

INTRODUCTION AND BACKGROUND

1. Mission, Population, Acreage, Geographic, and Community Setting

- Marine Corps Base (MCB) Hawaii encompasses 4,500 acres within five parcels on the Island of O’ahu, and a 12-acre parcel on Molokai. On “leeward” O’ahu, we manage buildings and grounds at 220-acre Camp H. M. Smith; 137-acre Pu’uloa Range Facility; 27-acre Pearl City Warehouse Annex; and 63-acre Manana Housing Area. The remaining three parcels composing 90% of MCB Hawaii’s acreage are found on “windward” O’ahu—MCB Hawaii, Kaneohe Bay (K-Bay) on 2,951-acre Mokapu Peninsula; 1,078-acre Marine Corps Training Area – Bellows (MCTAB) in Waimanalo, and a 187-acre portion of Waikane Valley. K-Bay and MCTAB parcels contain the highest concentration of natural resources under MCB Hawaii jurisdiction, with 10 threatened/endangered species requiring focused management attention. MCB Hawaii’s mission is to sustain combat readiness for its operating forces and tenants and provide for well-being, morale, and safety of military and civilian personnel. We support 25,000 personnel (Marines, Sailors, family members, civilian employees), and 10,000 military retirees using base service facilities. Sustainability, one of 5 pillars in MCB Hawaii’s 2011 Strategic Plan, includes ensuring that natural resources entrusted to our care support the mission and remain healthy and available for future generations. Sustained favorable review by state and federal natural resources agency partners, budgetary support, and cooperative activities with facilities managers, military training operators, and the public demonstrate enduring commitment to supporting combat readiness, quality of life, and natural resources conservation.

- Hawaii is the world’s most isolated land mass, with distinctive evolution and biological diversity, but imperiled by habitat loss and invasive species. 25% of U.S. endangered species are found here and strong advocates for their preservation. MCB Hawaii’s windward parcels are located within 11 watersheds comprising Ko’olaupoko District, a watershed region whose characteristics typify statewide ecological assets and threats. This region is a dramatic tropical landscape, with steeply-contoured drainage basins from Ko’olau mountain peaks to off-shore reefs of Kane’ohe, Kailua, and Waimanalo Bays. Public concerns about flooding, non-point pollution, wetland and wildlife conservation here are reflected by its State ranking as “Category One” for watershed restoration priority under the National Clean Water Action Plan. The State cites MCB Hawaii as a partner in restoring windward watersheds in their Polluted Runoff Control plan (2000). They cite our leadership in controlling invasive species in their Aquatic Invasive Species Control Plan (2003). A significant component of O’ahu’s remaining wetland habitat for Hawaii’s 4 listed endangered waterbirds is in this region (1600 acres). US Fish and Wildlife (FWS)’s Waterbird Recovery Plan (2005) notes our key role in sustaining this habitat on base.

MCB Hawaii (K-Bay) in Ko’olaupoko Regional Watershed Context



75% of Mokapu peninsula is flat, supporting the “built environment” —about 5,000 buildings and 80 miles of road valued at over \$1.8 billion. 25% is fringing sand dunes, coastal wetlands, beaches, and 3 volcanic features: Ku’au (Pyramid Rock), Pu’u Hawai’i Loa, and Ulupa’u Crater—whose 683-foot head is the highest. Weather is semitropical, temperatures 70’s-80’s, with 40 inches annual average rainfall. Mokapu is bordered east by Kailua Bay, north by the Pacific, and south/southwest by Kane’ohe Bay and Nu’upia Ponds. Adjacent Kailua and Kane’ohe communities contain a combined population of 82,749 residents (2010 census). We enforce a 500-yard seaward security buffer zone around our 11-mile peninsular coastline. Adjacent bays host live corals, threatened green sea turtles, endangered marine mammals, state seabird island sanctuaries, and public recreation. MCTAB is

“downstream” of Waimanalo, a rural community of small farm lots, Native Hawaiian homesteads, and parks along O’ahu’s largest white sand beach. Amphibious Assault Vehicles (AAVs) travel several nautical miles from K-Bay for critical beach landing maneuvers here - the only convenient, cost effective Hawaii training location. AAVs safely transit en route around coral reefs and recreational marine activities. MCTAB also supports non-live fire, ground maneuvers, helicopter training,

visiting Marine Expeditionary Units (MEUs), civil defense exercises, and a 48-acre tenant training facility run by Hawaii Army National Guard. Military trainers use MCTAB's south shoreline on weekdays. Weekend public beach access is jointly managed with City/County (C/C) of Honolulu. Adjacent Bellows Air Force Station supports military recreation.

