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**AAPA ENVIRONMENTAL IMPROVEMENT AWARD ENTRY:
STAKEHOLDER AWARENESS, EDUCATION & INVOLVEMENT CATEGORY**

Port of Stockton Barn Owl Nest Box Program

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Table of Contents

TITLE	PAGE
Introduction to the Nest Box Program	1
Goals and Objectives	3
Discussion	4
Conclusion	8





INTRODUCTION TO THE NEST BOX PROGRAM

The Port of Stockton

The Port of Stockton (Port) facilities are located on 2,000 acres in the Sacramento-San Joaquin Delta, an important and delicate environment. The Delta provides habitat for countless fish, birds, and other wildlife. While commerce is the Port's primary objective, environmental stewardship is taken very seriously, and the Port is deeply committed to maintaining and protecting nearby species and habitats. The Port's Delta Environmental Enhancement Program aims to enhance air quality, water quality, and wildlife habitats in the Delta and surrounding communities.

In addition to the broader Delta biological communities, a variety of plants and animals live at the Port itself—some more welcome than others. Rodent control is a serious issue for the Port and Port

tenants. Left unchecked, rodents such as gophers and ground squirrels burrow into the Port's levees, causing structural damage. The barn owls that reside at the Port offer a natural defense; more barn owls mean fewer rodents and a safer Port. Thus, the Port's Delta Environmental Enhancement Program implemented a Barn Owl Nest Box Program.

Barn Owls

The barn owl is a medium-sized owl with a heart-shaped face and no ear tufts. These owls are closely associated with human activity and are one of the most widespread of all land birds, found on every continent except Antarctica. With a ghostly appearance, eerie rasping shrieks (rather than hoots), and a habit of roosting in such places as church steeples, this bird has attracted much superstition and is also known as the "ghost owl."

However, for the Port and others, barn owl presence in the area is a good omen because the species chiefly preys on rodents.

Barn owl nest sites include hollow trees and many artificial sites such as barn lofts, church steeples, abandoned structures, dry wells, crevices under bridges, and nest boxes. They specialize in hunting small ground mammals, and the vast majority of their food consists of small rodents. They typically hunt at night by silently flying low over open ground, watching and listening. The owls have excellent night vision and their hearing is so precise that they can strike prey in total darkness.

A male and female barn owl will mate for life. The chicks are covered in white down and brood for about 2 weeks, then are fledged in 50 to 55 days. They will remain near the nest to learn hunting skills before dispersing. Young birds are able to breed at about 10 months. In recent decades, the barn owl has declined slightly in some regions, and drastically in others. Population numbers appear stable overall; however, their status may be helped in some areas by providing nest boxes.

Barn Owl Nest Box Program

After a successful pilot project, the Port completed the Barn Owl Nest Box Program to provide 20 Port-manufactured boxes as adopted homes for nesting owls at the Port. Approximately six owlets have been observed per box, resulting in approximately 120 owls per year.

The Port attached infrared video cameras to several of the nest boxes, so the owls can be seen at night when they are most active. Cameras stream live to the Port's website so the public can follow the adult owls nesting and the growth of new owl chicks in the relative safety and comfort of the nest boxes.

Barn owl nesting season typically begins in November and baby owls usually leave the nest by June. In a good year, a pair of barn owls may breed twice, and at least one pair of owls bred three times in the Port's nest boxes. It is estimated that on average, the Port's barn owl population consumes approximately 40,000 rodents per year.

A BARN OWL WITH ITS EGGS IN THE DAGGETT ROAD OWL NEST BOX

January 2016



BARN OWL CHICKS IN THE DAGGETT ROAD OWL NEST BOX

March 2016





GOALS AND OBJECTIVES

The Program has four primary objectives:

- Enhance the barn owl population
- Protect the Port's levees
- Promote natural rodent control to reduce the need for chemical control methods
- Increase awareness of Port projects, educate the community about the Port's environmental stewardship efforts, and encourage ongoing public involvement with the Port

Occasionally, it becomes necessary to tear down old and dilapidated buildings at the Port; sometimes, these structures serve as nesting sites for barn owls. Great care is taken not to disturb active nests, but the Barn Owl Nest Box Program was implemented with the primary goal of providing suitable nesting locations to increase the barn owl population.

Rodent control is a serious issue at the Port. The Port and Port tenants transport significant quantities of agricultural products that rodents feed upon (for example, rice, corn, and animal feed). Additionally, the Port is surrounded by levees. Left unchecked, rodents such as gophers and ground squirrels dig holes that could threaten the structural integrity of the levees. Promoting the owl population at the Port helps control the rodent population without the use of toxic rodenticides.

