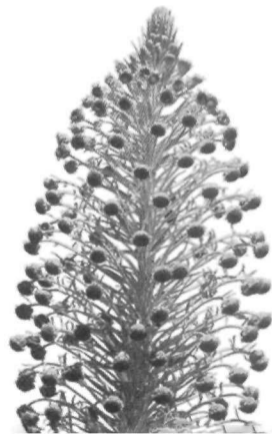
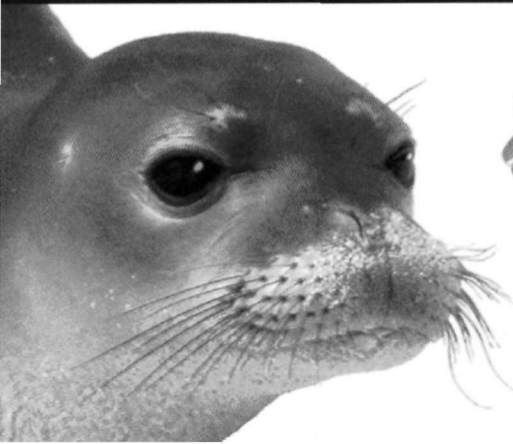


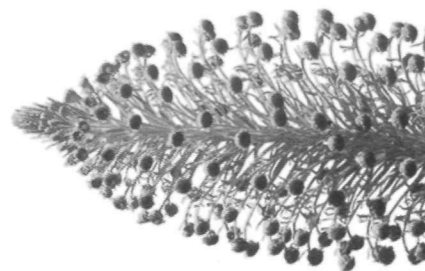
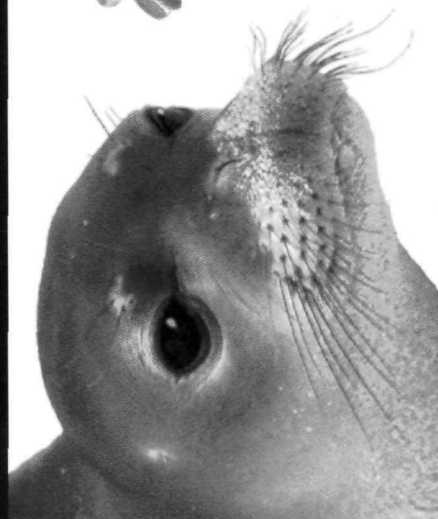
Hawai'i Volcanoes National Park On the Brink of Extinction

National Park Service
U.S. Department of the Interior

2016
National Park Service
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Extinction is Forever

Paradise in Peril

Life, in all of its diversity, is precious. Across our planet, plants and animals have adapted and evolved into species that are each amazing, unique, and beautiful. Yet with rapidly deteriorating changes to their environments, many species cannot adapt quickly enough, their populations drastically decline until, tragically, they vanish forever.

In Hawai'i, the problem is magnified. Life arrived to this isolated chain of islands, and against all odds, some species survived. Over millions of years, descendants of the pioneers formed new interrelationships with the land and other life forms. From coral reefs to the summits of towering volcanoes, from the harsh deserts to lush rainforests, from lava flows to caves—new life evolved and biological communities in the islands entered a state of balance and lōkahi (harmony).

Disruption to the balance began with the arrival of Polynesians. To feed and nourish their growing populations, Hawaiians burned lowland forests for cropland, converted coastlines into fishponds, and diverted streams to create flooded fields.

Loss of habitat increased exponentially after western contact in 1778. Vast forests were harvested for sandalwood and cleared for ranches, lumber, sugar cane and other agriculture. As human populations continue to grow, native plants and animals face a colossal invasion of new, human-introduced species that destroy native ecosystems.

