

Draft

WILDLIFE MANAGEMENT – BYXBEE PARK AND FUTURE LANDFILL CLOSURE AREA

Wildlife Habitat Assessment

Prepared for
City of Palo Alto

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I. Introduction

Environmental Science Associates (ESA) of San Francisco was tasked by the City of Palo Alto in 2006 to prepare the *Baylands Comprehensive Conservation Plan* for the entirety of the Baylands Nature Preserve, which includes Byxbee Park as one of its 10 Management Units. In February of 2008, ESA submitted a draft final *Vegetation Management Element* for the Plan (ESA, 2008). Subsequent to this submittal, but prior to full authorization to proceed with the wildlife element of the Conservation Plan, the City Council expressed an interest in what the wildlife element would recommend for the current Byxbee Landfill, scheduled to close in 2011. Open questions were whether the composting center might continue operating or be closed along with the landfill, and:

1. What wildlife are currently using the area?
2. What is the potential habitat for burrowing owls and other species?
3. How might passive recreation (hiking and biking) and trails affect wildlife? How might a dog park affect wildlife and habitat potential?
4. How would industrial activities (such as the composting center) affect the wildlife and habitat potential?

This report examines each of these questions in turn, with recommendations developed in #s 1 and 2, above, tested against the disturbance factors associated with potential public and industrial uses of the closed landfill.

II. Current Management Direction

A. Baylands Ecosystems Habitat Goals

The Palo Alto Baylands (PAB), while not directly connected to the larger planning efforts of the San Francisco Baylands (Baylands Goals Project, 1999), is part of Project Segment O, South Bay Subregion, located between Dumbarton Bridge and Alviso Slough. While the Project is silent on how uplands should be managed (here as elsewhere), its recommendations include:

- Restoring large areas of tidal marsh and providing a continuous corridor along the bayshore;
- Providing more and wider buffers to tidal marshes, and improving management to reduce human intrusion and predators; and
- Enhancing seasonal wetlands and burrowing owl habitat.

The general intent of maintaining protected wildlife movement corridors and developing where possible seasonal wetlands are applicable to the PAB wildlife planning, and the emphasis on burrowing owl is reflected in the locally-generated goals expressed thus far (see below).

B. Palo Alto Baylands Goals

In 1980, the master plan for Byxbee Park was adopted with the intent to create from a closed landfill "a work of art which would enhance the beauty of the site and express the dichotomy of the man-made and the natural elements within and surrounding the park." The current 30 acre park, constructed to meet this goal on the closed portion of the landfill between 1988 and 1992, is adjacent to the still-active portion of the landfill and was used by ESA as a surrogate for what the future landfill closures would look like, absent specific wildlife objectives. ESA's *Baylands Comprehensive Conservation Plan* proposed the following general direction, on page 32:

C. Byxbee Park Hills

This former landfill consists of non-native grassland, recreational trails and public art. Artificial nest burrows were provided for burrowing owls in mounds deposited over the landfill cap. Although owls were documented here in the past, they have not been seen for some time, and no nesting pairs have been observed. Vegetation management includes recommended actions for improving the habitat suitability for burrowing owls through reduction of the height and density of annual grasses on the nest mounds.



*Other vegetation management issue within this unit is the threat of invasion by stinkwort (*Dittrichia graveolens*), an upland species with a large potential source population located within the current operating landfill adjacent to the Preserve.*

D. Landfill Closure Goals

All other things being equal, the requirements of safe landfill closure impose certain limitations on what can be done with the vegetation cover. Landfill closures have become more common as a result of greater amounts of waste deposited and tighter environmental regulations governing their usage. In California alone, more than 40 sites are listed as closing or closed on California's Integrated Waste Management Board's website. Closed sites typically have three layers: the waste layer is buried underground, a cover layer surrounds the waste and contains it, and a vegetation layer is above the cover

layer on the surface. Barriers around waste create the cover layer, and their primary purpose is to prevent toxic waste leachate from entering groundwater. Cover above the waste is often referred to as the “cap”. These layers also minimize waste surface exposure and control release of methane gas. Barriers are often composed of clay, asphalt, concrete, or synthetic liners. Additionally, a soil and vegetation layer is created above the cap to reduce erosion and hold moisture (CIWMB, 1999; FRTR, 2008).

