# Region 1 FY 2015 Invasive Species Control Program Proposal

**Refuge/complex name:** Midway Atoll National Wildlife Refuge/Battle of Midway National Memorial
**Project title:** Ironwood Removal for Dune Restoration and Sea Level Rise Resiliency
**Total amount requested:** $40,000

**Project description:** The proposed project consists of removal of invasive, non-native ironwood trees (*Casuarina equisetifolia*) from approximately 40 acres of high priority coastal strand habitat along the western shore of Sand Island, Midway Atoll. Native to Southeast Asia, the southern Pacific Islands, and Australia, at Midway, ironwood is a highly invasive tree species that forms dense, monotypic stands. It has demonstrated its ability to outcompete desired native plants by altering soil chemistry and limiting light. With very shallow roots, these trees also have a high propensity of blowdown and branch breakage even in moderate winds, which poses a significant hazard to wildlife, humans, and infrastructure. This also makes ironwood a dune destabilizer, causing moderate to severe coastal erosion in invaded areas. A coastal strand habitat with native species richness free of invasive species competition is superior at supporting dune accretion than monotypic ironwood habitats and is critical for long-term habitat viability in the face of sea level rise. Ironwoods preclude seabird nesting, pose flight hazards to seabirds, and are barriers to fledgling albatrosses attempting to reach the shoreline.

The project builds on an existing, successful Refuge-wide invasive plant control program using current control techniques. Requested funding will provide hourly labor for the existing Base Operations Support Services contract personnel to remove ironwood using Refuge heavy equipment. The remaining funds will be used to purchase necessary project support equipment (chainsaws, fuel, PPE, herbicide, etc.). The resident contract employees are skilled workers experienced at tree removal and will work under the guidance of Refuge staff over a 4-week period between July and October to systematically remove with heavy equipment and cut, pile, and burn all ironwood trees within the project area. The area can be accessed with heavy equipment existing at the Refuge (tracked excavator and front-end loader), which will be used to uproot entire trees where appropriate and move them to designated burn piles in pre-existing clearings. Trees unsuitable for complete removal will be cut, stumps treated with an appropriate herbicide to prevent regrowth, and the biomass piled and burned. Long-term benefits include a native-dominated coastal shrub and grass community that supports seabird nesting, dune accretion, and sea level rise resiliency.

**Distinct project with well-defined objectives (10 points):** The project has five main objectives: 1) compliment a Refuge-wide invasive plant control and eradication program to enhance seabird nesting habitats (including those required to maintain the largest nesting albatross colony in the world); 2) thwart the spread of ironwood on the Refuge by focusing efforts on nascent foci; 3) eliminate ironwood in high priority habitat types including coastal dune/strand; 4) increase sea level rise resiliency by allowing re-vegetation of coastal habitat with native, dune-stabilizing plants; and 5) reduce the amount of bird mortality as a result of ironwood trees and large branches falling in the wind. This project addresses the Papahānaumokuākea Marine National Monument Management Plan Strategy HMC-3 "Protect and restore beach strand and crest habitats over the life of the plan." The project also fulfills Objective 1.D of the Refuge's draft Terrestrial Habitat Management Plan (THMP). Strategies under this objective list ironwood forest removal along the western coastal strand on Sand Island as the highest ironwood control priority to benefit seabird populations. The draft THMP also defines improving coastal strand resiliency to projected sea level rise and storm surge impacts as a primary, Refuge-wide goal. Selection of the project site is based on the review of the localized impacts of dynamic sea level rise using USGS 2013 modeling data. The area is predicted to be especially vulnerable to storm surge and wave action under 1 m and 2 m sea level rise scenarios, making the elimination of plant species that destabilize dune habitat a critical need. The project area was also selected based on historic nesting patterns of black-footed albatrosses (a priority species), which nest at high densities adjacent to the project area. Removal of ironwood within the area is not currently achievable with existing Refuge resources.

