CONSERVATION PLAN FOR THE AMERICAN OYSTERCATCHER (*HAEMATOPUS PALLIATUS*) THROUGHOUT THE WESTERN HEMISPHERE

Version 1.1

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WESTERN HEMISPHERE SHOREBIRD RESERVE NETWORK

NOTE about Version 1.1:

The only difference between Version 1.1 (February 2010) and Version 1.0 (September 2009) is the addition of a Spanish executive summary.

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EXECUTIVE SUMMARY

The American Oystercatcher (*Haematopus palliatus*) is the most widely distributed of the four oystercatcher species in the Western Hemisphere. Its range covers almost the entire Atlantic Coast from northeastern United States to southern Argentina; on the Pacific Coast it is found from northern Mexico to central Chile. The current plan covers the entire range of the species, and is not intended to serve as a substitute or update for the conservation plan and business plan that cover the U.S. Atlantic and Gulf Coast populations. Readers are advised to refer to those plans, available at www.whsrn.org, for more detailed information about that population.

The subspecific taxonomy of *H. palliatus* is far from clear, but five races are recognized in this plan, primarily to facilitate reference to specific populations (Figure 1). These are nominate *H. p. palliatus* (coasts of eastern and southern United States; eastern Mexico; Pacific and Caribbean coasts of Central America; the Caribbean; and northern and eastern South America); *H. p. frazari* (Gulf of California and western Mexico); *H. p. pitanay* (coast of western South America); *H. p. durnfordi* (coast of southeast South America) and *H. p. galapagensis* (Galapagos Islands). The Galapagos race may deserve species status.

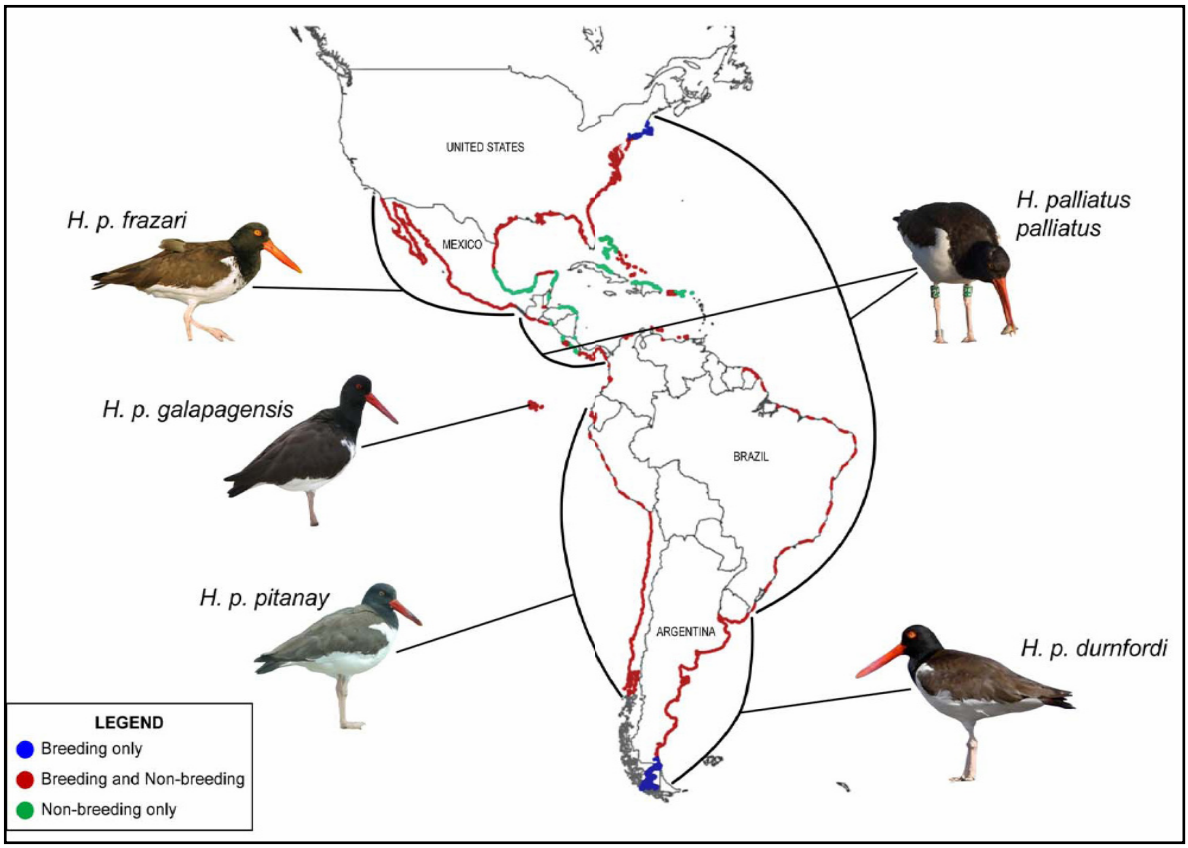

Figure 1: Distribution of the five subspecies of American Oystercatcher (*Haematopus palliatus*). Although the map shows *durnfordi* as the subspecies in Uruguay and northern Argentina, these areas appear to be occupied by the nominate subspecies, with *durnfordi* restricted to southern Argentina.