On many landfills, vegetation layers are designed to serve ecological or aesthetic functions as well. In addition to mechanical benefits, sites can either be re-vegetated to be aesthetically pleasing or restored to promote native ecosystems. Revegetation typically involves planting of native or non-native plants to comply with state and federal regulations. The simplest of revegetation plans involve as little slope alteration and as few vegetation types as possible, and, previously, it was believed that many shrub and tree species were unsuitable for planting on capped landfills because their roots could penetrate the clay cap. Several recent studies (Robinson and Handel, 2006; Handel et. al., 2008) have shown that cap penetration is not likely, and even that many tree species can survive and grow in the adverse soil conditions of many restored landfills.

A critical requirement of typical capped landfills is that they be allowed to drain completely. Optimally, rainwater would drain into designated catchments before it even could reach the cap. Any remaining moisture in poorly-drained areas could begin to erode the cap and compromise its integrity. Additionally, if moisture does infiltrate the waste layer, it can accelerate the decomposition process and create differential settling in certain areas of the landfill. Any water infiltrating the waste layer could potentially leave that layer as well, and would bring toxic chemicals with it (CIWMB, 1999).

III. General Wildlife Habitat Planning Considerations – Restoration or Habitat Enhancement?

Historically, the PAB comprised tidal flats, adjacent tidal salt marshes and, further inland, moist grasslands in the adjacent uplands. The moist grassland habitat supported seasonal ponding (e.g., willow groves) in the rainy season, as did streams that drained the coastal hills but did not reach the Bay. “Restoration” -- bringing the land back to a previously extant condition -- is not feasible for a closed landfill, given the basic constraints described above. Habitat enhancement, i.e., determining the appropriate natural habitats that can be created and sustained, is the better alternative.

Even for more suitable enhancements, there are other constraints to wildlife habitat management. Although tree planting is theoretically possible, costs of planting and maintenance, considered with rooting problems for the landfill cap, suggest that vegetation enhancement be limited to introducing species with a typical rooting depth of two feet or less.

IV. Current Wildlife Use of the Closed Landfill (Current Byxbee Park)

A. Methodology

The approach taken by ESA was, first, to make structured observations at Bixby Hills Park as a source of information on how it has attracted and supported wildlife, essentially using it as a surrogate for the basic habitat “pallet” which would be available when the rest of the landfill is closed. Although our recommendations will not necessarily be constrained by these observations, enough time has passed to allow natural processes to stabilize and to provide clues as to site potential.

Trapping surveys and bird observation point-counts were conducted to determine presence of small mammals and birds in the Byxbee Park area. Traps were set on two transects; transect A is located inside the landfill fence in an unmowed grass area, and transect B is in a mowed, publicly-accessible area (see Figure 1). Sherman non-folding traps were set every 50 feet along each transect for a total of 11 traps on transect A and five transects on transect B. Each trap night, traps were baited with peanut butter and oats and set around 2000. After two trap nights with no trapped individuals, raw bacon fat was added as bait. Traps were checked before 0800 the next morning. Trapped mammals were processed by removing the individual from the trap into a clear bag and identifying it before release.

Point counts were also conducted to determine bird species present along each transect. Biologists stood at every other trap location for five minutes and identified bird species using 8x binoculars.