In the race to preserve the native species that survive, park staff strive to pull them back from the brink of extinction. Of the 56 federally listed threatened or endangered plants and animals that find refuge in the park, five representative species are featured here. More info can be found at www.nps.gov/havo/naturescience/onthebrink.com

PHOTOS AT LEFT (TOP TO BOTTOM): 'ĀHINAHINA: NPS, 'AKIAPŌLĀ'AU: © JACK JEFFREY, 'ŌHAI: NPS, 'ĪLIO HOLO I KA UAU: USFWS / © JAMES WATT

'Ōhā wai, *Clermontia peleana*



'ŌHĀ WAI: NPS / JAY ROBINSON

Evolutionary Brilliance

High in the rainforest canopies of Hawai'i, 'ōhā wai clings to life. It is one of 113 Hawaiian bellflowers that all descend from a single ancestor. They are one of the world's premier examples of adaptive radiation, in which a single immigration event gave rise to a spectacular array of descendant species. They evolved to exploit a variety of habitats and exhibit outlandishly different leaf shapes and flowers. While some evolved into tree species, others became vines or shrubs. 'Ōhā wai grows as a small tree with dark green leaves laced with purple veins. The beautiful dark purple flowers curve downward and produce copious nectar and pollen. These flowers accommodated the large bills of Hawaiian nectar-feeding birds like the extinct mamo. Limited to wet forests of Mauna Loa and Mauna Kea, these rare gems have a short life span of 15 - 25 years.

One Foot Over the Edge

'Ōhā wai once thrived in lush forests of Hawai'i. But since the introduction of rats, pigs and cattle, it has all but disappeared. Rats gnaw their bark and eat their seeds, while feral pigs root and destroy their seedlings. By the late 1990s, 'ōhā wai was thought to be extinct except for one plant growing in cultivation under the close care of botanists. Miraculously, in the summer of 2007, botanists rediscovered six wild plants, all surviving high in the branches of huge 'ōhi'a trees—far above the destructive reach of pigs.

Hope Remains for these Rare Beauties

Increasing the number of plants in the wild is critical to the survival of 'ōhā wai. Towards that end, botanists collect air-layered cuttings from the wild plants and closely monitor their health in secure greenhouse facilities. Once these flower, they are carefully cross-pollinated to ensure genetic viability. Seedlings are then planted in wild areas like the park and other conservation partnership lands, where feral pigs have been removed and fences restrict their return. Hope remains in these pig-free zones.

EXPERIENCE YOUR AMERICA™

Nēnē (Hawaiian goose), *Branta sandvicensis*



NĒNĒ: NPS / JAY ROBINSON

The Last of the Island Geese

Wild nēnē, the world's rarest goose, are only found in Hawai'i and are the last survivor of several other endemic geese. Their strong feet sport padded toes and reduced webbing, an adaptation that allows them to traverse rough terrain like lava plains. Most nēnē fly between nighttime roosts and diurnal feeding grounds. The female builds a simple ground nest and incubates one to four eggs for a full month while her devoted mate acts as a sentry. Shortly after they hatch, goslings leave the nest and follow their parents to their traditional foraging grounds which can be more than a mile away. At 14 weeks nēnē can fly, and along with their parents, they join large flocks where they meet their relatives and potential mates. They usually mate for life.