Based on a review of existing population estimates and an extrapolation of data from quantitative surveys throughout its range, revised estimates are given for the populations of all five subspecies, and a total population of about 43,000 individuals. The nominate race is the most abundant with an estimated population size of about 20,000 individuals, while the least abundant is *H. p. galapagensis*, with just 300 individuals estimated. Biogeographic population estimates were used to determine 1% threshold levels and identify sites of regional and global conservation importance. A total of 20 sites have been identified for *H. p. palliatus*, 5 for *H. p. frazari*, 10 for *H. p. pitanay* and 10 for *H. p. durnfordi*. No key sites were identified for *H. p. galapagensis* as it is found in low density scattered throughout the islands. Of these 45 sites, 14 have counts that surpass the 1% level of the global population, and are thus of global conservation significance for the species. As a dispersed breeder, 1% threshold approaches are of limited value in identifying key breeding sites. For the time being, these have been defined as sites holding 20 or more breeding pairs; 17 such sites have been identified, with all but 4 in the

United States. It is hoped that a more rigorous approach for identifying key breeding sites can be developed for future versions of the plan.

As an obligate coastal species, American Oystercatcher is at risk from widespread habitat loss due to coastal development, and recreational activities that lead to nest disturbance and increased predation. This is exacerbated by the species's low population size and low reproductive success. Climate change also poses a significant future threat, especially with regard to sea-level rise.

To address these threats, conservation actions are proposed that focus on increased legal protection for the species and on the conservation of key sites and important habitats. Conservation could include implementing beneficial management practices, such as restoration of nest and roost sites, controlling predation, and reducing disturbance. Education and outreach programs are needed throughout the species's range, especially for beach users and urban planners. Training programs will be necessary to ensure successful implementation of many of the priority conservation actions. Finally, a key first step towards the implementation of this plan is the creation of a rangewide *H. palliatus* Working Group that includes researchers, conservationists, and educators from throughout the range of the species, with the goal of fostering and coordinating research, conservation action, and monitoring as outlined in the plan.

RESUMEN EJECUTIVO

El ***Haematopus palliatus*** es la especie que tiene mayor distribución de las cuatro especies de ostreros en el Hemisferio Occidental. Su distribución abarca casi toda la Costa Atlántica, desde el noreste de los Estados Unidos hasta el sur de Argentina; en la Costa Pacífica se encuentra desde el norte de México al centro de Chile. El plan actual cubre el rango entero del *H. palliatus* y no está destinado en servir como un sustituto o actualización del plan de conservación y plan de negocios que cubren las poblaciones de las Costas Atlántica y Golfo de los Estados Unidos. Se encuentra la información más detallada sobre estas poblaciones en el "Plan de Acción de Conservación para el *Haematopus palliatus* para las Costas Atlánticas y Golfo de los Estados Unidos," disponible en la página web www.whsrn.org.

La taxonomía de las subespecies de *H. palliatus* está lejos de ser clara, pero actualmente cinco subespecies son reconocidas en este plan, sobre todo para facilitar la referencia a las poblaciones especificas (Figura 1). Ellas son la denominada *H. p. palliatus* (se ubica en las costas este y sur de los Estados Unidos, la costa este de México, las costas Pacífica y Atlántica de Centroamérica, el Caribe, y las costas del norte y este de Suramérica); *H. p. frazari* (desde el Golfo de California hasta el oeste de México); *H. p. pitanay* (la costa oeste de Suramérica); *H. p. durnfordi* (la costa del sureste de Suramérica); y *H. p. galapagensis* (Islas Galápagos). Esta última podría ser determinada como una especie.