2. Significant Natural Resources and Features – Many stunning landscapes; seascapes, and shoreline natural resources are under our jurisdiction and are rich in Hawaiian tradition, military history, and biological diversity.

- **Wildlife Management/Wetland Areas** – Together, MCB Hawaii's K-Bay and MCTAB support 133 acres of jurisdictional wetlands. About 112 of these acres are in the 517-acre Nu'upia Ponds Wildlife Management Area (WMA) on K-Bay. This WMA hosts 10% of the endangered Hawaiian stilt's population. Stilt and 3 other endangered waterbirds (Hawaiian coot, moorhen, and duck) and over 60 species of native and migratory birds have been recorded here and/or at several other smaller coastal and inland freshwater base wetlands. K-Bay hosts about 12 acres of coastal wetlands along our Kane'ohē bay-facing shoreline, and about 5 acres of inland, freshwater wetlands. They all perform valuable stormwater retention and biofiltration roles as well as provide bird and fish habitat. 2.2 wetland acres are at MCTAB along Waimanalo stream, where waterbirds and other native aquatic species (e.g., gobies or o'opu) are found. A survey confirmed 16 native fish species at Nu'upia Ponds WMA. Wedge-tailed shearwater seabirds have colonized the eastern shoreline of Nu'upia Ponds WMA, with 700 active burrows to date. Our 25-acre Ulupa'u Crater Head WMA at K-Bay is above an active weapons firing range and hosts 1 of only 2 red-footed booby seabird colonies in the main Hawaiian Islands, with 2,500 birds.

- **Diverse Coastal and Marine, Living and Fossil Flora and Fauna** - Sea cliffs and coastal sand dunes at K-Bay and MCTAB support native strand vegetation treasured in Hawaiian folklore and gathering traditions. A small stand of endangered 'Ohai plants (*Sesbania tomentosa*) recently self-established within a native plant community along Nu'upia Ponds WMA's eastern shoreline (2008), the first sighting here since the 1930s. Mokapu's 500-yard seaward security buffer zone around the peninsula contains native corals, algae, sponges, bryozoans, sabellid worms, tunicates, reef fishes, culturally important seaweeds, and a newly-discovered native seagrass meadow not previously known in Kane'ohē Bay—supporting rare sea horses and threatened green sea turtles. These waters also support transiting dolphins, endangered humpback whales, and critically endangered Hawaiian monk seals who have been hauling out more frequently to rest on K-Bay beaches in recent years. In 2009, a threatened Olive-Ridley turtle nested and over 50% of the hatchlings successfully reached the sea from K-Bay's Pyramid Rock Beach, only the 3rd time ever recorded anywhere in Hawaii. Olive-Ridley hatchlings were again sighted here in Dec 2011. Fossil shells on reef ledges along Ulupa'u Crater's coastline are of an extinct marine gastropod (*Conus kahiko*) at least 120,000 years old. A fossil bird bone deposit here is Hawaii's oldest, dating 400,000 years before present. Specimens collected were properly curated, and made accessible for public display at Hawaii's Bishop Museum and the National Smithsonian Institute. An invertebrate survey discovered an endemic moth species new to science on slopes of the volcanic feature, Pu'u Hawai'i Loa, in the middle of Mokapu Peninsula.

