

SUBGOAL 2-B: PROTECT THE SOUTH FLORIDA ECOSYSTEM FROM THE HARMFUL EFFECTS OF INVASIVE EXOTIC SPECIES

**Table 4: Subgoal 2-B: Control Invasive Exotic Plants and Animals
Comprehensive Status July 2012–June 2014**

Objective	Projects	Status
<p>Prevention <i>Objective 2-B.1: Prevent the introduction of invasive exotic species.</i></p>	Brown Marmorated Stink Bug (interception and research for potential biocontrols [Project ID 2500])	Implementation: Ongoing; (project up for annual renewal).
	FDACs Detector Dog Teams [Project ID 2501]	Implementation: Ongoing.
	Fruit Fly Survey and Detection [Project ID 2502]	Implementation: Ongoing, (project up for annual renewal).
	Python Responder/Patrol Training [Project ID 2503]	Implementation: Ongoing.
	Exotic Psyllids and Liberibacter species [Project ID 2504]	Implementation: Ongoing.
	High Risk Areas-target domestic inspection activities at vulnerable points in the safeguarding continuum [Project ID 2505]	Implementation: Ongoing.
	Interdiction Sites and Marina and Canals [Project ID 2506]	Implementation: 9/26/2013-2014 status complete.
	Effects of exotic fish on Everglades structure and function: risk assessment [Project ID 2507]	A literature review is currently being conducted FY14 funds will support studies to fill gaps in the known physiological tolerances of Spottfin Spiny Eel and Banded Cichlid, two species key to the development of a quantitative risk assessment model funded under the USGS Natural Resources Preservation Program.
	Enhanced pest detection at high-risk domestic interdiction sites and marinas/canals systems [Project ID 2508]	Implementation: Ongoing, (project up for annual renewal).
Enhancement of Fruit Fly Immature Stage ID and Taxonomy [Project ID 2509]	Implementation: Ongoing, (project up for annual renewal).	
<p>Early Detection and Rapid Response <i>Objective 2-B.2: Eradicate Invasive Exotic Species through Early Detection and Rapid Response.</i></p>	Early detection of new exotic fish species in adjacent canals Vital Sign [Project ID 2601]	In 2013, SFCN conducted its second year of electrofishing in the canals along the periphery of Everglades National Park (EVER). Last year's initial pilot study determined that nighttime electrofishing yields higher fish abundance and higher species richness, and species composition of canals are stable over 3 year sample periods. The 2014 study is still in progress.
	Mexican Red Bellied Squirrel Eradication on the Islands in Biscayne National Park [Project ID 2602]	Since 2006, EPMT has found 1,814 dreys, 49 squirrels, over 1,760 hours.
	Development of comprehensive fish monitoring programs in Everglades National Park [Project ID 2603]	Implementation: Ongoing.
	Cooperative Agricultural Pest Survey [Project ID 2604]	Implementation: Ongoing, (project up for annual renewal).
Everglades Invasive Reptile and Amphibian Motoring Program [Project ID 2605]	Implementation: Ongoing (funded through state FY 2015).	

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<p>Early Detection Rapid Response Continued</p> <p><i>Objective 2-B.2: Eradicate Invasive Exotic Species through Early Detection and Rapid Response.</i></p>	<p>Metagenomic (eDNA) survey in south Florida waters [Project ID 2606]</p>	<p>Implementation: Water samples were analyzed using the Titan supercomputer at Oak Ridge National Laboratory. Tentative identifications were made on thousands of taxa from viruses to mammals. These include many disease organisms and invasive species. Positive taxonomic identifications require specific genetic verifications which have yet to be performed, pending NPS input and recommendations.</p>
	<p>Development of eDNA for Nile Monitor detection and removal [Project ID 2607]</p>	<p>Implementation: Method development is underway.</p>
	<p>Burmese python eDNA development and application [Project ID 2608]</p>	<p>Implementation: Methodology developed and published in 2013/2014; field sample collections and analyses are ongoing.</p>
	<p>Miami Dade Fire Rescue Rapid Response and Invasive Species Removal (Venom Response) [Project ID 2609]</p>	<p>Implementation: Personnel from the unit are currently actively engaged in removal of exotic species during the course of their normal 24 hour workday, and respond to complaints of non-native species regularly.</p>
	<p>Nile Monitor Eradication Project [Project ID 2610]</p>	<p>Implementation: Ongoing.</p>
	<p>Giant African Land Snail Eradication Program [Project ID 2611]</p>	<p>Implementation: Ongoing.</p>
	<p>Northern African Python Removal [Project ID 2612]</p>	<p>Implementation: Ongoing.</p>
	<p>Corridors of Invasiveness Vital Sign [Project ID 2613]</p>	<p>Implementation: A complete sample of all selected survey sites in the three National Park Service units (BISC, EVER, BICY) occurs every five years. Sampling effort is balanced across years by using a rotating design, with year one starting in Biscayne National Park, year two dedicated to the eastern region of Everglades National Park, and year three dedicated to the south region of Big Cypress National Preserve. Because most of the area of Biscayne National Park is marine, survey sites are restricted to areas of the mainland and a few of the off-shore keys. Therefore, all of BISC can be surveyed within one annual cycle. Since all of BISC will be surveyed in a single year, year four will be dedicated to the western region of EVER, and year five will be dedicated to the north region of BICY, with year six starting the cycle over again, and dedicated to all of BISC. So far BISC, Eastern EVER, and South BICY have been completed. This summer, western EVER will be surveyed.</p>
<p>Fruit Fly Eradication Methods Development [Project ID 2614]</p>	<p>Implementation: Ongoing.</p>	