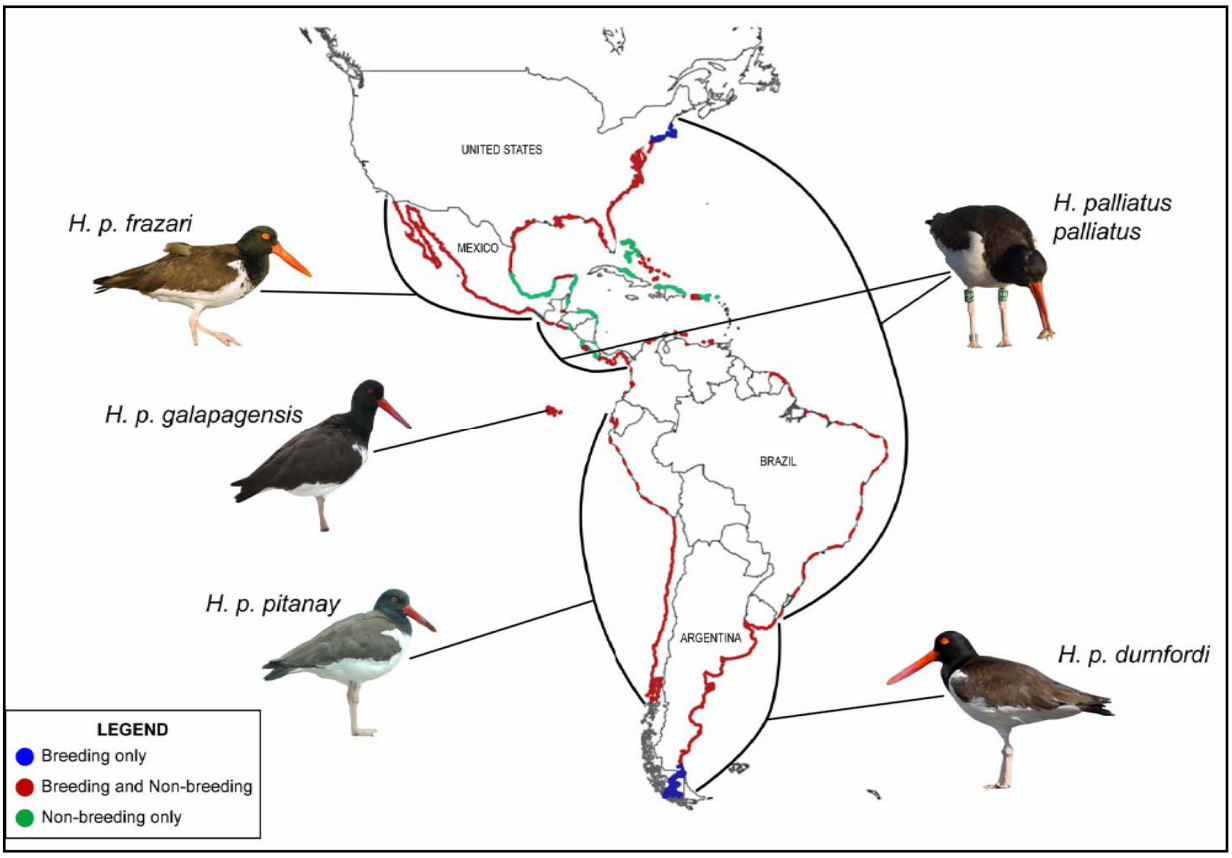

Figura 1. Distribución de las cinco subespecies de *Haematopus palliatus.* Aunque el mapa se muestra a *H. durnfordi* como la subespecie en el norte de Argentina y Uruguay, estas áreas parecen ser ocupadas por la subespecie denominada *H. p. palliatus,* con *H. durnfordi* restringida al sur de Argentina.

Basado en la consideración de las estimaciones de las poblaciones existentes y de una extrapolación de los datos de los censos cuantitativos por todo el rango de *H. palliatus*, se presente las estimaciones actualizadas para las poblaciones de todas las cinco subespecies, y una población total de los 43.000 individuos aproximadamente. La subespecie dominada *H. p. palliatus* es la más abundante, con un tamaño de población estimada de 20.000 individuos, mientras que la menos abundante es *H. p. galapagensis*, con sólo 300 individuos. Estimaciones biogeográficas de las poblaciones fueron utilizada para determinar los niveles de umbral del 1% y identificar de sitios de importancia regional y mundial para la conservación. Un total de 20 sitios han sido identificados para *H. p. palliatus*, 5 para *H. p. frazari*, 10 para *H. p. pitanay,* y 10 para *H. p durnfordi*. No se han identificado sitios claves para *H. p. galapagensis* ya que se encuentran dispersos en las islas con una baja densidad poblacional. De estos 45 sitios, 14 tienen

los datos que sobrepasan el nivel de 1% de la población mundial, y por lo tanto son importantes para la conservación global de la especie. Como una especie dispersada en las áreas de reproducción, un umbral de 1% tiene valor limitado en la identificación de sitios claves para la reproducción. Por el momento, un sitio clave ha sido definido como lo que tiene 20 o más parejas; los 17 de dicho tipo de sitio han sido identificados, y de todos, los 13 se encuentran en los Estados Unidos. Se espera que una manera más rigurosa por la identificación de sitios claves de reproducción será desarrollada para futuras versiones del plan.

Como una especie estrictamente costera, *H. palliatus* está en riesgo de la pérdida extensiva de su hábitat debido al desarrollo en áreas costeras, y actividades de recreación que conllevan a la perturbación del nido y un aumento de depredación. Esto se ve agravado por la disminución del tamaño de la población y el bajo éxito reproductivo. Otra fuerte amenaza futura es el cambio climático global, especialmente el incremento en el nivel del mar.

