forb cover • Percent native graminoid cover • Native herbaceous species richness • Native forb:graminoid ratio, 3 to 5 years post burn
5	**SAVANNAH SPECIES DOMINANCE/COMPOSITION**	• Tree stems/acre • Tree canopy cover

ABOVE Orcas are summer residents and occasional during other seasons

MARINE ECOSYSTEM

THREAT MONITORING		INDICATORS
1	**POACHING BY COMMERCIAL & SPORTS FISHERS**	• Frequency of incidents; amount of resource removed
2	**NON-NATIVE SPECIES ABUNDANCE**	• Abundance and distribution of non-native vegetation relative to eelgrass beds • Abundance and distribution of non-native vegetation relative to kelp beds
3	**UNMANAGED RECREATIONAL USE**	• Number of human disturbances of oystercatchers on Low Island • Number of human caused seal stampedes during pupping season • Evidence of crushed intertidal invertebrates • Eelgrass cover lost due to boat anchoring
4	**DERELICT FISHING GEAR**	• Abundance and distribution of lost fishing gear; evidence of mortality of marine species.

VIABILITY MONITORING		INDICATORS
CONDITION		
5	**POPULATION STRUCTURE & RECRUITMENT OF BOTTOM DWELLING FISH**	• Modal size and age distribution
6	**NATIVE INVERTEBRATE SPECIES RICHNESS AND ABUNDANCE**	• Species evenness • Species richness
SIZE		
7	**POPULATION OF NATIVE INVERTEBRATES SPECIES AND BOTTOM-DWELLING FISH**	• Abalone/square meter • Sea cucumbers/square meter • Sea urchins/square meter • Numbers of fish
8	**BEACH-DEPENDENT FAUNA POPULATIONS**	• Oystercatcher population • Young oystercatchers fledged each year • Adult seal population during pupping season • Surviving seal pup population

BELOW Young male elephant seal on Yellow Island's west spit

CONCLUSION

The Yellow Island Project Area is a mix of terrestrial and marine targets with good to very good viability ranks and one marine target with a fair ranking (see Table A, page 5). The terrestrial targets are expected to remain healthy examples of grassland and savannah habitats under the current maintenance regime. The beach-dependent fauna are also expected to remain healthy under current protocols. More information is needed to determine long-term viability of large marine invertebrates, bottom-dwelling fish, and submerged vegetation in the project area. This will be the focus of future work in the Yellow Island Project Area.

BELOW Sunset from Yellow Island