Figure 1 Trap Line Locations

B. Results

No small mammals were trapped during the surveys. The bird point-counts yielded the following species:

Anna's hummingbird (*Calypte anna*); Barn swallow (*Hirundo rustica*); Black phoebe (*Sayornis nigricans*); Brewer's blackbird (*Euphagus cyanocephalus*); California towhee (*Pipilo crissalis*); Canada geese (*Branta canadensis*); Cliff swallow (*Petrochelidon pyrrhonota*); Common raven (*Corvus corax*); Gull species (*Larus spp.*); House finch (*Carpodacus mexicanus*); Lark species (*Eremophila spp.*); Marsh wren (*Cistothorus palustris*); Mockingbird (*Mimus polyglottos*); Mourning dove (*Zenaida macroura*); Northern harrier (*Circus cyaneus*); Ring-necked pheasant (*Phasianus colchicus*); Rock dove (*Columbia livia*); Song sparrow (*Melospiza melodia*).

C. Constraints Analysis

The absence of small mammals is probably due to soil compaction and the limited vegetation diversity of the grasslands. Bird data suggest a very simple avifauna: birds with broad habitat preferences and tolerant of disturbance. Our conclusion is that the simplified (and maintained through mowing) vegetation structure is of limited value to wildlife at present. Looking at potential wildlife enhancements, we eliminated raptors because of the limited small mammal prey base (although raptors are regularly seen hunting at Byxbee) and because raptor management is not consistent with PAB efforts to encourage the western burrowing owl to nest. The owl issue, and PAB habitat opportunities, are discussed in greater detail below.

V. Wildlife Habitat Potential

ESA examined potential wildlife management strategies and, notwithstanding site limitations, there are several habitat amenities which could be considered. As an approach, we selected small plantations of native shrub (scrub) "islands" as a basic model, thus creating a mosaic of Coastal Scrub vegetation and grasslands. These islands would be managed around shallow depressions behind berms placed within drainage swales (Figure 3). These swales would be landscape features provided by basic closure operations and the berms would not measurably impede drainage, impounding small amount of water for a month at most, merely to help shrubs and other understory plants become established.

VI. Target Species

Further details of the structure and composition of the habitat islands requires selecting species generally associated with this type of habitat (mainly birds and insects), and also, equally important, animals known to be present on the PAB or in surrounding areas. A list of potential bird species for management was compiled in a three-step process. First,

the three USGS quadrangles (Figure 2a-d) containing the PAB and surrounding areas were reviewed for species known to use bayfront areas and nearby uplands. They are mostly salt and freshwater marsh associated species and with few exceptions would be poor choices to use as target species for habitat enhancement.

Second, approaching the question from the perspective of the Coastal Scrub habitat that we deemed be feasible on the closed landfill, a new list was created from the *California Habitat Wildlife Relationship System* (CWHR) database, which uses habitat suitability as a starting point and reports species using that the stipulated habitat type. We limited this search to birds, as the enhancement islands would be too small to support other animals (except insects). Third, this list was then compared with the *Checklist of the Birds of Palo Alto and Adjacent Areas* (Suddjian and Noble, 1985). Species that were not on the checklist were rejected because of the low likelihood of attracting species not already known from the Palo Alto area. The species that were *both* on the CWHR list and the Palo Alto checklist was refined further as a final step. Species that do not breed in Coastal Scrub were rejected, as were raptors (due to insufficient small mammal populations), very common species, as well as very rare species. The final list comprises Anna's hummingbird (*Calypte anna*), black-chinned sparrow (*Spizella atrogularis*), blue-gray gnatcatcher (*Polioptila caerulea*), lesser goldfinch (*Carduelis psaltria*), orange-crowned warbler (*Vermivora celata*), and the wrenit (*Chamaea fasciata*). Their habitat requirements are described below.

Anna's hummingbird

Breeds in open woodland and chaparral. Nests in a variety of substrates, including oak, shrubs, vine, brush and human-built structures, from 1.5 to 30 feet off the ground. Diet includes nectar, insects, spiders and tree sap. *C. anna* feeds most frequently on chaparral current, gooseberry, manzanita, monkey-flower and sage.