Para hacer frente a las amenazas, se propone acciones de conservación que se enfoquen en una mayor protección jurídica para la especie y la conservación de sitios claves y hábitats importantes. La conservación se puede incluir la aplicación de prácticas de manejo beneficiosas, como la restauración de sitios de anidación y duerme, control de la depredación, y reducción de la perturbación. Se necesitan los programas de educación y divulgación por todo el rango de la especie, especialmente hacia los personas que usan las playas además hacia los planificadores urbanos. Los programas de capacitación serán necesarios para garantizar la implementación exitosa de las acciones prioritarias de conservación. Finalmente, un primer paso importante hacia la implementación de este plan es la creación de un Grupo de Trabajo para el *H. palliatus* que incluye los investigadores, conservacionistas, y educadores desde todo el rango de la especie, y con el objetivo de fomentar y coordinar las investigaciones, las acciones de conservación, y el monitoreo como indica el plan.

PURPOSE

The purpose of this conservation plan is to define the conservation status of *Haematopus palliatus* throughout its range, describe current threats, list research and management needs, and outline recommended conservation actions to be taken in the near term. This rangewide plan is not intended to serve as a substitute or update to the *Conservation Action Plan for the American Oystercatcher (Haematopus palliatus) for the Atlantic and Gulf Coasts of the United States, Version 2.0* (Schulte *et al.* 2007). Information about the eastern U.S. population of *H. palliatus'* ecology, threats, and needed conservation actions have been incorporated into this rangewide plan as appropriate, but readers should continue to refer to the region-specific plan for more detailed information.

H. palliatus warrants conservation planning for several reasons:

1. Low overall population size: Despite its extensive range, the overall population size is comparatively small, with a disproportionate number of birds concentrated in a relatively small area;

2. Widespread habitat loss: *H. palliatus* is restricted to a narrow range of coastal habitats, and development of beaches, barrier islands, and marshes is a serious concern for the species;

3. Threats during the breeding and nonbreeding seasons: Populations also face pressure from recreational disturbance, increases in nest predators, potential contamination of food resources, and alteration of habitat through beach stabilization. Consequently, the species appears to have very low reproductive success in many parts of its range.

4. Climate change: As an obligate coastal species, *H. palliatus* is particularly vulnerable to effects of sea-level rise.

Unfortunately, the relative impact of each threat on *H. palliatus* populations is poorly understood. A thorough understanding of population dynamics is needed to identify how these threats affect different life stages and where conservation actions should be targeted for the greatest impact.

STATUS AND NATURAL HISTORY

The nominate race of *Haematopus palliatus* has been well studied on its breeding and wintering grounds in the United States (particularly on the East Coast), and has been the focus of a separate and detailed conservation plan (Schulte *et al*. 2007). The ecology, population size, migration patterns, major habitat types, and key sites are all relatively well known for this eastern U.S. population. The same cannot, however, be said for the species throughout the rest of its range—with the exception of a few studies of foraging ecology, primarily in Argentina and Chile, and unpublished recent censuses from southern Brazil and Chile.

MORPHOLOGY

Haematopus palliatus is the only pied oystercatcher throughout most of its range, and its large orange-red bill and contrasting black, brown, and white pattern make it instantly recognizable. Among the pied species of oystercatcher, the strong contrast between the brown back and wings and the black head and neck, plus the combination of a yellow eye and red eye-ring is unique (Hayman *et al*. 1986). The juvenile plumage (with pale fringes to the upperpart feathers) is distinctive in the field for the first 2 to 4 months, and differences in bare part coloration (duller) are useful for separating young birds for at least 1 and perhaps 2 years (Hayman *et al*. 1986). The sexes are similar in plumage, although males (at least in the nominate race) tend to be blacker-backed and redder-billed, and females average larger, with an 8- to 10-millimeter longer bill. The overall length of *H. palliatus* is 400–440 millimeters, with wing 232–272 millimeters, bill 64–95 millimeters, tarsus 49–68 millimeters, and tail 90–112 millimeters (Hayman *et al.* 1986).

TAXONOMY

Oystercatcher taxonomy worldwide remains in controversy, and the 20 or so separate forms have been treated as few as 4 species and as many as 11 species (Peters 1934, Heppleston 1973). *Haematopus palliatus* has at times been considered conspecific with European Oystercatcher *H. ostralegus* (Murphy 1936, Heppleston 1973, Johnsgard 1981), though they are now generally recognized as separate species (*e.g.* Clements 1991, Nol & Humphrey 1994, Sibley & Monroe 1990).

Haematopus palliatus is known to hybridize with American Black Oystercatcher (*H. bachmani*) in the Gulf of California and west Mexico (Jehl 1985), and hybrids with Blackish Oystercatcher (*H. ater*) are known from southern South America (Hockey 1996). A recent DNA barcoding analysis (of short segments of mitochondrial DNA) has shown the interspecific difference between segments of mtDNA of *H. palliatus* and *H. bachmani* to be very low (less than 1.25%) (Hebert *et al.* 2004), which is consistent with Jehl's (op. cit.) suggestion that they represent allopatrically distributed color morphs of a single species.