3. Organization and Staffing - The base Environmental Compliance and Protection Department (ECPD) comprises a USMC Captain as director, and 30 military and civilian environmental professionals. Base natural resources staff within the Conservation Division, ECPD, consist of a GS-12 team leader/senior natural resources manager; a GS-11 natural resource manager; a GS-9 bioscience technician; and a GS-11 conservation law enforcement officer. The natural resources team works closely with other ECPD teams in overlapping program areas (e.g., clean air, water, solid/hazardous waste management, cultural resources, outreach, spill response, recycling, pollution prevention, and use of geographic information system applications). On-base assist also comes from facilities planners, engineers, shop laborers, military police, military training operators, legal staff; budget officers, inspectors, and the Base Environmental Impact Review Board. Off-base assist comes from US FWS, National Oceanographic and Atmospheric Administration (NOAA)-Fisheries, Hawaii Department of Land and Natural Resources (DLNR), US Department of Agriculture (USDA) Wildlife Services; O'ahu Invasive Species Committee, contractors, scientists, volunteers, and Native Hawaiians with traditional knowledge. For most of the award period, our GS-11 natural resources manager has been serving the nation on active Marine Reserve duty. We are ably assisted in his absence by interagency partnering, contractors and volunteers.

4. MCB Hawaii's Integrated Resources Management Plan (INRMP) – Since 2001, when 1st completed per the Sikes Act, our INRMP - a combined plan and environmental assessment - guides our ecosystem-based approach to natural resource management, while supporting quality of life and “no net loss” in military training options. Required regulator

concurrence was received from US FWS, NOAA-Fisheries, and Hawaii DLNR. In 2006, we completed the 1st five year INRMP Update, and in 2011, the 2nd INRMP Update as required. During this decade of INRMP implementation, we completed over \$12M worth of discrete management actions. This reflects an average of \$6M spent every 5 years, consistent with the projected \$6M programmed over the next 5-year implementation period (2012-16). Types of INRMP management actions covered are similar over time, grouped under specific goals and objectives, within seven “course of action” categories: wildlife, wetland, watershed, coastal and marine resources, grounds maintenance and landscape, access/quality of life/outdoor recreation, and resource information management. Per Federal directives, we have followed consistent criteria for developing INRMP actions, measuring INRMP implementation progress, and completing required regulator reviews since 2001. This systematic INRMP implementation/evaluation process contributed to MCB Hawaii’s being the 1st USMC installation to successfully meet EPA’s requirement that federal agencies implement principles-based environmental management systems (EMS) with performance measures for tracking progress. MCB Hawaii has also followed a required, web-based Natural Resources Metrics Builder to document INRMP implementation, consistently receiving an overall “Green” score from State and Federal Sikes Act partners (FWS, NOAA-Fisheries, Hawaii DLNR) and military trainers participating in the scoring process.

PROGRAM SUMMARY/OUTSTANDING ACCOMPLISHMENTS (FY10-FY11)

1. INRMP Program/Progress Summary - Most of the management actions programmed to occur in these 2 years at time of the 2006 INRMP update were successfully executed. A total of 593 out of 691 discrete management actions listed in the INRMP 2006 Update were either completed, started, or in-progress by the end of FY11. Some actions were implemented ahead of schedule and some optional action opportunities pursued that were unforeseen in 2006. Some less critical actions were deferred in order to address emergent priorities. Overall, our INRMP is being implemented on time and within budget. Favorable, above-cited regulator review has been independently verified: (1) In March 2011, MCB Hawaii was honored by FWS with a Certificate of Recognition for “Outstanding Partnering Efforts for Resource Conservation;” (2) NOAA Fisheries published a proposed rule (Federal Register (FR) June 2, 2011, Vol 76, No. 106, pp 32025-320643) to revise Critical Habitat (CH) for Hawaiian Monk Seals by including suitable O’ahu beach and offshore waters within that designation. Although we host rising numbers of monk seals at our beaches and offshore waters, NOAA declared these areas “ineligible” to be included in this ruling because, as stated in the FR: “the MCB Hawaii INRMP demonstrated potential conservation benefits for the species, a strong history of plan implementation, and a clear structure to ensure plan effectiveness; thus the plan was found to be a benefit to the species....Based on these benefits....., we determined that the areas covered under the MCB Hawaii INRMP on O’ahu are not eligible for designation as critical habitat.” NOAA’s determination of our INRMP’s effectiveness thus relieves Base from additional regulations associated with operating in a CH designated area.