The Port is also invested in increasing public awareness of environmental stewardship and fostering public involvement in port projects. Public awareness of governmental agencies' environmental stewardship projects contributes to public understanding of local ecosystems, and can enable future public and private actions to produce similar environmental benefits.



DISCUSSION

Background

The Barn Owl Nest Box Program's primary beneficiaries are the local barn owl population, the Port and Port tenants, and the public.

The Port has found the nest boxes to be a very effective, environmentally friendly, and cost-efficient method to control the rodent population. As a result, the Port has been able to reduce other forms of rodent control. Additionally, the Port has switched to a raptor-friendly rodent bait that does not pose a risk to raptors that may eat rodents that have ingested rodent bait.

The boxes continue to be used year after year and the Port estimates that collectively the boxes have housed more than 300 new owls. Considering that over the course of one breeding season, two adults and five young can consume as many as 2,000 rodents, the Barn Owl Nest Box Program is clearly an efficient method of rodent control without the need for toxic bait or other controls. With 20 active boxes, it is estimated that the owls consume more than 40,000 rodents annually.

Evidence suggests that the owls are having a significant impact. Port employees tasked with managing the rodent population have reported a noticeable decline since installation of the boxes.

In addition to those benefits, the Program has resulted in a tremendous amount of public engagement. In the pilot project, the Port installed infrared video cameras in two of the nest boxes located at the Port's West Complex. The Port upgraded these two interior cameras and installed one new interior camera in another nest box as part of Program implementation in 2014. In 2015, the Port added three exterior cameras to the same boxes in response to overwhelming public interest. All cameras are equipped with infrared vision for night viewing when the owls are most active.

A Port webpage streams live video (<http://www.portofstockton.com/owl-cams>), which the public can use to follow the owls' life cycles from hatch to fledge.

The owl cam pages average more than 200,000 visits per year, and the Port's owl box YouTube video compilation has received almost 4,000 views. In February 2015 alone, more than 45,000 viewers shared a real-time experience of several owlets hatching, crowing, and flying the coop.

“Teachers really do enjoy it, particularly those that may be teaching biology.

Kids, it's very popular with, when you go to the Port's Facebook page, there is a long list of people that have made that one of their favorite.”

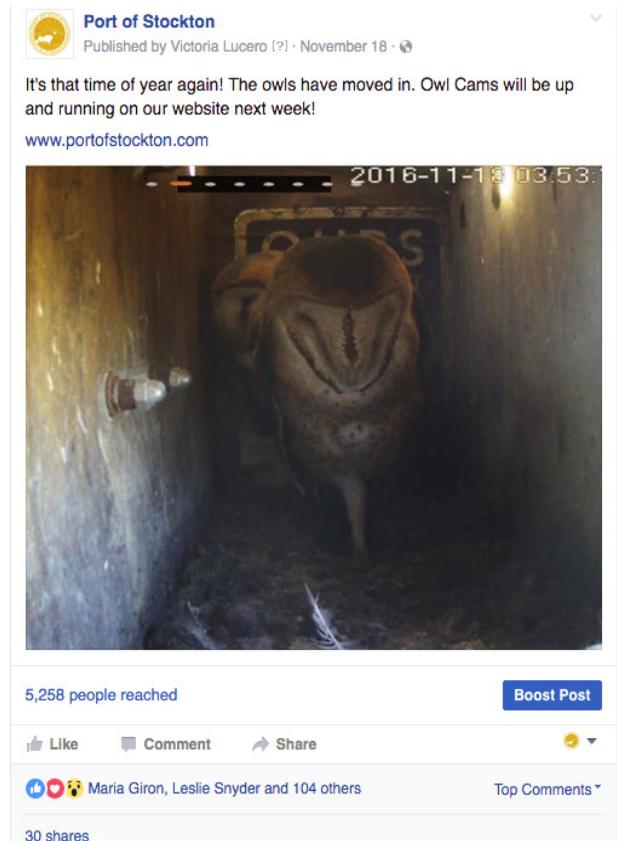
—Port Director Richard Aschieris

The Port has engaged in other public outreach efforts related to the program, including hosting a booth at local events to hand out barn owl stuffed animals and introduce more people to the video feed, and programs with elementary school students to dissect owl pellets and learn about the owl box program.

The Program's visibility has increased public awareness of the environmental stewardship projects undertaken by the Port and increased the public's engagement with Port programs.

A SCREENSHOT OF A PORT FACEBOOK POST

The Port posts regular updates on the Port's social media page, and has seen extensive public engagement with the posts.



Methodology

Great care is taken to avoid disturbing active barn owl nests when the Port needs to tear down old and dilapidated buildings. In an effort to reduce impacts to barn owls and control the rodent population, the Port conducted a Barn Owl Nest Box Pilot Project in 2006. During the Pilot Project phase, the Port installed ten nest boxes. In response to the success of the Pilot Project, the Port launched the Barn Owl Nest Box Program in 2014.

