

Conservation World — Conservation Project Candidates

In this unit, you will explore the current “Sixth Extinction” and biodiversity conservation.

By the end, you should be able to:

1. Explain the impacts of humans on biological diversity.
2. Compare and contrast the causes and rates of the sixth extinction with previous mass extinctions from the fossil record.
3. Evaluate criteria for setting species conservation priorities.
4. Distinguish between ex situ and in situ conservation approaches.

Conservation World (CW) plans to implement a new conservation project. Available funding limits the organization to one project. As the advisory committee to the CW board of directors, please evaluate and rank the following four potential conservation projects. These are real-world conservation issues that incorporate biological, geographical, geological, and climatic information. You will recommend your top choice to the board of directors shortly.

Why should your choice be targeted for conservation? There is no right or wrong answer, but you do need to justify your choice (i.e., why is it a better, more important choice than the others?), including the criteria you used to make your choice.

Discuss the following as a group. Making notes will be helpful:

<i>Project:</i>	#1	#2	#3	#4
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Criteria:

Biodiversity of area?

Endemic species?

Extinction risk?

Likelihood of success?

Relative cost?

Value to humans?

Future threats/sustainability?

Ranking:

- 1. _____
- 2. _____
- 3. _____
- 4. _____

Justification:

Potential Conservation Project #1: Sebangau, Borneo

Size: ~5600 km²

Description: This potential area in southern Borneo is centered along the Sebangau River, a large and slow-moving river that flows through peat swamp forest. The peat swamp forest is an unusual ecosystem that consists of a diverse tropical forest on top of a peat layer ~10 m thick that formed over ~20,000 years. The peat stores huge amounts of carbon as organic matter, serving as important natural carbon reservoir. Deforestation, draining of peat swamps, and fires release this stored carbon to the atmosphere as carbon dioxide, a greenhouse gas. As a result, preserving tropical peat lands helps limit global warming. Peat swamp forests are not well understood, but they are one of the more threatened ecosystems on the planet. The tropical forests on top of the peat are home to thousands of species of plants and animals, and Sebangau is no exception.

Notable species: Bornean orangutan. The Sebangau River peat swamp forest is home to the planet's largest population of orangutans with ~6,900 individuals. Orangutans are the largest arboreal mammals and are listed as endangered by the IUCN. Habitat disturbance and destruction by logging (see threats below) have a negative impact on their density within peat swamp forests. Other endangered species include the Agile gibbon, proboscis monkey, rough-backed frog, cloud leopards, and Storm's stork.

Threats: The human population is about 4000 people living in about 15 small- to medium-sized villages and one larger town. Key threats include logging, as well as peat drainage and burning to convert the land to agriculture, especially for rice and palm oil plantations. Between 1980 and 1995, parts of the proposed conservation area were heavily logged. Logging has since been outlawed, but some illegal logging still occurs. Restoring the logged areas to a pre-logged state could take several centuries and will require building dams to restore water lost to logging canals.

Cost: \$4.4 million



Resources for more information:

<http://www.protectedplanet.net/317262>

<http://www.outrop.com/sabangau-forest.html>

http://en.wikipedia.org/wiki/Peat_swamp_forest

<http://www.iucnredlist.org/details/17975/0>

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http://commons.wikimedia.org/wiki/File:%3ASUMATRAN_ORANGUTAN.jpg

Potential Conservation Project #2: Guadalupe Island, Mexico

Size: ~4700 km² including offshore waters

Description: Located 240 km (150 miles) west of Baja California, Mexico, Guadalupe Island is formed from two overlapping extinct shield volcanoes. The island itself has an area of 244 km² (94 mi²) and rises from sea level to ~1300 m (4260 ft). It contains a variety of Mediterranean vegetation communities, including succulent plants and woody shrubs at lower elevations, patches of endemic Guadalupe palm groves and Guadalupe cypress forest at mid-elevations, and cloud forest at higher elevations. The island shores and offshore waters support large populations of marine species.

Notable species: Species endemic to the island including more than 30 plants, birds such as the Guadalupe rock wren and Guadalupe house finch, several spiders, and the Guadalupe fur seal. There is a major breeding colony of endangered Guadalupe fur seals along the shore. Northern elephant seals are also found on Guadalupe Island. These were hunted almost to extinction, with only an estimated 100 individuals remaining in 1910—all found on Guadalupe Island. Since then, numbers have rebounded and the northern elephant seal has expanded its range from Baja California to Alaska. Great white sharks (a vulnerable species) congregate offshore from late July through October. Great white sharks are keystone predators that, like all sharks, help maintain healthy ocean ecosystems. Reliable shark sightings and excellent visibility underwater have made Guadalupe Island one of the world's top locations for cage diving with great whites.

Threats: The human population is only about 150 people living in a small fishing cooperative with minimal impacts. Impacts of past human activities are still being felt on the island, however. These include invasive goats that were introduced by Russian whalers and sealers ~150 years ago. Grazing by goats has devastated some plant communities and caused several plant extinctions. Efforts to eradicate the goats have been ongoing. In the past, Guadalupe fur seals and northern elephant seals were hunted relentlessly. Populations of both should recover with protection. Threats to the great white sharks include commercial and sport fishing, protective beach nets, degradation of inshore habitats that serve as nurseries, and campaigns to kill great whites after bite incidents fueled by negative media coverage. Great white shark tourism can be an important tool for



conservation, generating several million dollars/year at the top locations in Australia, South Africa, and Guadalupe Island from tourism and permit fees. However, some practices such as chumming and hang baits are controversial because they can disrupt the sharks' natural behavior, so regulation is important.