2. Outstanding Highlights - Integrated Natural Resources Management Program - Our INRMP is a “living” document, continuously improving through adaptive management after completion of each action, stakeholder input, and environmental response evaluation. Below highlights key prescribed management actions completed, on-going, or initiated in each of the seven component INRMP areas during FY10 – FY11. They are described in the context of steady improvements over the last decade, in a broad array of areas--innovative staffing supplementation through effective partnering with military operators and cooperating agencies, non-government organizations, contractors, and the public to expand resource inventories, enforce natural resources laws, enhance wildlife habitats, control invasive species, and monitor natural resource responses to management actions, while supporting civil works, “no net loss” in military training, and quality of life.

a) Fish and Wildlife/Wetland Management – Wetland/WMA areas on K-Bay would be unable to support the protected bird diversity cited above without regular control of both plant invaders and vertebrate/invertebrate predators.

- Annual, supervised assault amphibious vehicle (AAV) “Mud ops” training has been hosted in K-Bay’s coastal wetlands just before endangered Hawaiian stilt nesting season for 30 years, to remove alien pickleweed that otherwise encroaches over nesting/feeding grounds, while enhancing AAV operator skills. This enduring partnership supports bird conservation and combat readiness, results in favorable publicity and community good will; while also contributing to increased Hawaiian stilt numbers (60 to 160 birds) counted during regular surveys..

- Endangered Hawaiian moorhens and coots prefer inland fresher-water wetlands. Ten years ago, they were rarely seen during bird counts at K-Bay’s inland, freshwater wetlands, whose habitats were degraded by weeds and sediment in-fill. Since then, a total of \$1.3M was invested in 2 INRMP wetland renovation projects (2003 at Klipper Golf

Course Ponds and 2007 at Percolation Ditch) that replaced invasive weeds with natives, re-contoured the banks, and dredged new pond depths for improved stormwater retention, bird foraging and nesting. Regular bird-monitoring and a site-specific 2010-completed contractor survey confirmed sustained improved numbers of these birds in these wetlands since then: 12 to 18 Hawaiian coots regularly forage and or breed in the Percolation Ditch where before, there were none; and 10 to 15 Hawaiian moorhens regularly forage or breed in Klipper Golf Course Ponds where before there were 2-3 birds. Another 2010-completed evaluation study of the Percolation Ditch wetland renovation project documented how its enlarged stormwater retention capacity now provides valued flood control benefits to an adjacent combat vehicle compound. This study spawned a follow-on proposal now seeking funds to trial salt-water irrigation here to curtail re-encroachment of salt-intolerant, invasive grass species found here to reduce reliance on herbicides. Without control, invasive grasses will eventually degrade this wetland and negate recent improvements. The proposal has triggered interest from FWS, who shares similar wetland weed threats at their refuges. Hence, through project implementation, evaluation, and adaptive management, we seek to continually improve upon our on-going efforts at wildlife/wetland habitat restoration.

- In 2010, we received a final wetland delineation report from an Army Corps of Engineers (COE) wetland ecologist retained to review/update an earlier wetlands delineation report for MCB Hawaii in 2002. The updated report verified expanded wetland boundaries at the Percolation Ditch (per the above-cited project), and re-affirmed boundaries of the 2002-listed wetlands. It also mapped 2 additional jurisdictional wetlands along Waimanalo stream at MCTAB. Such surveys must be regularly updated since Army COE wetland boundary certifications are valid for only five years at a time.

- In 3 years since a new full-time bioscience technician position was filled, our predator trapping efforts have become more frequent, systematic, efficient and better documented. Collaboration with U.S. Army, New Zealand (NZ) Dept. of Conservation, and US FWS biologists led to our acquisition of NZ-made DOC250 cage traps to augment live-tomahawk type traps to control predators of protected birds on base. These traps are humane, efficient, and decrease reliance on rodenticide bait stations, thus supporting pesticide reduction goals. Rodent attacks on newly emerged, endangered 'Ohai plants (2008) at Nu'upa Ponds WMA have been curtailed through construction of protective cage enclosures, allowing these plants last seen here in the 1930's to again thrive in the area.

- A 2009-initiated, on-going project with FWS cooperators is addressing a new aggressive Invertebrate invader, yellow crazy ants, at our wedge-tailed shearwater colony, causing nest/chick abandonment. It involves testing relative effectiveness of various target-specific ant baits. Lessons learned will help FWS treat a similar problem at bird colonies on remote Johnston Atoll where less frequent visits are possible to conduct such trials.