From Abundance to Near Extinction

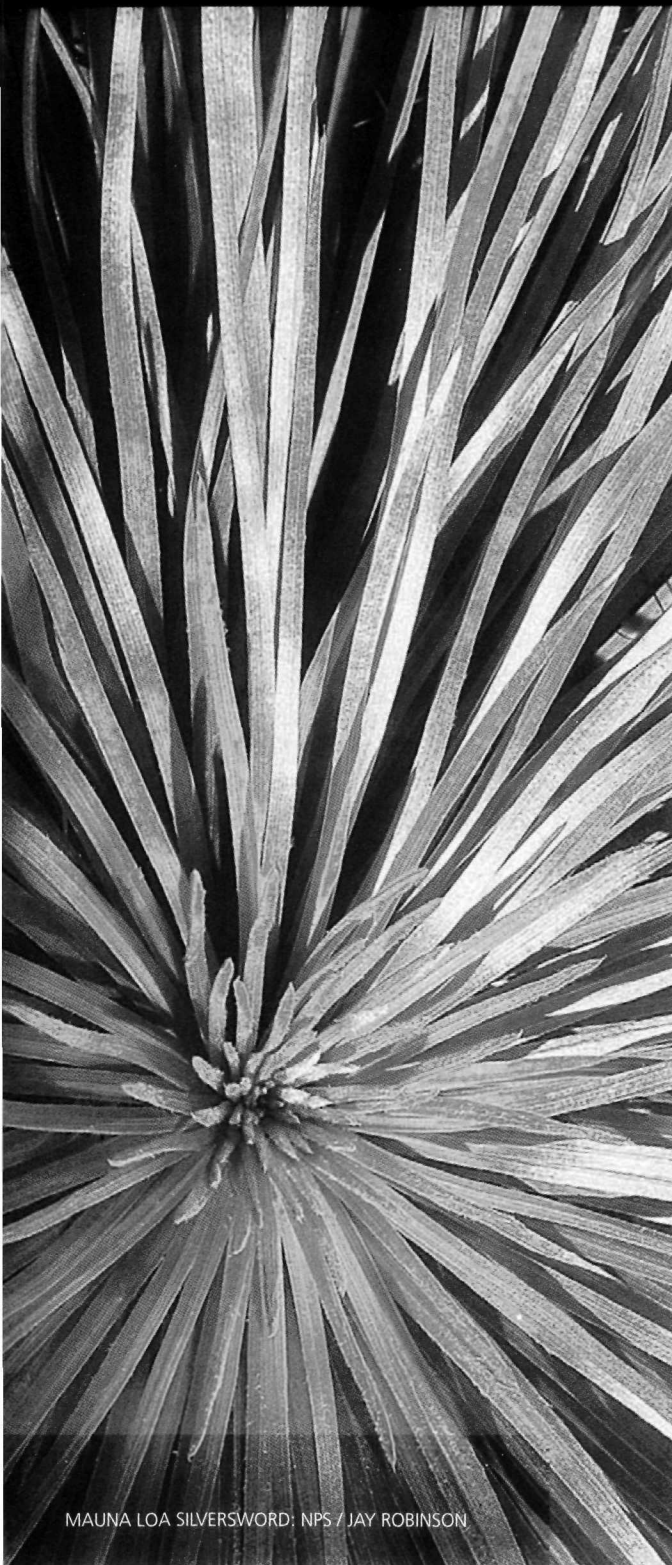
By the time of western contact, there were an estimated 25,000 nēnē throughout Hawai'i. With increased hunting and the introduction of predators (such as mongooses, pigs, dogs, and cats), nēnē had become extinct on all islands, except Hawai'i Island, by 1900. By 1952, their population had plummeted to just 30 birds. Luckily, this species breeds well in captivity, and conservationists saved them from disappearing forever. Beginning in the 1960s, nēnē were reintroduced into the wild, and by 2010 there were over 2,000 birds statewide.

Conservation and Public Support

Today, park managers work to improve nēnē habitat and protect wild nests and goslings from alien predators. Unfortunately, many deaths today are still associated with humans. Nēnē evolved without people. They have no instinct to avoid us and may approach without fear. If fed, they quickly associate humans with food. These birds learn to frequent roads and parking lots where they are eventually killed by cars. Do not approach nēnē and never feed them. Watch for signs posted where nēnē cross the road, follow speed limits and always drive with caution.

www.nps.gov/havo

‘Āhinahina (Mauna Loa silversword), *Argyroxiphium kauense*



MAUNA LOA SILVERWORD: NPS / JAY ROBINSON

Wondrous Treasure on Mauna Loa

One of the world’s most extraordinary plants survives only on the flanks of Mauna Loa between 5,000 to 8,000 feet (1,500 to 2,500 m). ‘Āhinahina are named for the remarkable shine of soft, silver hairs that cover and protect their sword-like leaves. Although they share the same ancestor, Mauna Loa silverswords are distinct from the other species found on Mauna Kea and Haleakalā. Mauna Loa silverswords generally grow fewer “petals” in their flowerheads and their thinner leaves are less hairy. Also remarkable is their life history. It is only once in their lives and only after 10 to 30 years that ‘āhinahina send up a spectacular stalk of fragrant flowers as tall as 9 feet (3 meters). Within weeks it goes to seed and its life is concluded—the entire plant dies.

Feral Animals Lead to Their Decline

Foraging ungulates, like cattle, sheep, and goats, love silverswords and devour any they find like a child does ice cream. By the early 1990s, the entire species was limited to a handful of plants clinging to survival at three remote sites on Mauna Loa.