Cost: \$2.2 million

Resources for more information:

<http://www.protectedplanet.net/342345>

<http://www.marinemammalcenter.org/education/marine-mammal-information/pinnipeds/>

http://en.wikipedia.org/wiki/Guadalupe_Island

<http://www.sharksavers.org/en/education/the-value-of-sharks/sharks-and-ecotourism/>

<http://www.iucnredlist.org/details/3855/0>

Author's photo of great white sharks at Guadalupe Island.

Potential Conservation Project #3: Lake Titicaca, Peruvian Sector

Size: 4600 km²

Description: Lake Titicaca is a large, deep lake located high in the Andes Mountains at 3812 m (12,500 feet) along the border between Peru and Bolivia. The lake has a surface area of 8372 km² (3232 m²) and over 1,100 km (699 mi) of shoreline. The lake is fed by five major river systems. Once it reaches the lake, water has a residence time of 1343 years. The lakeshore and islands within the lake have supported human populations for thousands of years, and there are several rapidly growing cities within the watershed. The lake is also home to more than 530 aquatic species.

Notable species: The endemic Titicaca water frog is listed as critically endangered. One of the world's largest frogs, it is captured for food and medicinal use, so overharvesting is a major threat, as well as predation of larva by introduced trout, and habitat loss. Although not endemic to the lake, the marbled water frog is considered vulnerable in Lake Titicaca due to overharvesting for food and pollution. The lake is also home to the main population of the endangered Titicaca grebe (a freshwater diving bird), as well as several native fish (95% of which are endemic to the lake), 15 endemic snails, and endemic amphipods (small crustaceans).

Threats: Lake Titicaca has long supported agricultural and fishing societies, including pre-Hispanic indigenous Aymara and Urus ethnic populations. These groups live along the shores and on islands within the lake, which include both natural islands and artificial floating reed islands. Traditional cultural patterns are maintained, including dress, dance, and textile making. Lake Titicaca is considered sacred to the Aymara and is a central element in Incan mythology. There are no cars or hotels on the islands, but families open their homes to tourists



for overnight stays arranged through guides. Extreme poverty in the region surrounding Lake Titicaca has compelled many to migrate to cities, and urban areas are growing rapidly. This has resulted in water pollution from garbage, wastewater, and sewage as treatment facilities struggle to keep up with growth. Additional heavy metal pollution is derived from mining activities in the region. Introduced species have also had an impact, with the presumed extinction of least one native fish, the Titicaca orestias, and the decline of others since non-native trout and mackerel were brought to the lake in the 1930s. Climate change also threatens the lake. Lake levels have been dropping since 2000 due to increased evaporation, shorter rainy seasons, and melting of the glaciers that feed the lake.

Cost: \$5.2 million

Author's photo of Aymara girl on Taquile Island, Lake Titicaca

Resources for more information:

<http://www.protectedplanet.net/145547>

<http://www.theguardian.com/environment/2012/jan/12/urban-population-boom-lake-titicaca>

http://en.wikipedia.org/wiki/Lake_Titicaca

http://webworld.unesco.org/water/wwap/case_studies/titicaca_lake/titicaca_lake.pdf

<http://www.iucnredlist.org/details/57334/0>

Potential Conservation Project #4: Scimitar-horned Oryx

Description: The scimitar-horned oryx is mostly white, with a reddish neck and facial marks and long backward-curved horns. The horns are thin and do not regrow once broken, so it is thought that this species may have given rise to the myth of unicorns. The scimitar-horned oryx previously ranged across northern Africa in arid deserts and semi-arid desert grasslands, but it is now extinct in the wild. It typically lived in herds of 20–40 individuals led by a dominant male, but herds of up to 1000+ could be found during migrations and wet periods.

(Other) Notable species: Several other antelope species are threatened or endangered in northern Africa, so captive breeding and reintroduction efforts of scimitar-horned oryx could generate knowledge and protect habitat that would benefit other species, such as the critically endangered Dama gazelle.

Threats: Overhunting, habitat loss, and competition with domesticated livestock for food are the main reasons it is thought to have gone extinct in the wild, but drought and war also played a role. The scimitar-horned oryx fared well in the Ouadi-Achim Game Reserve in Chad until the 1970s, but declined with increased hunting pressure for food during subsequent civil wars in Chad. There have been no confirmed sightings in the wild for at least 15 years, making it the largest mammal to go extinct in the wild in the past 20 years.

Worldwide there are ~6000 scimitar-horned oryx living in captivity. This includes ~1550 individuals in managed breeding programs and zoos, >4000 in a private collection in the United Arab Emirates, and a smaller number in private collections in the United States. Additional small populations exist in fenced protected areas in Tunisia, Morocco, and Senegal as part of reintroduction efforts. In zoos, many animals are bred and managed as pairs or small groups due to limited space and other resources. For polygamous herding animals like the scimitar-horned oryx, taking a “big herd approach” may help with breeding, allow offspring to develop in groups, and maintain social behaviors found in natural herds—all of which may be important for reintroduction into the wild.

There is potential for reintroducing the scimitar-horned oryx into the wild. A major challenge, however, is finding enough suitable habitat within the species’ historic range. One potential site is the 80,000 km² Ouadi-Achim Game Preserve where the species previously thrived. Reintroducing the species here would require cooperation among Conservation World, zoos, and private wildlife owners around the world for animals to

release, the Chadian government to ensure protection from hunters, and traditional land users, including the local and nomadic pastoralists who use the land for grazing livestock.

Cost: \$3 million

Resources for more information:

<http://www.iucnredlist.org/details/15568/0>

http://en.wikipedia.org/wiki/Scimitar_oryx

<http://www.saharaconservation.org/?Scimitar-horned-Oryx-Chad>



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