Several races have been proposed for this species, though many may be insufficiently distinct to warrant recognition (Hockey 1996). In fact, A. J. Baker (in litt. to Hayman *et al*. 1986) speculates that there are no valid subspecies, and that the differences between the described forms result from clinal variation and hybridization with black oystercatchers. Recent authors recognize either two subspecies, the nominate and *galapagensis* (e.g. Hockey 1996, Penhallurick 2007), or five (e.g. Hayman *et al*. 1986, Nol & Humphrey 1994), and that is the treatment followed here (Figure 1), though this is more to facilitate reference to specific populations than a statement regarding *H. palliatus* subspecific taxonomy.

The nominate race is found on the East and Gulf Coasts of North America, locally in the Caribbean, on the Pacific coast of Central America, and along the Caribbean and Atlantic coast of Central and South America south to Uruguay. *H. p. frazari* is found in the Baja area of west Mexico and southern California, where it hybridizes with *H. bachmani* (Jehl 1985). *H. p. pitanay* is found from Pacific Colombia (Ruiz-Guerra in litt. 2009) south to Chiloe Island, Chile, while the isolated race *galapagensis* is restricted to the Galapagos Islands. *H. p. durnfordi* is found on the Atlantic coast of Argentina. At least one additional race has been described, *H. p. prattii* from the Bahamas, considered as separate from *H. p. palliatus* due to its larger bill, but now generally treated as synonymous. The distribution of nesting birds in the Northern Bahamas does support, however, the suggestion that the Bahamian breeding population is disjunct from that of the Atlantic coast of the United States (Kushlan *et al*. in press). Hockey (1996) proposed that the race *galapagensis* might best be treated as a separate species, given some differences in adult morphology and plumage, differences in chick coloration and its geographic isolation.

The three races restricted to the Pacific (*frazari*, *galapagensis* and *pitanay*) have very little or no white in the primaries. The isolated *galapagensis* has disproportionately large legs and toes. *H. p. pitanay* is the smallest race in wing measurements, while *frazari* is the largest,

and *durnfordi* has the shortest legs. Three races, *frazari*, *galapagensis* and *durnfordi* are darker above and have a mottled lower breast, as opposed to a sharp division of black and white. *H. p. frazari* is the largest, has little or no white in the outer primaries, and is generally darkest above with a mottled breast. The latter two characteristics are believed due to hybridization with Black Oystercatcher, and where their range overlap occurs in southern California, birds with white bellies, all black underparts, or streaked breasts all occur (Jehl 1985).

POPULATION ESTIMATE AND TREND

Limited data are available regarding population size and trends for *Haematopus palliatus*. With the exception of the U.S. population, estimates are primarily based on expert opinions, and trends come primarily from local surveys which often vary in methodology and coverage. In this section we provide an overview of existing estimates, and extrapolate from quantitative surveys to provide revised estimates for the populations of all five subspecies.

Wetlands International (2006) provides population estimates for all five subspecies of *Haematopus palliatus*, though they give one combined estimate for the subspecies *pitanay* and *durnfordi*. These are summarized in Table 1.

Table 1: Wetlands International (2006) population estimates and trends for *Haematopus palliatus.*

Subspecies	Distribution	Population Estimate	Source	Trend	Source
palliatus	Coasts of e. & s. USA, Caribbean	11,000	1, 2	Stable	2
frazari	Gulf of California & w. Mexico	350	5	-	-
pitanay + *durnfordi*	w. South America (Ecuador to SC Chile); e. South America (s. Brazil to s-c. Argentina)	25,000–100,000*	3	-	-
galapagensis	Galapagos Islands	300	4	-	-

Key
* Coded range "C" is given, which equates to 25,000–100,000 individuals.
1. Brown *et al*. (2005)
2. Morrison *et al*. (2006). Cited in Wetlands International (2006) as a draft report.
3. Schlatter in litt. to Wetlands International (2002) Unpublished information on South American waterbirds.
4. Hockey (1996)
5. Morrison *et al*. (2001)

H. palliatus population

The eastern U.S. population of *H. palliatus* was recently estimated by Brown *et al*. (2005) at about 11,000 birds (10,700 to 11,300), substantially increasing the previous estimate (see Morrison *et al*. 2001). This subspecies is also found in Mexico and Central America, throughout the Caribbean and on the Atlantic coast of north-east South America (French Guiana and Brazil), suggesting that the Wetlands International (2006) estimate of 11,000 birds for the total *palliatus* population is rather low.

For the identification of Important Bird Areas (IBAs) in the five countries of the Tropical Andes, Boyla & Estrada (2005) estimated the Caribbean population of *palliatus* at 1,100 individuals, of which they considered 550 to be resident and 550 to be migrants (from the North American-breeding population). The recent survey of the eastern U.S. population was conducted during the nonbreeding season, so these migrants to the Caribbean should be included within the estimate of the U.S. population. Nonetheless, little is really known about whether North American breeding oystercatchers migrate to the Caribbean, or whether Caribbean oystercatchers move about seasonally (see, *e.g.* Kushlan *et al*. in press). Consequently, the figures proposed by Boyla & Estrada (2005), and especially the division between resident and migrant birds, should be treated with appropriate caution.