Muscles and Science Save Silverswords

Toiling on hard rock at high altitudes, national park crews have erected miles of fence to keep out stomping and chomping beasts. To ensure the long-term survival of ‘āhinahina, a public/private partnership collaborates to bolster silverswords’ genetic diversity. Botanists painstakingly cross-pollinated wild plants, collect their seeds, and carefully germinated them in secure greenhouses. Field crews planted more than 20,000 of those seedlings back into protected areas of the park. Though drought years have taken a toll, the winter rains of 2012 brought great rewards with wild seedlings sprouting from their out-planted parents for the first time. With this success, Mauna Loa silversword recovery is underway. Safe inside protective fences, these beauties will soon replenish the mountain’s majestic landscapes.

‘Ua‘u (Hawai‘i petrel), *Pterodroma sandwichensis*



‘UA‘U: © JIM DENNY

Seabirds Nest in Alpine Burrows

The ‘ua‘u, or Hawaiian petrel, is a federally endangered native seabird. Adults are 16 inches long from head to tail and have a wing span of three feet. They make a variety of haunting calls—one gives the birds their distinctive name: oo-AH-oo. The only known nest sites on Hawai‘i Island are in northern Kohala and within the park on the lower alpine and subalpine slopes of Mauna Loa. Wildlife biologists estimate that only 50 to 60 breeding pairs nest in the park, so the odds of encountering them are quite rare. Adult ‘ua‘u arrive on land in early spring and nest in underground lava burrows, entering and leaving after dark. The female lays a single egg in June. Taking turns, both parents incubate the egg for 60 days and feed the chick for an additional four months.

Chicks, Fledglings and Adults at Risk

While at their nesting grounds, the chicks, and even their parents, are easy prey for feral cats. In November, after weeks on their own, young ‘ua‘u leave their nests for the first time and fly to the ocean at night to search for food. Bright urban lights can cause these night-flying birds to become disoriented, collide with structures, or fall to the ground. Once grounded, it is difficult for ‘ua‘u to take flight—leaving them extremely vulnerable to cats, dogs and mongooses. It’s a precarious time for one of our rarest endemic seabirds, and the national park is keeping a watchful eye on its remaining population.

Big Fences and Shielded Lights

To protect ‘ua‘u from feral cats, the national park is constructing a large-scale barrier fence around the primary nesting colony on Mauna Loa. To help prevent potentially deadly groundings, Hawai‘i Volcanoes National Park has modified its outdoor lights to be downcast and shielded on the top. All new lighting must meet specific requirements to minimize disorientation of night-flying petrels. Hawai‘i Island has so few remaining ‘ua‘u, their protection is of the utmost importance.

Honu‘ea (Hawaiian hawksbill turtle), *Eretmochelys imbricata*



The “other” Sea Turtle in Hawai‘i

Green sea turtles are common around the island, but our coastal waters also harbor its more elusive and rare cousin—the Hawaiian hawksbill turtle. Called honu‘ea or ‘ea by Hawaiians, they feed almost exclusively on sponges. Males never come to shore and females only do so in order to nest. Of the few beaches they nest on statewide, three are protected along the remote coast in Hawai‘i Volcanoes National Park. The female waits until night to crawl ashore and uses her hind flippers to dig a narrow egg chamber in the sand near vegetation. After she deposits and covers an average of 180 eggs, she returns to the sea, leaving the eggs to incubate during the next two months. Hatchlings emerge under cover of darkness as the sand temperature begins to drop a few hours after sunset. They find the ocean by crawling towards the brighter, open horizon. Along the way to the sea, they face a variety of predatory crabs, rats, mongooses, cats, dogs and pigs. Once they reach the ocean, large fish and other sea creatures find them irresistible. As few as one in 1,000 honu‘ea hatchlings survive to adulthood.

Fewer than 20 Females Nest in a Year

Loss of nesting habitat, predation and poaching have reduced honu‘ea populations to critically low levels. On their last remote nesting beaches, artificial lights may attract and disorient nesting females and hatchlings, causing them to head away from the water where they become stranded and die.

Your Actions Directly Impact Their Future

Since fires and lights disorient nesting turtles and hatchlings, do not build campfires when camping at the beach during the nesting season. Cover your flashlight lens with a red filter to minimize the bright white light and remember to direct the light beams away from the ocean. To discourage predators, always keep beaches clean of food scraps. Follow these simple precautions and honu‘ea might have a chance for a bright future in Hawai‘i.