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<p><u>Early Detection Rapid Response Continued</u> <i>Objective 2-B.2: Eradicate Invasive Exotic Species through Early Detection and Rapid Response.</i></p>	eDNA monitoring of five aquatic invasive species in South Florida [Project ID 2615]	Implementation: The USFWS's Region 4 Conservation Genetics lab has developed eDNA qPCR markers for five AIS taxa found in the Everglades: Mayan cichlid, African jewelfish, bullseye snakehead, Asian swamp eel, and lionfish. This technique has been used to sample waters of the A.R.M. Loxahatchee National Wildlife Refuge (Water Conservation Area WCA-1) to help monitor species such as African jewelfish and bullseye snakeheads, found in canals outside the refuge.
	ECISMA Early Detection Rapid Response [Project ID 2616]	Implementation: Ongoing management of ECISMA priority EDRR species through ECISMA workdays and contracts. Florida Fish and Wildlife Conservation Commission provides funding for rapid response for new invasive species documented on Florida CISMA EDRR plant lists. The National Park Service, Broward County, Miami-Dade County and others have provided personnel and supplies to respond to newly detected invasive species eradication efforts.
	Develop and Implement a FWS Invasive Species Strike Team (ISST) [Project ID 2617]	Implementation: Ongoing.
<p><u>Containment</u> <i>Objective 2-B.3: Contain the spread of invasive exotic species</i></p>	Eradication of Gambian Pouch Rat [Project ID 2700]	Implementation: Ongoing.
	Population suppression and biology of Black spiny-tailed Iguanas <i>Ctenosaura similis</i> [Project ID 2701]	Implementation: Ctenosaurs continue to be removed from Gasparilla Island (Charlotte County) by USDA Wildlife Services personnel. Necropsies are being performed to document additional aspects of the biology of the invasive population.
	Argentine black-and-white tegu (<i>Tupinambis merianae</i>) interdiction [Project ID 2702]	Implementation: Ongoing.
	Improve probability of detection and removal of pythons and other invasive reptiles [Project ID 2703]	Implementation: In initial development currently funded through fiscal year 2014/15.
	Feral Swine Assessment of control and impacts to help contain [Project ID 2704]	Implementation: Recently underway with FY2014 funds. Projects will include quantifying swine damage before and after control measures are implemented so that efficacy of control actions can be measured.
	BICY exotic reptile IES data sheet [Project ID 2705]	Implementation: Efforts to control invasive exotic reptiles currently depend upon chance observations from visitors (public and private), contractors, employees, volunteers, and landowners, who report those observations, or are in a position to capture or kill the animal. Often a lag exists between reported observations and staff response capability.