Howell & Webb (1995) considered *Haematopus palliatus* to be a locally fairly common breeding resident on the Caribbean coast of the Mexican states of Tamaulipas and northern Veracruz, and on the northern Yucatan Peninsula. Aerial surveys conducted by Morrison *et al*. (1993) located just 102 birds along the Gulf and Caribbean coast of Mexico in January 1993, with most (50 birds) around the Laguna Madre on both shores of the outer barrier enclosing the lagoon. Harrington *et al*. (2000) recorded higher numbers of *H. palliatus* (58 in total) during a brief ground survey of four locations in Laguna Madre and Laguna Morales. Taking these data and the Howell & Webb (1995) summary into consideration, it seems reasonable to estimate a breeding population of c. 250 birds for the Mexican Gulf and Caribbean coast population. This population is probably continuous with birds in Texas, and it seems likely that this is a discrete population from that of the Atlantic Coast (B. Ortego in litt. 2009).

Komar *et al*. (2006) estimated the Central American breeding population as between 1,751 and 2,450 breeding birds, with an additional wintering population of 275 to 600 birds (presumably representing birds breeding in the United States and/or Mexico). While the

subspecific status of birds in Central America is uncertain, for the purposes of this assessment they are assumed to be *palliatus*.

The species is a rare and very local resident of the Caribbean coast of Colombia (Moreno & Arzuza 2005, Ruiz-Guerra *et al*. 2008) and Venezuela (Rodner 2006), is not known to occur in Guyana (Johnson 2006) or Suriname (Ottema 2006), and is a rare resident of rocky coasts in French Guiana, with a population estimated at less than 50 birds (Delilis & de Pracontal 2006). Morrison (1983) recorded a total of 48 birds along the Venezuelan coast during aerial surveys in 1982. An estimate of 200 birds for the population along the Caribbean coast of northern South America to French Guiana seems reasonable.

In Brazil, the species is locally distributed along the entire coast (Sick 1997), though with the exception of the far south (Rio Grande so Sul state) it would appear to be very localized and uncommon. For instance, Morrison (1983) recorded just 7 birds during aerial surveys of the north coast of Brazil in 1982, and Rodrigues (2007) recorded 13 birds along the same coastline during boat-based and shore-based surveys. Although birds here have been attributed to the subspecies *durnfordi* (Wetlands International 2006), they appear to be the nominate race (Carmen Elisa Fedrizzi & Caio José Carlos in litt. 2007). Morrison (1983) reported 851 birds during aerial surveys of the coast of Rio Grande do Sul state in 1982. Ground-based surveys along 60 kilometers of beach to the south of Cassino from May 1982 to December 1986 recorded peak densities during March to June, with a mean of 6.88 birds/km and a range from 0.30 to 11.10, with mean density during the remaining months was 3.42 birds/km (Vooren & Chiaradia 1990). Ground surveys in 2005 and 2006 by Fedrizzi and Carlos produced a maximum count of 821 birds along 141 kilometers of coast (a density of 5.8 birds/km) and 413 birds along 20 kilometers of coast (a density of 20.7 birds/km). However, these are post-breeding season counts. A nesting season survey of 10 kilometers of Hermenegildo beach located 11 nests, or an average of 1.1 pairs/km. The total coastline of Rio Grande do Sul state is c. 600 kilometers. If each pair is assumed to equate to three individuals (a factor commonly used to allow for the presence of immature birds in a population [see Meininger *et al*. 1995, Wetlands International 2006]), and assuming that pairs are evenly distributed along the coastline, the Rio Grande do Sul *H. palliatus* population can be estimated as 1,980 birds. The remaining Brazilian coastline is c. 6,900 kilometers long. The species is notably more uncommon and locally distributed along the remainder of the Brazilian coastline (some 6,900 kilometers). Assuming that the breeding density

of the species north of Río Grande do Sul is one-tenth of that in Rio Grande do Sul, provides an estimate of 2,275 birds, suggesting a total Brazilian population of c. 4,250 individuals.

No comprehensive survey data appear to be available for *H. palliatus* in Uruguay, where birds are considered to be of the nominate race (Claramunt & Cuello 2004). However, J. Aldabe in litt. (2008) recorded 70 birds along 32 kilometers of coast in Rocha Department. If this density is applied to the length of Uruguayan coastline with appropriate habitat for the species (about 300 kilometers), a total population of 660 birds can be expected.

Finally, assuming that the winter visitor populations in the Caribbean and Central America represent U.S.-breeding birds, a total U.S.-breeding population of 11,825 (11,000 + 550 + 275) is suggested, and a total population of c. 20,000 for the subspecies (see Table 2).