Black-chinned sparrow

Nests in shrubs 1.5 to 3 feet off the ground, often in sagebrush. Feeds on insects and seeds, (Ehrlich *et al.*, 1988). In summer they eat insects, mostly from foliage and on the ground, rarely catching them in flight. Black-chinned sparrows obtain sufficient water from food. Nests are in a wide variety of shrubs including chamise, sagebrush, ceanothus (wildlilac) and buckwheat. Nests are usually found on gentle to steep, south-facing slopes.

Blue-gray gnatcatcher

Breeds in a wide range of habitat including scrub. Nests in deciduous trees 2-25 feet off the ground. Diet includes insects and spiders gleaned from foliage, (Ehrlich *et al.*, 1988). Preferred foods from highest to lowest: Homoptera (cicadas, aphids), Hemiptera, Coleoptera (beetles), Lepidoptera (moths, butterflies), Diptera (flies), Hymenoptera (ants, bees, wasps), and Araneae (spiders) (Roof, 1999).

FIGURE 2a

FIGURE 2b

FIGURE 2c

FIGURE 2d

FIGURE 3: Coastal Sage Planting and Seasonal Pool

Lesser goldfinch

Nests in trees, shrubs, and forbs, from 2-30 feet off the ground. Feeds on seeds of deciduous trees, forbs, grasses, floral buds, and berries. Available water is important, especially during dry season, and this can significantly affect distribution (Ehrlich *et al.* 1988).

Orange-crowned warbler

Breeds in chaparral as well as woodlands. Nests are often hidden on the ground located up to three feet above the ground, but can also be located in low shrubs in vines. Diet consists of insects, fruit, nectar, tree sap, berries, and plant galls (Ehrlich *et al.*, 1988).

Wrentit

Breeds in chaparral and scrub as well as well planted suburban areas. Nests in shrubs 1-15 feet off the ground. Diet consists of spiders, insects, and fruit, gleaned from foliage and bark (Ehrlich *et al.* 1988). Also eats caterpillars and seeds, particularly seeds in winter. Prefers coastal sage scrub among other habitats, nests in California sage, coyote bush, California blackberry, coffeeberry, and bush lupine (Geupel, 2002).

A. Other Target Species

We eliminated nesting burrowing owl as a management focus, because it is not associated with scrub vegetation of any kind, and because artificial burrows have not, to date, been successful in attracting breeding birds. The proposed islands will increase the biodiversity of the site which may indirectly improve habitat for the owls, and the artificial burrows should be maintained. However, at present we do not see the need for further efforts on behalf of this species, except as part of visitor management discussed below.

Lastly, in the course of developing these criteria and considering what understory vegetation (i.e., below or adjacent to the shrub canopy) might be considered, we chose native bees as a secondary target species group. The recent threat of Colony Collapse Disorder in imported *Apis mellifera* colonies has increased awareness of the role that native bee species play in pollinating both cultivated crops and other plants. Native bee species have also suffered global declines in what may be a “pollination crisis” (Ghazoul, 2005). Managing for native species even at small scales can greatly assist local populations. For example, over seventy bee species have been found in gardens in Albany and Berkeley alone (Shepherd *et al.*, 2006).

B. Planting for Shrub-Nesting Songbirds

Table 1 displays Coastal Scrub species which provide suitable nesting or foraging substrate for the target species (woody shrubs which may reach 4 feet in height).

C. Planting for Native Bees

Native bees have specific nesting and habitat requirements that can be addressed with simple management choices. The careful selection and arrangement of plants and habitat features at the closed landfill can provide both nesting and foraging habitat for bees native to the Bay Area.

