Renewal for Cyanotech Corporation's Habitat Conservation Plan and Incidental Take License

Pursuant to Hawaii Revised Statutes Chapter 195D Cyanotech Corporation (Cyanotech) is requesting to renew its current *Habitat Conservation Plan for Hawaiian Stilt at the Cyanotech Aquaculture Facility* (HCP) (Ducks Unlimited Inc., 2002) and extend its incidental take authorization. The first permit issued to Cyanotech was Endangered Species Enhancement of Survival Permit No. T&E ES-01. In December 2003, the project was authorized by Protected Wildlife Permit (WLIT-04) for incidental take of the endangered Hawaiian Stilt (*Himantopus mexicanus knudseni*) (A`eo) as a result of ongoing operations and maintenance activities of the Cyanotech Aquaculture Facility. The Incidental Take License (ITL) was extended by amendments to March, 2016. In October 2015, Cyanotech submitted a request to their 2002 HCP to extend their ITL until 2035. The authorized take is the greater of 45 or the number of chicks produced to offset losses. To date Cyanotech has produced 103 fledglings and taken the equivalent of 43 (Table 1). The current "credit" of 60 fledglings exceeds the amount of take expected for the duration of the extension to 2035, therefore no additional take is being requested with this amendment.

This renewal will only affect the duration of Cyanotech's HCP and ITL. There will be no change in ongoing operations at the facility and no effects or increase of take to the Hawaiian stilt not already considered or analyzed in the 2002 HCP. All success criteria and offsetting mitigation as detailed in the HCP has been fulfilled. All NEPA requirements were satisfied during the original ITL issuance and no changes or updates are necessary.

The 2006 HCP does not specify a specific amount of take authorized, but merely states "Cyanotech will ensure that the total number of stilts fledged at off-site locations is greater than the number of stilts incidentally taken over the ten-year permit term. If incidental take exceeds the number of stilts fledged over any two-year period, then Cyanotech will increase habitat management at Opaeula pond or an additional off-site location."

Based on annual reports and our calculations, since the 2002 HCP has been in place, Cyanotech has taken 43 stilt fledglings and produced 103 for a net offset of 60 fledglings (Table 1). The average take since 2005, when effective deterrent measures were put in place, is 1 fledgling per year. Therefore, it is expected that the current offset of 60 fledglings will be sufficient for the 19 year permit renewal and no additional take is being authorized. It should be noted that Cyanotech also produced a net offset of 135 fledglings from 1998-2001, while the 2002 HCP was being developed. Since these 135 birds were produced before an HCP was developed, they are not included in the total mitigation offset, but have certainly contributed to the increased population of stilts along the Kona Coast.

Background

In 1985, Cyanotech Corporation began operating a 5-acre facility within the boundaries of the Natural Energy Laboratory of Hawaii Authority on the Kona Coast of Hawaii Island. By 1996, the facility had expanded to 90 acres where microalgae is grown and harvested within approximately 48 acres of open-water raceway ponds.

Table 1. Total take and mitigation offset of Hawaiian silts at Cyanotech from 2002-2017

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Annual Average[b]	Total
Take																		
Adult take	0	2	10	0	0	0	0	0	3	0	0	1	1	1	0	0	0.46	18
Chick take	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.08	4
Fledgling take (adult take/0.46)[a]	0	4	22	0	0	0	0	0	7	0	0	2	2	2	0	0	1.00	39
Total	3	4	22	1	0	0	0	**0**	7	0	0	2	2	2	0	0	1.08	**43**
																		0
Mitigation offset																		0
Fledglings produced at Cyanotech	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		48
Fledglings produced at Opaeula	0	0	0	3	3	3	2	3	13	5	3	3	13	4	0	0		55
Total	48	0	0	3	3	3	2	**3**	13	5	3	3	13	4	0	0		**103**
Net offset	45	-4	-22	2	3	3	2	**3**	6	5	3	1	11	2	0	0		**60**

[a]At the time the HCP was written, best available science supported a survival rate of 46%. Therefore from 2002-2017, each adult taken was equivalent to (1.0/0.46) or 2.17 fledglings (Reed et. al. 1998).

[b]There has been no reported take since March 24, 2015. Average take from 2005-2017 (since successful deterrent measures were put in place) = 0.46 adults or 1.0 fledglings per year.

During early operations, adult stilts were attracted to the microalgae raceway ponds where they forage and nest. However, after hatching next to raceways, stilt chicks were unable to fledge and were found dead in raceways as a result of drowning or adverse reactions to the microalgal medium. In 2002, an HCP was developed to address take of stilt chicks and eggs incidental to normal operations and maintenance of Cyanotech's microalgae facility. The biological goals of the HCP were to ensure net reproductive success by eliminating nesting in hazardous areas, to reduce the invertebrate food source that attracts stilts, and to encourage stilt dispersal to other natural wetland areas.