- Wetland and predator trapping improvements cited above have contributed to a rebound of the endangered Hawaiian duck/duck hybrids found at K-Bay.. Prior to 2002, surveys typically detected less than 20 ducks per visit. From 2007 to 2011, an average of 95 Hawaiian ducks or hybrids have been noted during bird counts.

b) Watershed Management – For the past 10 years, MCB Hawaii has made significant, systematic progress in characterizing flooding, erosion, and sediment-laden run off problems on its properties and implementing solutions in a phased, geographically-focused watershed-based approach. K-Bay's Ulupa'u Crater was a first focus area due to its highly-erodible tuff-type lava composition and critical function hosting housing, a landfill, a weapons training platform, a red-footed booby seabird colony, and due to its "downstream" sensitive marine water surroundings.

- Two erosion assessments were performed (2003, 2007) to pinpoint erosion "hot spots" around the Crater and identify solution concepts that were subsequently designed and constructed in 3 projects between 2008 and 2011. The 1st \$800K INRMP project repaired one mile of a steep, severely rutted weapons/booby colony access road in the Crater using the latest stormwater diversion designs and technology. The road's base course of highly erodible coral fill was replaced with a basaltic gravel one, with a geotextile lining. The road was re-graded to allow drainage diversions at intervals along the road into small micro-basins at the discharge locations. A drainage ditch was built alongside the road to catch the diverted runoff. Since then, gulying in the road has been reduced and the road's geotextile liner has stopped invasive weeds from growing into the road, helping reduce fire risk and herbicide use

- The other 2 projects, valued at \$1.9M, were completed in 2011. They control erosion along the Crater's steeply-eroded southeast slopes and shoreline below the weapons range/landfill and along the north-facing Crater slopes above housing and North Beach. Unlined drainage ditches were lined with a self-cleaning, corrugated High Density Polyethylene (HDPE) material; eroded north-facing Crater slopes and seaside cliffs above the Crater's southeastern shoreline were stabilized with waddles (biodegradable erosion-stabilizing material) that slow runoff, catch sediment, and foster plant growth to further anchor down the soil. Drainage diversion features were installed at the range parking lot and gutters along the asphalt road used daily for critical access to/from the landfill and weapons range. Cumulative results of

these projects have improved access, reduced road maintenance, decreased landslide threats above housing, and arrested siltation in downstream marine waters. During the 2010 annual INRMP progress review meeting with partner agencies, a Pacific Islands office FWS representative stated that these projects are “right on target” in addressing national objectives to mitigate land erosion and reduce sediment and non-point pollution in surrounding sensitive marine habitats.

c) Coastal and Marine Resources Management – Since a Headquarters Marine Corps 1999 compliance evaluation that said MCB Hawaii was not paying sufficient attention to marine resource concerns, significant progress has been made.

- In 2010, we funded \$80K to fill data gaps in an earlier FY03-funded, 2008-completed \$110K coastal and marine resources inventory in waters around K-Bay. Both the baseline survey and this on-going supplement are being carried out by an FWS-led interagency team comprising some of the top State and Federal marine biologists in Hawai'i. They are characterizing many unique attributes in K-Bay's 500-yard security buffer zone around the peninsula. The supplemental survey is photo-documenting benthic conditions and producing sensitivity maps for incorporating into the base Geographic Information System (GIS). The FWS biologist leading this inventory states that their findings show our waters rival “some of the best sites within the Northwestern Hawaiian Islands,” the most pristine part of the Hawaiian Island chain.

- Kane'ohē Bay's reef systems are among the most studied and scientifically valued in the world. Non-point pollution from increasingly urbanized surroundings and other threats (e.g., invasive species, marine debris, overfishing, and intense recreational use pressures) continue to pose challenges for regional resource managers and MCB Hawaii. Our conservation law enforcement officer has a dedicated vessel and teams with our waterfront operations' active-duty Navy staff to patrol our 500-yard security buffer zone around the peninsula, and apprehend illegal fishing, net laying, and reef diving activities. They confiscate illegal or abandoned fish nets that would otherwise harm marine life. In FY10-11 alone, 2 dinghies used to lay illegal gill nets were confiscated, along with 22 illegal fish traps, 8,000 ft. of illegal gill net and 3 tons of marine debris. Over 12,000 ft. of nets and 9 tons of debris were removed in 5 years. Waterfront operations also assist US Coast Guard on windward O'ahu—providing critical first response to water safety accidents and spill situations. They host boat mooring/launch support for FWS, NOAA, State DLNR special agents and University of Hawaii's marine mammal researchers through cooperative agreements. Sharing access has enabled all agencies to stretch limited dollars for more effective, cooperative region-wide marine enforcement, resource surveys, and research, while preserving valuable military marine training space.