TABLE 1
NATIVE PLANT SPECIES FOR NESTING BIRDS IN COASTAL SCRUB

Species	Common Name
<i>Baccharis pilularis</i>	coyote bush
<i>Rubus ursinus</i>	California blackberry
<i>Rhamnus californica</i>	coffeeberry
<i>Diplacus aurantiacus</i>	bush monkeyflower
<i>Ceanothus thyrsiflorus</i>	blue blossom
<i>Lupinus variicolor</i>	varied lupine

SOURCE: ESA, 2008

Of California's 1500 native bee species, 95% are solitary, most of which are ground nesting species (Frankie, 2008). Ground-nesting species require patches of bare ground or soil mounds in order to nest. Gently sloping or flat areas that are well-drained, open, sunny, sandy, free from mulch, and south-facing are preferred (Vaughan *et al.*, 2007; Shepherd *et al.*, 2006, Frankie, 2008). Nesting areas should be located away from trails to reduce bee mortality from trampling.

A small portion of solitary bee species nest in cavities in old trees, wood, metal, or other human structures such as mason blocks. Nesting in these species can be encouraged by installing trap-nest blocks or bee boards. The blocks should be covered with a roof to provide shelter, and fastened securely at about four feet above the ground facing southeast (Vaughan *et al.*, 2007).

Social bumble bees require larger cavities to nest, such as abandoned mouse holes or artificial nest boxes (Shepherd *et al.*, 2006). However, even with ideal habitat conditions, only about 30% of available nest areas will be used by bumble bees (Shepherd *et al.*, 2006). Therefore, managing for bumble bees at Byxbee Park is not the best investment compared to solitary bees.

A larger number of plant species will support both greater bee diversity and abundance and reduce the need for long distance foraging (Steffan-Dewenter and Kuhn, 2003). Ideally, it is recommended that there be at least eight plants species flowering at a time through spring and summer (Shepherd *et al.*, 2006). Patch size should be as large as

possible both to attract foragers and to provide sufficient resources. Studies on farms have indicated that with natural habitat totaling 30% of the cropped area, adequate bee populations are supported to provide pollination services to the farm, though as little as 10% can have a positive effect (Vaughan *et al.*, 2007; Kremen *et al.*, 2004). As Phase II of the planned landfill closure is 97 acres, a minimum of 10%, or about 10 acres, could be converted to forage habitat. This can be fulfilled with many smaller patches or fewer larger patches. The averaging foraging distance for native bees ranges from 50 feet to a half-mile, however it is estimated that most bees only travel about hundred yards from their nests (Shepherd, 2002). Therefore, nest sites should be located within a hundred yards of at least one large foraging area. Also, mowing should be done when flowers are not in bloom and only part of the park should be mowed at the same time (Di Giulio *et al.*, 2001).

The plants below have been selected based on the following characteristics: native to California with occurrences in the San Francisco Bay Area, able to supporting native bees, and adapted to Coastal Scrub/grasslands of central California coast, well drained soils, dry climate, and low shade (Frankie, 2008; Jepson Online Interchange, 2008). A balance between spring and summer species would be selected from the lists below.

TABLE 2.
NATIVE PLANT SPECIES FOR NATIVE BEES IN COASTAL SCRUB

Plant Type / Scientific Name	Common Name	Species Type
Annual seed mix:		
<i>Eschscholzia californica</i>	California poppy	Spring
<i>Gilia achilleifolia</i>	California gilia	Spring
<i>Gilia capitata</i>	Globe gilia	Spring
<i>Layia platyglossa</i>	Tidy tips	Spring
<i>Phacelia tanacetifolia</i>	Tansy phacelia	Spring
Herbaceous perennials and subshrubs:		
<i>Achillea millefolium</i>	Common yarrow	Spring/summer
<i>Eriogonum latifolium</i>	Coast buckwheat	Summer
<i>Eriophyllum staechadifolium</i>	Seaside wooly sunflower	Summer
<i>Phacelia californica</i>	California phacelia	Spring
<i>Scrophularia californica</i>	California bee-plant	Summer
<i>Solidago californica</i>	California goldenrod	Summer

SOURCE: ESA, 2008

D. Other Considerations

Plants on this list are adapted to open, well-drained areas, so planting many of them requires little to moderate care. Several species are native California wildflowers.