**Potential for maximum control/Likelihood of success (10 points):** Contractors and Refuge staff permanently residing on Midway Atoll are experienced with complete tree removal using heavy equipment. Since the trees will be completely uprooted or cut and stumps subsequently treated with herbicide (a.i. *Triclopyr*) and the biomass piled and burned during the short season when seabirds are not nesting (approximately July through October), complete removal of the standing biomass in the targeted area will be achieved no later than November 2015. With only a short time window of minimal nesting seabirds, intensive direct removal is the only effective means for

accomplishing project goals. Similar ironwood removal projects have been successful on the Refuge and routine maintenance has ensured those areas remain free of ironwood. Currently, existing staff and contractors are focusing control efforts on invasive herbaceous plants such as *Verbesina encelioides* and *Euphorbia cyathophora* in the ironwood forest understory. This control will continue and would include treating any ironwood seedlings within the project area. Although not required for project success, follow-on native plant outplanting as part of ongoing habitat enhancement and dune stabilization will complement the project and aid in facilitating conversion to desirable coastal plant communities within a few years.

**Biological benefit to priority species or BIDEH (10 points):** This project would be immediately beneficial to seabird colonies by the fall of 2015. Black-footed albatrosses, a species particularly vulnerable to the effects of sea level rise, are listed as a resource of concern in the draft THMP and are a priority species in the North Pacific region. Ironwood removal will improve airflow through the colonies, provide the open, physical structure preferred by black-footed albatrosses and other ground-nesting species, will result in greater connectivity between seabird nesting areas and beach habitats, and reduce flight collision hazards. The draft THMP also recognizes the Bonin petrel as a resource of concern, due to its vulnerability to sea level rise and Midway Atoll's significant contribution to the global population of the species. Ironwood roots do not provide the vegetative architecture needed to support the shallow burrows excavated by Bonin petrels, leaving the burrows subject to collapse. The small fibrous roots of native ground cover (which cannot coexist with ironwoods) are required to provide substrate stabilization and reinforcement. At least 15 species of seabirds and shorebirds that use Midway Atoll year-round and the federally endangered Laysan duck will benefit from the project.

**Sustainability (10 points):** The project will result in eradication of ironwood trees in the project area. Since the area is regularly monitored and treated during routine invasive plant control operations, any seedlings or stump resprouts will be easily controlled by ground crews. Ironwood seedlings are easily detected once the overstory is removed and will be treated during normal Refuge operations by basal bark treatment with Garlon 4 herbicide in a vegetable oil carrier. Ironwood trees were completely removed from Eastern Island in 2003 and from small selected areas on Sand Island in 2003-2004 and 2014. While monitoring for seedlings continues in the area treated in 2014, all of the treated areas are currently ironwood-free.

**Monitoring to document and evaluate project success (10 points):** Existing imagery, maps, and habitat data indicate that the project area has been invaded by ironwood since before 1994. Digital photography linked with GPS locations will be used to document existing conditions pre- and post-treatment. The project site will be revisited at least bimonthly for the first year post treatment to treat stump re-sprouting or seedling growth. Seedling ironwood trees and the expected flush of herbaceous weeds after tree removal will be treated on the regular weed treatment schedule currently maintained by Refuge staff and contract personnel. An annual census of breeding Laysan and black-footed albatrosses has been conducted across the entire project area since 2004. Continuation of that survey will yield important information about habitat use changes following ironwood removal.

**Budget: Total ISC Grant Funding Requested: $39,995.00**

| **Labor** | **Fuel** | **Supplies: PPE and Equipment** | **Herbicide** |
|---|---|---|---|
| 5 laborers, 160 hours each @ $16.00/hour | 973 gallons/month @ $15.00/gallon | **Nomex PPE for Fire**: Helmets, pants, shirts, gloves, boots, chest radio harnesses<br>**Equipment**: Stihl chainsaws, chainsaw chaps, herbicide backpack sprayers | JLB Oil Plus Improved (8, 15-gallon drums plus shipping)<br>Garlon 4 Ultra (2.5 gallon jugs), x10 |
| $12,800.00 | $14,595.00 | $8,000.00 | $4,600.00 |
| | | **TOTAL** | **$39,995.00** |

Labor and heavy equipment are on-site and employed routinely on the Refuge. Fuel, herbicide and other materials and supplies (including shipping to Midway Atoll) are not currently present at the refuge or not present in sufficient quantities and are all essential for the project to succeed.