With the inception of the Barn Owl Nest Box Program, the number of nest boxes was increased from ten to 20. Additionally, the Port relocated three of the original ten nest boxes to more suitable locations (those three Pilot Project boxes were unsuccessful in attracting occupants). All new and relocated boxes were mounted on hinged metal posts rather than the original non-hinged wooden posts. The hinged posts allow for safer and easier cleaning and maintenance.

In late 2014, the Port upgraded two original cameras and installed one new camera in three of the barn owl nest boxes located at the Port's West Complex. Exterior cameras were added to the same nest boxes in 2015 to allow viewers to observe events on the outside of the nests, such as adult birds bringing food or chicks learning to fly. The cameras are equipped with infrared vision to allow for night viewing when the owls are most active.

Thus far, the Port has installed 20 barn owl nest boxes at various locations around the East and West Complexes to replace lost nesting sites and create new ones. The Port has found the nest boxes to be a very effective, environmentally friendly, and cost-efficient method to control the rodent population. As a result, the Port has been able to reduce other forms of rodent control. Additionally, the Port has switched to a raptor-friendly rodent bait that does not pose risks to raptors that may eat rodents that have ingested rodent bait.

The Port conducts an annual inspection of each nest box in the summer or fall. The inspection is conducted to assess the box condition, clean the box, make repairs if needed, and determine if the box was used to rear young during the previous breeding season. If the box was not used, the Port may decide to relocate the nest box to another suitable location in an effort to promote breeding. Standard maintenance procedures include cleaning out debris, checking that all hardware and fasteners are secure and in good condition, checking the structural integrity of the box and post, and applying an exterior coat of linseed oil.

BARN OWLS ON THE EXTERIOR OF A NEST BOX



Award Criteria

Benefits to Environmental Quality

The program enhances the barn owl population and is an efficient method of rodent control without the need for toxic bait or other controls.

Furthermore, the Program's visibility has increased public awareness of the environmental stewardship projects undertaken by the Port. Public awareness of governmental agencies' environmental stewardship projects contributes to public understanding of local ecosystems, and can enable future public and private actions to produce similar environmental benefits.

Port Involvement

The Barn Owl Nest Box Program and the integrated public outreach effort were planned by the Port, and are conducted and maintained entirely by the Port.

Creative Solutions

The Barn Owl Nest Box Program has captured the attention of the public. It has proven to be a creative solution to the need for an ongoing method to engage both school children and the larger community with the Port.

The program has also addressed the serious issue of rodent control for the Port and Port tenants. Promoting the owl population at the Port helps control the rodent population without the use of toxic rodenticides.

Project Results to Date

The Port has installed 20 highly effective and environmentally friendly barn owl nest boxes. The boxes continue to be used year after year and the Port estimates that collectively the boxes have housed more than 300 new owls.

Concurrently, the Port has seen increasing engagement from a public that is excited about the nest boxes and the owl cams.

Cost Effectiveness

The Port has found the nest boxes to be a cost-efficient method to enhance the barn owl population and control the rodent population.

Transferability to the Port Industry

Like many ports, the Port and its tenants transport significant quantities of agricultural products that rodents feed upon. Additionally, left unchecked, rodents dig holes in the levees that surround the Port and could threaten their structural integrity. The barn owls that reside at the Port offer a natural defense; more barn owls mean fewer rodents and a safer Port.

Ports that also have an interest in educating their communities and increasing awareness of port projects could also consider a similar outreach program.

"We got a lot of feedback last year, a lot of people who know a lot more about the Port now than they ever have.

That's what this is all about—educating the public and the community about what's important to us."

*—Jeff Wingfield, Director,
Environmental and Public Affairs*



CONCLUSION

The Port has installed 20 highly effective, cost efficient, and environmentally friendly barn owl nest boxes. The boxes continue to be used year after year and the Port estimates that collectively the boxes have housed more than 300 new owls. Considering that over the course of one breeding season, two adults and five young can consume as many as 2,000 rodents, the Barn Owl Nest Box Program is clearly an efficient method of rodent control without the need for toxic bait or other controls. With 20 active boxes, it is estimated that the owls consume more than 40,000 rodents annually. Evidence suggests that the owls are having a significant impact on the rodent population. Port employees tasked with managing the rodent population have reported a noticeable decline since the installation of the boxes.

Simultaneously, the Port has seen increasing engagement from a public that is excited about the barn owl nest boxes. The Program's visibility has been a success in the effort to increase awareness of the environmental stewardship projects undertaken by the Port.

Increased public engagement with Port environmental stewardship programs promotes the Port and its tenants, contributes to public understanding of local ecosystems, and can produce support for future Port actions.