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<p><u>Long-Term Maintenance Management</u></p> <p><i>Objective 2-B.4: Reduce the populations of widely established invasive exotic species and maintain at lowest feasible levels.</i></p>	<p>Schaus swallowtail butterfly (<i>Heraclides aristodemus ponceanus</i>) Habitat Enhancement [Project ID 2800]</p>	<p>Implementation: To date, we have planted 2,007 torchwood, 445 wild lime, and 96 nectar plants, for a grand total of 2,548 plants. Plantings took place at Elliott Key in the main breezeway restoration area, and Spite Highway restoration area. Additional plantings took place in Adam's Key in the main restoration area and the breezeway restoration area. Constant maintenance has been done in these areas including herbicide application, removal of noxious weeds, and watering of seedlings. This is necessary as plants are not yet mature enough to shade out understory and prevent weed growth. There is currently ongoing monitoring and removal of exotics species on the project site.</p>
	<p>Tegu Trap and lure [Project ID 2801]</p>	<p>Implementation: Testing is underway.</p>
	<p>Enhanced Mitigation Techniques for Control of Cactus Moth [Project ID 2802]</p>	<p>Implementation: Ongoing (project up for annual renewal).</p>
	<p>Biological Control of Imported Fire Ant [Project ID 2803]</p>	<p>Implementation: Ongoing (project up for annual renewal).</p>
	<p>Enhanced Mitigation Techniques for the Control of Several Whitefly Species [Project ID 2804]</p>	<p>Implementation: Ongoing (project up for annual renewal).</p>
	<p>Expansion of Asian Citrus Psyllid Biocontrol [Project ID 2805]</p>	<p>Implementation: Ongoing (project up for annual renewal).</p>
	<p>Python Removal Program - FWC [Project ID 2806]</p>	<p>Implementation: Ongoing.</p>
	<p>Everglades Complex of WMA's Exotic Plant Control [Project ID 2807]</p>	<p>Implementation: Ongoing annually or biennial (Lygodium surveys).</p>
	<p>Everglades Complex of WMA's Restoration Native Tree planting [Project ID 2808]</p>	<p>Implementation: Ongoing.</p>
	<p>Miami-Dade County Environmentally Endangered Lands Program-Conservation Land Acquisition and Management [Project ID 2809]</p>	<p>Implementation: Since its inception, the EEL Program has acquired and manages more than 20,800 acres of land within the Greater Everglades Ecosystem, including pine rockland, tropical hardwood hammock, salt marsh, mangrove and freshwater wetlands. The EEL Program manages an additional 2,800 acres of environmentally sensitive lands owned by the county Parks Department. Over 20,000 acres of land within the EEL Program's inventory are within the CERP C-111 and BBCW project footprints. The primary effort of management activities is eradication of invasive exotic plant species and restoration of native habitats at a cost in excess of \$3,000,000 per year.</p>
<p>Arthur R. Marshall Loxahatchee National Wildlife Refuge -Invasive Exotic Control Program [Project ID 2810]</p>	<p>Implementation: Ongoing.</p>	
<p>Python removal authorized agent program for South Florida National Parks [Project ID 2811]</p>	<p>Implementation: Start 2009 and Ongoing.</p>	

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<p><u>Long-Term Maintenance Management Continued</u></p> <p><i>Objective 2-B.4: Reduce the populations of widely established invasive exotic species and maintain at lowest feasible levels.</i></p>	Lionfish assessment and control in South Florida National Parks [Project ID 2812]	Implementation: Ongoing.
	Palmetto Bay/Cutler Bay Coastal Habitat Restoration (Project ID 2813)	Implementation: 2013 start and ongoing.
	Digital Aerial Sketch Mapping (DASM) of 4 priority Invasive plants and Laurel Wilt [Project ID 2814]	Implementation: 2013 start and ongoing.
	Python Chemical Communication [Project ID 2815]	Implementation: Data collection for the project begins in 2014 to identify and isolate python sex pheromones to improve trapping success.
	Genetic Analyses of invasive reptiles in Florida [Project ID 2816]	Implementation: Genetic sequencing of Agama (15 specimens), Ctenosaura (22 specimens) and Python sebae (21 specimens) are ongoing.
	Thermal infra-red detection of Burmese pythons [Project ID 2817]	Implementation: Readings were collected and the data are being analyzed, with follow up trials to be determined.
	C&SF:CERP Melaleuca Eradication and Other Exotic Plants (OPE) (CERP Project WBS # 95) [Project ID 2818]	Construction: Rearing facility under construction. Completion expected October 2012.
	Everglades National Park Exotic Control Program (Project ID 2819)	Implementation: Ongoing.
	Hole-in-the-Donut [Project ID 2820]	Implementation: Ongoing.
	Aquatic and Upland Invasive Plant Management [Project ID 2821]	Implementation: Ongoing.
	Invasive Exotic Plant Control in Terrestrial and Aquatic Natural Systems [Project ID 2822]	Implementation: Ongoing.
	Invasive Species Research and Information Exchange [Project ID 2823]	Implementation: Ongoing.
	Enhancement of the Aquatic Resources at the Miccosukee Tribe [Project ID 2824]	Implementation: Ongoing.
	Big Cypress National Preserve Long-term Maintenance and Control of Invasive Exotic Plants [Project ID 2825]	Implementation: Currently, Australian pine is at maintenance level; Lygodium is the Preserve's highest priority exotic; melaleuca is at or near maintenance level; and Brazilian pepper while being addressed in all existing exotic plant treatment contracts, is far from a maintenance level. About 20% of the Preserve acreage remains infested with invasive exotic plants. New threats from exotic plant invasion are eminent.
	Mitigating ecological and cultural effects of Laurel wilt disease [Project ID 2826]	Implementation: Ongoing.
Invasive Exotic Plants Control in Terrestrial and Aquatic Natural Systems [Project ID 2827]	Implementation: Maintenance control of Melaleuca achieved in most regions of the Everglades Protection Area.	