Table 2: Revised population estimate for *H. palliatus palliatus*

Distribution	**Season**	**Population Estimate**	**Source**
Coasts of e. & s. USA	Nonbreeding	11,000	1
Mexico	Breeding	250	*
Caribbean	Breeding Nonbreeding	550 550	2
Central America	Breeding Nonbreeding	1,751–2,450 275–600	3
n. South America	Breeding	200	*
Brazil & Uruguay	Breeding	4,910	*
***palliatus* total**	-	**19,486**	*

Key
* New estimates
1. Brown *et al*. (2005)
2. Boyla & Estrada (2005)
3. Komar *et al*. (2006)

H. frazari population

Morrison *et al*. (2001) estimated a total population of 350 birds for the *H. frazari* subspecies, based on a combination of counts from the Pacific coast of Mexico. Such a low number seems somewhat at odds with the statement that the species is an "Uncommon to fairly common but often local resident from Baja and Gulf of California to Isthmus" (Howell & Webb

1995), and even more so with "This species [*Haematopus palliatus*] is a common resident on both coasts of the peninsula [Baja California]" (Danemann & Carmona 2000). The nomination forms for three Mexican sites recently approved for inclusion in the Western Hemisphere Shorebird Reserve Network (WHSRN 2009 *unpubl. data*) demonstrate that the total population must be larger than the Morrison *et al*. (2001) estimate, with single-site high counts of 423 at Bahía Magdalena, 458 at Laguna Guerrero Negro, and 287 at San Ignacio (all Baja California). In fact, recent surveys along the coast of northwest Mexico have recorded at least 2,482 birds (X. Vega in litt. 2009) and it would seem plausible that the total *frazari* population is 3,000 birds.

H. galapagensis population

The population of *galapagensis* was considered by Harris (1973) to be "very small, probably less than 100 pairs," and this would appear to be the source of more recent estimates of 100 pairs or 300 individuals (Hockey 1996, Wetlands International 2006). Wiedenfeld (2006) considered the species to be "Nowhere common, as reported by Snodgrass and Heller (1904), and generally found on the coasts of main islands (Harris 1973)." Although the observed density at some sites (*e.g.* Punta Espinosa, Fernandina and Punta Suárez, Española) multiplied by the total coast of the Galapagos would give a much higher estimate, only a fraction of the Galapagos coastline is suitable for the species, and the estimate of 100 pairs/300 individuals is reasonable (D. Wiedenfeld in litt. 2007). Wiedenfeld and Jiménez-Uzcátegui (2008) considered the subspecies to have "a very small population, probably fewer then 500 individuals, which almost certainly has never been much larger."

H. pitanay and *H. durnfordi* populations

The only population estimate for these two subspecies appears to be that given in Wetlands International (2006; and earlier editions), of 25,000–100,000 birds. Morrison *et al*. (2001) and Boyla & Estrada (2005) both use 50,000 as the single figure estimate derived from this range, though 62,500 is the true numerical midpoint. Morrison's 1982 aerial survey data of 11,426 birds along the Argentine coast (Morrison 1983) suggest that the lower part of the range may be more accurate. This is further supported by the limited site count data from throughout the range of the two subspecies. For instance, summing the highest counts from all sites in Argentina in the Neotropical Waterbird Census database totals just 2,613 individuals, while the

sum of highest counts for sites in Uruguay is just 29 birds; for Chile 1,497 birds; for Peru 184 birds; and for Ecuador 43 birds (Wetlands International 2007).

The total coastline of Argentina is c. 5,000 kilometers. Using a similar density of breeding pairs as that for *H. palliatus* in Rio Grande do Sul, 3.3 individuals per kilometer provides a total estimate of 16,500 individuals for *H. durnfordi*. Blanco *et al*. (2006) recorded *H. palliatus* at a total of 28 of 54 localities surveyed for shorebirds along the coast of Buenos Aires Province, Argentina, with a mean of 6.6 birds/km and standard deviation of 21.9. Eliminating the three highest counts (all for transects of 1.1 kilometer or less) reduces the mean to just 1.7 birds/km, and gives an estimate of 9,520 birds for the entire coastline. A realistic estimate for the *durnfordi* population would appear to be in the range of 10,000–15,000 birds.

No density estimates are available from within the range of *pitanay* (Ecuador to Chile). However, the extent of the range of this subspecies is about the same as that of *durnfordi* (*i.e*. about 6,000 kilometers), suggesting that the population of this subspecies is likely in the same range of 10,000–15,000 birds.

Global Population

The revised subspecific population estimates suggest a global population of the species of 38,000–48,000 individuals (see Table 3).

Table 3: Revised population estimates for *Haematopus palliatus* subspecies.

Subspecies	**Distribution**	**Population Estimate**	**1% level**
palliatus	Coasts of e. & s. USA, e. Mexico, Central America, Caribbean, n. & e. South America	20,000	200
frazari	Gulf of California & w. Mexico	3000	30
pitanay	w. South America (Colombia to s-c. Chile)	10,000–15,000	100[2]
durnfordi	se. South America (s. Brazil to s-c. Argentina)	10,000–15,000	100
galapagensis	Galapagos Islands	300	3
All subspecies	**(Minimum total estimate)**	**43,300**	**430[1]**

1. Rounded to nearest 1 or 10 as appropriate
2. Calculated from minimum of range

Only very limited population trend data are available for *Haematopus palliatus*, and current information comes primarily from state and local surveys in the United States (and which often vary in methodology and coverage). Survey data show that *H. palliatus* is continuing its range expansion in the Northeast region of the United States (Nol *et al*. 2000), but that numbers are declining in most core mid-Atlantic coast U.S. breeding areas (Mawhinney & Bennedict 1999, Davis *et al*. 2001). One exception to the latter may be Virginia where, more recently, intensive annual surveys of the barrier islands between 2000 and 2007 documented a 41% increase in the number of breeding pairs (Wilke *et al.* 2007).