d) Grounds Maintenance and Landscape Management – Over a decade, MCB Hawaii has complied with numerous directives to implement sustainable development principles in everyday government practices. We strive to create exceptional, sustainable buildings and integrate them with the surrounding environment while conserving natural resources, providing operational effectiveness, and promoting a Hawaiian “sense of place” (1) Planting regionally-indigenous plants in public places; and (2) systematically eradicating high-maintenance, often flammable, invasive plant species in protected wildlife and critical military training areas are two key aspects of this “greening of government” revolution underway. Recent highlights of MCB Hawaii's “sustainable landscaping” follow.

- Our INRMP cites planting and landscape maintenance guidelines required by both in-house and contracted projects. It cites our policy of not less than 50% native plants in new or renovated tree, shrub, and understory landscaping schemes. We review plans and inspect areas to ensure compliance. Our INRMP contains specific lists of preferred native/regionally indigenous species to be used; and of prohibited species to be avoided, due to invasive or high-maintenance characteristics. These lists are regularly reviewed, updated as needed, reprinted with every INRMP Update, widely disseminated, and posted on our internet natural resources website.

- Over 10 years, \$2.5M has been invested in landscaping at six major housing, barracks, office, recreational, and static display areas on K-Bay and at Camp H.M. Smith, emphasizing use of prescribed native plants. We also implemented a vision to restore watershed health and help restore a “Hawaiian sense of place” by creating a more natural meander in the straightened K-Bay central drainage corridor, in a \$1.7 million project that improved flood control, wildlife habitat, scenery, and installed native trees, shrubs, and ground cover along its stream banks. The earlier-cited wetland renovation Klipper Golf Course project incorporated native plants; course managers systematically replaced the “greens” with environmentally-friendly *Paspalum* grass enabling reduced use of herbicides and enhanced water conservation.

- Most recently (late 2009 through 2011), \$300K were invested in 2 projects that installed 230 native/regionally indigenous trees and palms in public spaces on K-Bay, and removed some high maintenance species.

- “Greening” the base with species that help restore a “Hawaiian sense of place” has been noticed by external stakeholders. In 2011, Outdoor Circle, the oldest (established 1912) environmental organization in Hawaii, gave us a Certificate of Recognition for “Sustainable Landscape Improvements on Mokapu Peninsula.” One of the trees regularly

used in landscaping projects is the lauhala (*Pandanus tectorius*), a highly-valued indigenous species treasured by “hala” weavers among Hawaiians and other Polynesian groups, whose distribution across Hawaii has diminished over time. After noticing increased presence of hala on base, several of Hawaii’s noted weavers inquired and received conditional access to specific hala trees, between 2009 and present, to regularly harvest its abundant leaves for use in no cost educational workshops that perpetuate this tradition.

- Vegetated cover on base training ranges, as well as those of other Services in Hawaii is primarily non-native; dominated by highly-flammable invasive grass species that do not hold the soil or water as efficiently as natives, hence augmenting erosion and flooding risks as well. An important INRMP objective has been to better control vegetation in training landscapes, using a phased, cooperative approach. The task is daunting due to the ubiquitous nature of the statewide invasive plant cover. Recent highlights of efforts at MCTAB follow:

- At time of the 2001 INRMP, \$350K was invested in vegetation mapping and development of a prioritized management plan for vegetation control at this training area, newly-acquired from the Air Force. Vegetation removal projects have since been prioritized, undertaken, or planned using environmental, facilities, and military training staff and budgets. Vegetation maps show that unimproved MCTAB acreage is dominated by flammable Guinea grass, valued among cattle ranchers, who formerly grazed on Bellows up to the 1970s. A 2008 DoD Legacy-funded study evaluated re-introduction of dairy cattle on MCTAB as a cost-effective method for reducing guinea grass fuel load as compared to mechanical or herbicide methods. Promising study results led us to fund a \$162K FY10 INRMP project to evaluate the economic climate and contract mechanisms feasible for re-introducing a limited cattle grazing program on a non-interference basis with training. Preliminary study findings show promise and an interested market base. While working on reducing existing fuel load, we are also pro-actively addressing new invasive weed threats. For example, Fountain grass (*Pennisetum setaceum*), one of Hawaii’s most flammable noxious weeds, plagues Hawaii Island but is still scarce on O’ahu. To keep it from spreading at MCTAB, since 2002 we have led annual “Fountain Grass Hunts,” with help of other Bellows users (Air Force and Hawaii Army National Guard and state-paid personnel from the O’ahu Invasive Species Committee). After 10 years of annual patrols, our interagency team efforts have successfully detected, mapped, and removed most incipient Ft. grass clumps from Bellows, reducing its presence from a high of 201 clumps in 2003 to a low of one clump in 2011. Since Ft. Grass persists throughout Hawaii, interagency patrols will continue.

e) Natural Resources Access/Educational Outreach/Outdoor Recreation Management –

- (1) **Access/Outreach** - Providing public access to/outreach about Base natural resources is a Sikes Act requirement in such manner as to not compromise security, military training, or resource conservation. Over 10 years, 10,244 people participated in our INRMP program. More specifically, 7,366 were involved in on-base natural resources tours or service projects, while 2,878 were reached off-site at staff presentations in public forums and professional conferences. In 2010 - 2011, we coordinated 53 service projects, involving 532 military and civilian volunteers donating 278 labor hours—mostly as “Weed Warriors” in K-Bay wetlands. Military volunteers participate, as well as civilians from service organizations or schools. Of note is that the Sierra Club Hawaii Chapter “adopted” MCB Hawaii’s wetlands, contributing volunteers over the past 30 years. Hawaii’s Youth Conservation Corps regularly volunteers, with about 10 members donating 2 weeks each summer, to gain hands-on insight into a conservation career. Audubon bird counts have been hosted for over 6 decades. These enduring partnerships testify to sustained program bonds with the community. Volunteers help sustain gains made by contracted large-scale weed removal projects funded over the years. Without them, for example, we would not have kept invasive mangrove plants (alien in Hawaii) from re-colonizing our wetlands, after a preceding 25 year, 2.5 million dollar phased project that removed them from 30 acres of K-Bay wetlands. Mangrove propagules float in on the tide to K-Bay wetlands from off-base sources. (2) **Tours/Presentations** - In 2010-11, natural resources tours or presentations were performed for a variety of publics; e.g., kupuna (Native Hawaiian elders/teachers); military spouse groups; government students in a FWS-sponsored Migratory Bird Treaty Act Course; and a Navy environmental course, University of Hawaii students, Mokapu elementary school teachers/students, Hawaiian language immersion program students; VIPs from various Asia or Pacific nations, and U.S. and/or State legislators and their staff members.

- **Recreational Resource Management** - (1) **Shoreline Access**—MCB Hawaii provides public access to ocean/coastal resources within operational, environmental, and security constraints. The public is sponsored at K-Bay by families and for special events (e.g., surfing competitions) and enjoys weekend access at MCTAB’s Bellows Beach under a cooperative agreement with C/C of Honolulu, who manages weekend use. Marathon running/biking contests at K-Bay include access to scenic coastlines without disturbing native vegetation, wildlife nesting, or Native Hawaiian burial grounds.