Clearing ground of weeds when planting and weekly watering is recommended for greater establishment but is not essential. Birds and some small mammals will be able to find many of the planted seeds, but lightly raking the seeds in with soil and grass may hinder foraging wildlife. Hydroseeding can also be used and is often much faster to implement, but seasonal timing needs to be precise for maximum recruitment.

Contamination of seed stocks is also more likely, so care is needed when choosing stocks and maintaining hydroseeding equipment. The best times to plant most of the perennials listed above is in the spring or the fall, depending on whether the plant establishes better in wet or dry conditions; a fall planting means seedlings have less competition with other herbaceous plant growth, but species that dislike wet conditions may be more successful when planted in the spring (Las Pilitas Nursery, 2001; Backyard Gardener, accessed 2008).

E. Conceptual Design of Enhancement Areas

As noted above, and consistent with the habitat requirements of the target species, a suggested landscape template would comprise plantations of native Coastal Scrub islands, managed around shallow depressions behind berms placed within drainage swales (see Figure 3). The final design, number and size of the swales would be determined in the landscape plan for the closed area. Ideally, there would be 3-5 of these incorporated into the design, 50 feet in diameter, with as much southern exposure as possible. Shrub species for birds would be planted closest to the ephemeral pool behind the berm, with the bee plantation (understory) species interspersed in and adjacent to the shrubs on the outside. Although some initial irrigation and weed control would be needed, the pool would provide water over the longer period of plant establishment. The pool would eventually fill in with plant detritus and sediment from higher in the swale, but would continue to retain higher soil moisture content and support the scrub stand indefinitely. If the temporary pool is considered a problem for the integrity of the landfill cap, the pool could be lined with bentonite (clay), essentially suspending the moisture above the lower layers of the cap.

VII. Potential Effects of Disturbance Factors on Wildlife

A. Passive Recreation (Hiking and Biking) and Trails

Many studies have found that human recreational users in parkland areas can adversely affect wildlife. The most common short-term effects seen in bird species is running or flying away when disturbed. The level of this disturbance can differ between bird individuals as well as between species: one study found that larger birds flush at greater distances from human activity than smaller birds, which would be important to consider when managing for raptors or large shorebirds, but which is not the case in our recommended enhancement approach (Rodgers and Smith, 1995). Additionally, many bird species are more sensitive to a recreational user moving directly towards them rather than past them on a trail (Burger and Gochfeld, 1991). Human disturbance of nesting

sites can have significant effects on chick mortality and nest abandonment (Anderson and Keith, 1980; Hand, 1980), and several species of birds have showed lower nest densities near trails (Burger and Gochfeld, 1993). Small mammal species have shown a small disturbance reaction when recreational users were passing on trails, but disturbance reactions increased with off-trail users moving directly through burrow areas (Mainini *et al.*, 1993). Few studies showed no adverse effects from human use on wildlife, and even hiking trails would have some negative effects on foraging or nesting birds.

While acknowledging that visitor disturbance of wildlife is and should be a planning concern, the target species are not particularly sensitive (one species, the bushtit, was eliminated from the list because of a propensity to abandon nests). With trail planning that kept trails at a distance of about 75 feet from, and not directed toward, the habitat islands, they would be adequately buffered from human disturbance.

B. Effects of a Dog Park on Wildlife and Habitat Potential

Dog walking is a common recreational activity in areas with abundant wildlife, and several studies have found disturbances were greater by pedestrians with pets than pedestrians alone. One study found that pedestrians within 50 meters of piping plovers caused them to stop feeding 31 % of the time, while pedestrians with pets at the same distance caused plovers to stop feeding 52 % of the time (Hoopes, 1993). Other studies have also found reduction in bird abundance and diversity and nesting disturbance in areas where pedestrians and dogs interacted with wildlife (Banks and Bryant, 2007; Yalden and Yalden, 1990). In one urban park, no difference in wildlife disturbance was found between unleashed and leashed areas, but it is important to note that differences between human impacts with or without dogs were not analyzed (Forrest and St. Clair, 2006). Dogs in wildlife areas can produce strong disturbance reactions from wildlife, often more than by human recreational users alone. Given this, a closed dog park located in an area with minimum impact on wildlife, perhaps 500 feet from any of the habitat islands, could reduce these effects, assuming the dog park is fully fenced and that there are no other off-leash areas.