In 1997, Cyanotech created a 1.7-acre, on-site lake and managed it for stilt breeding as a measure to produce fledglings to mitigate for impacts occurring at the raceways. From 1998-2001, during HCP development, approximately 189 stilts fledged and another 48 fledged in 2002, for a total of 237 fledglings produced at the lake. In December 2002, Cyanotech and the Wildlife Agencies (USFWS and the Hawaii Division of Forestry and Wildlife) agreed to discontinue habitat management for stilt nesting at that site, primarily due to aviation safety concerns.

In 2004, Cyanotech began funding water bird surveys along the Kona Coast as well as predator control at the Kealakehe wastewater treatment plant and the Waikoloa Resort treatment plant in an effort to increase survivorship of stilt hatchlings at those facilities. From 2006-2016 mitigation consisted of funding off-site predator control at Opaeula Pond and continuing the Kona Coast Waterbird Surveys. During this 10-year span, Cyanotech was credited with producing 55 fledglings at Opaeula Pond.

Cyanotech has implemented the required minimization and mitigation measures, and achieved the desired biological goals as measured by the success criteria identified in the HCP. Success criteria is defined as:

1. The total number of stilts fledged at off-site locations is greater than the number of stilts incidentally taken over the course of the permit term.
    - Since 2002, Cyanotech has taken 18 adult stilts and 4 chicks. Because not all fledgling stilts survive to breeding age, we have adjusted the number of adult take to account for the survival rate of fledglings. Based on best available science when the 2002 HCP was written, it is estimated that 46% of first-year stilts survive to breeding age (Reed et.al. 1998). If this survival rate is applied, each adult is equivalent to (1/0.46) or 2.17 fledglings. Therefore, we have adjusted the incidental take of adult stilts from 2002-2015 to be 43 fledglings (18 adults/0.46 = 39 fledglings + 4 chicks = 43 fledglings) (Table 1).
    - Cyanotech is credited with producing 48 fledglings at the lake in 2002 and 55 fledglings produced at Opaeula Pond for a total of 103 fledglings.

2. Nesting success (average number of fledglings per nest) at off-site locations managed with predator control is greater than 1.
    - From 2006-2015, the average nesting success at Opaeula Pond was 0.95 fledglings per nest, with a nest success range from 0.18 (2013) to 1.86 (2010) fledglings per nest. If the very low nest success year of 2013 is removed from the calculation, the average nest success is 1.3 fledglings per nest.

Since 2005, Cyanotech has implemented numerous non-harmful bird deterrent measures such as modification of gravel berms, netting, hazing (increased human presence, use of lasers and

pyrotechnics), mylar tape, predator calls, agitation calls, and effigies. Cyanotech has also researched methods to reduce the invertebrate prey base including increased raceway agitation, modification of raceway cleaning methods, sonic larvicides, and spraying with safflower oil. No known take of stilts has occurred as a result of implementation of bird deterrents.

HCP implementation has helped improve nesting success at Opaeula Pond and limit incidental take of stilts at the Cyanotech facility. Cyanotech has also significantly reduced stilt numbers at the facility during the breeding and non-breeding seasons, eliminated nesting in hazardous areas at the facility, and funded surveys to monitor stilt use at other wetland sites along the Kona Coast where successful reproduction is probable.

Plan Implementation

Activities funded under the HCP are biological monitoring and reporting, ongoing use of bird deterrents, Kona Coast waterbird surveys, and compensatory mitigation. Cyanotech proposes to continue normal microalgae operations, daily monitoring and maintenance at its aquaculture facility, and implementation of minimization measures described in their 2002 HCP and 2006 HCP Amendment until 2035. All provisions for reporting, monitoring, adaptive management, and funding assurances from the original HCP will be maintained. Since Cyanotech currently has a net mitigation offset of 60 fledglings, and the number of occurrences of take is not expected to exceed 1 fledgling stilt per year over the 19 year permit term, no additional take is being requested, thus there is no expectation of additional mitigation activity. Should take exceed the equivalent of 50 fledglings, Cyanotech will present a new mitigation project for consideration by the Endangered Species Recovery Committee (ESRC), to be implemented as needed to ensure net benefit if take exceeds the available credit. The ESRC will review the project annually and may make recommendations for adaptive management, which could include redirection of funds from the waterbird surveys to an alternate action that will yield a benefit to the species.

This HCP renewal will be administered by Cyanotech Corporation. The HCP is designed to authorize potential incidental take of the Hawaiian stilt as a result of operation of the Cyanotech Aquaculture Facility for a permit term of 19 years. If operation continues past 19 years or if it appears as though take may be exceeded, the HCP and associated ITL would need to be amended or extended in accordance with then-applicable laws and regulations.

Literature Cited

Reed, J.M., Silbernagel, M.D., K.A., Engilis, A., Jr. and L.W. Oring. 1998. Life history and viability analysis of the endangered Hawaiian Stilt. Biological Conservation 84(1):35-45.

Appendices

Include 2002 HCP, 2006 Amendment