A popular marina and a dive club are active. Annually, the marina sponsors a “Day on the Docks” event with a fishing derby for kids and education booths from partner resource agencies; (2) **Nu’upia Ponds Recreational Run Trail Access** – Since 2003, after an Environmental Assessment (EA) and FWS consultations were completed to ensure routes avoid impacts on sensitive wildlife, recreational running is enjoyed around the ponds’ outer perimeter by hundreds of joggers and controlled unit formations. A popular annual MCB Hawaii “Swamp Romp” event attracts over 1,000 on- and off-base entrants whose route also avoids wildlife impacts; (3) **Hunting/Fishing Access** - Lack of sufficient acreage, safety concerns, and presence of protected species preclude on-base hunting. Public fishing access is permitted at designated locations and off-base civilian fishers are allowed within enforceable numbers. 200 permits per quarter are issued on a first-come, first-serve, no fee basis. Natural resources and Military Police staff ensure fishers are properly informed about species allowed to be taken, those prohibited from take, and various gear/take limits. Fishing regulations and access maps have been recently revised/improved. A fisher survey/creel census was performed in 2011, updating a baseline survey completed in 2002; (4) **Bellows Beach Access Management Improvements** - Cumulative impact of weekend recreation here is a growing concern. In late 2009, a \$110K study evaluated best ways to control deterioration in the experience/site conditions where weekend camping is allowed. Due to budget-poor city staff, recreational user oversight had declined, and our conservation law enforcement officer and other staff documented crowding at campsites; illegal off-road vehicle and illicit open fire damage to resources; vandalism and illicit drug use at some campsites. A camping moratorium was called while the study proceeded. In 2010, the completed study recommended scaled back campsites, a centrally-controlled parking area, better signage and access points in/out of the area. Many recommendations were adopted. A revised agreement with C/C of Honolulu is being completed with their cooperation to implement the improved management system.

f) Resources Information Management/Data Sharing – We have made great strides since the 1980s, when natural resources data was stored in scattered locations (bookshelves, cabinets, staff files). In the past 10 years, a deliberate effort was made to inventory and archive these data, and improve data update/access. Focus was 1st on compiling electronic data base bibliographies, and--as funds allowed--converting the most critical subset of it into updated, shareable, and stable electronic formats (e.g., print documents scanned into pdf; cassette tapes of oral interviews transferred onto Mpegs; videotapes converted into DVDs; photos scanned into jpg; and maps digitized into Geographic Information Systems (GIS)). Since 2006, over 700 natural resources documents were inventoried and condition assessed. Key documents were converted into updated formats and placed in more stable archival-quality containers. Some were shared, if appropriate, with public libraries or internet sites, such as DoD’s DENIX, and Hawaii’s Heritage Data Base.

- In 2010-11, key dynamic data bases were placed on an ECPD share-drive and undergo regular maintenance/update by staff and supervised contractors (e.g., a basewide species inventory; time/place-specific records of birds handled; birds counted; Ft. grass controlled, marine species haul-outs (Monk Seals and Turtles), predators trapped, natural resources tours/presentations/service projects conducted; bibliographies of natural resources reports, news articles, studies, plans, and publications on-hand. Geospatial data is being standardized and archived in the USMC GEOFidelis program. Starting 2007, a Microsoft Access bird observation database was designed and populated with decades of base bird observations (e.g., date/species/location), and refined to be more user-friendly. Starting 2009, a Microsoft Access predator control data base was designed and populated with stored data and improves ability to track and analyze patterns in invasive predator populations. Unlike its predecessor, this database is linked to GIS data and manipulated in ArcGIS. In 2011, written instructions were developed for both bird and trapping data bases to guide multiple users.

- Program efforts are shared in news media, websites, publications, conferences, and posters at local, national, and international levels. Recent staff contributions are: (1) Our senior natural resources manager is lead author of the Base INRMP and Updates (2001, 2006, & 2011). She mentors as a University of Hawaii affiliate faculty member through lectures, publications, encouraging interns and relevant faculty/student research. She contributed 2 case studies in Conserving Biodiversity on Military Lands, a Handbook for Natural Resource Managers, posted at: www.dodbiodiversity.org; (2) In 2011, our bioscience technician published bird monitoring base work in Marine Ornithology; (3) our conservation law enforcement officer annually facilitates on-base training for 50 colleagues from State, FWS, and NOAA agencies (e.g., boat safety, firearms qualifications); and presents to military range users at mandatory pre-user orientation briefs. In 2011, MCB Hawaii partnered with Headquarters Marine Corps, FWS, and NOAA on a poster in a national series of “Saving a Few Good Species” posters. It celebrates coexistence of Marines and monk seals at MCB Hawaii. This is the 2nd MCB Hawaii-featured poster in a decade—a 2004 poster celebrates our enduring “Mud Ops” partnership between Marine amphibious vehicle training and improved Hawaiian stilt wetland habitat. These posters are widely circulated via internet and hard copy.