C. Effects of Industrial Activities (Composting Center)

Little work has been done on the physiological or population implications of noise *per se* on wildlife, and almost no literature that would enable a species-by-species sensitivity comparison for all the birds or other wildlife resident at the closed landfill. The Federal Highway Works Agency (FHWA) has recently reviewed the literature with an emphasis on roads, a disturbance factor which includes noise but many other factors as well (Kaseloo and Tyson, 2004). At this macro scale, the findings are somewhat clearer. The most comprehensive experimental studies on the subject demonstrate that many (although not all) species of small breeding birds in both grassland and forest habitats appear to avoid areas in proportion to the traffic noise and volume; it is also important to note that the other studies that review an extensive number of species found some to be negatively affected by road noise, but most species were neutral and a few species may *increase* in

numbers if the habitat is good enough to overcome the effects of disturbance. The complex interaction of noise with other factors, the differences in reactions between species and the scarcity of data, most land management plans do not consider in any detailed way how noise—at least noise within the levels common to Parks projects -- might impact wildlife on a species-by-species basis.

There are two ways to address the question at Byxbee Park: attenuation and habituation.

Attenuation. General background noise in natural settings is considered by the National Park Service, to cite one source, to be less than 60 dBA (CDPR and NPS, 2000). Construction activities typically operate in the range of 80-90 dBA at 50 feet (Schexnayder & Ernzen, 1999), and automobile noise frequently ranges up to 90 dBA at 50 feet (EPA, 1978). But even at the higher end of the scale, sound attenuates rapidly. Noise from a stationary source (i.e. a project site) attenuates at a rate of 6dBA for every doubling of distance (see Table 3). Even noises on the 90 dBA range are much muted at a few hundred feet, and if the composting facility operated at less the 80 dBA, the sound would approach background at 200 feet. In a Park as small as Byxbee, this would mean that some of area would be slightly “disturbed,” but given our approach to enhancement it would only constitute a siting limitation on the habitat islands.

**TABLE 3.
TYPICAL INDUSTRIAL NOISE LEVELS AND THEIR ATTENUATION OVER DISTANCE**

Typical Industrial- related Noise	Average Noise Levels at Distance From Project Site						
	50 feet	100 ft	200 ft	400 ft	800 ft	1600 ft	3200 ft
Foundations	78	72	66	60	54	48	42
Ground Clearing, Structural	84	78	72	66	60	54	48
Excavation, Grading, Finishing	89	83	77	71	65	59	53
Average operational	63	57	51	45	39	33	27
Maximum operational	80	74	68	62	56	50	44

Habituation. Assuming that the composting facility was in continuous operation while the final phase of closure is carried out, it would be part of the extant level of disturbance, and this is a different case from a new environmental impact. Habituation is a form of learning, in which an animal, after a period of exposure to a stimulus, stops responding. Like noise (and other wildlife response issues) it varies between types of stimulus and species of animal and is influenced by many other factors. But generally, over time there would be less and less effect. Disturbance-tolerant animals (house finches, for example) might be the first species to nest, but the more sensitive species would follow. Absent extremely rare and notoriously sensitive animals which would not find suitable habitat at Byxbee Park in any case (e.g., black-throated gray warbler [*Dendroica nigrescens*]) the

area would eventually acquire all the species normally associated with post-landfill habitats and the sites selected for enhancement.

Any future presence of nesting burrowing owls is an exception to the general human/wildlife peaceful coexistence predicted above. In this event, an exclusion area for both humans and pets should be established to provide a buffer of 250 around the nest, which would be maintained September 15 or until the young have successfully fledged.

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