Count data from the Neotropical Waterbird Census in Argentina during the period 1992–2006 (Wetlands International 2007) show apparent declines in numbers at a few sites, but this could be attributable to changes in site coverage, or movements of the species between sites, rather than real declines.

Despite the lack of information regarding population trends, it seems very likely that both local and the global population of the species have declined over the past 100 years as a result of widespread habitat loss and more indirect threats such as recreational disturbance, increases in nest predators, contamination of food resources, and alteration of habitat through beach stabilization.

DISTRIBUTION

Here we provide a brief summary of the species's distribution. In the United States, the nominate race is found from New England to the Gulf Coast, with the core of this range along the mid-Atlantic Coast, and especially the largely undeveloped eastern shore of Virginia. The species also occurs as an extremely rare summer visitor and vagrant to coastal eastern Canada. The race *frazari* is a rare vagrant (and perhaps winter visitor) to California.

In Mexico, the nominate race is a locally fairly common breeding resident on the Caribbean coast of Tamaulipas and northern Veracruz, and on the northern Yucatan Peninsula; wintering birds occur uncommonly in southern Veracruz, Tabasco, Campeche, and Quintana Roo. The race *frazari* is found on the coasts of Baja, Sonora, Sinaloa, Nayarit, Jalisco, Colima, Michoacan, Guerrero, and Oaxaca as a locally uncommon breeding resident and fairly common

winter visitor; it also occurs in Chiapas as an uncommon winter visitor. There is at least one record of *frazari* from as far south as Costa Rica (Slud 1964).

In the Caribbean, the nominate race is a fairly common breeding resident in the central and southern Bahamas, somewhat rarer in the northern Bahamas, a locally fairly common breeding resident in Puerto Rico, the Virgin Islands, and Guadeloupe (Petite Terre), and an occasional rare breeding resident on the remainder of the Lesser Antilles (though somewhat more common on Aruba, Bonaire, and Curaçao). The species is considered to be very rare in Cuba, but quite possibly there is a regular wintering population. In the Dominican Republic and Haiti, it is a rare breeding resident, while on Jamaica it occurs only as a rare winter visitor. Caribbean breeding birds are supplemented by winter visitors, presumably from the North American population.

In Central America, it appears to be the nominate race which occurs in low numbers on both coasts of Guatemala (rarely, perhaps just as a winter visitor, on the Caribbean coast), and which has a small breeding population in El Salvador. In Belize, Honduras, and Nicaragua, the nominate race is a rare and local winter visitor (there are also a few records from the Pacific coast of Honduras). In Costa Rica, the species is a rare resident on remote beaches and off-shore islands along the Pacific coast, being most numerous (but still rare) on the northwest coast from Cabo Blanco north (Villarreal Orias 2004, L. Sandoval in litt. 2009). To date, there is no evidence of breeding (Slud 1964, L. Sandoval in litt. 2009). It is also an uncommon migrant on the Caribbean coast. The subspecific identify of these birds is unclear, but they are here assumed to be the nominate race. In Panama, *H. palliatus* is a locally fairly common to rare resident breeder along the entire Pacific coast, somewhat more common on the Pearl Islands. There is also one record from the Caribbean coast. The subspecific identity of these birds is also far from clear. Murphy (1925) considered them to be the nominate race, though Wetmore (1965) ascribed them to *pitanay.* Quite possibly they represent a zone of intergradation between the two subspecies.

In northern South America, the species (nominate race) is known from just a few sites on the Caribbean coast of Colombia, and from scattered localities along the Venezuelan coast (mainly on offshore cays and islands), with breeding recently documented for the first time. It is a rare winter visitor to Trinidad, and then appears to be absent from the coast of Guyana and Suriname, reappearing as a rare resident on more rocky parts of the coastline of French Guiana.

The nominate race also occurs uncommonly along the entire Brazilian and Uruguayan coastline, though it is more abundant in the extreme south (especially in Rio Grande do Sul state). While these southern birds have been considered to represent *durnfordi* (Wetlands International 2006), an examination of specimens, photographs, and birds in the field indicates that they are actually of the nominate race (Fedrizzi & Carlos in litt. 2007). The nominate race also occurs uncommonly along the Uruguayan coast, and may well be the form in northern Argentina. In southern Argentina it is replaced by the race *durnfordi,* which is locally common as far south as the north end of the Straits of Magellan (R. Matus in litt. 2009), with the southernmost record at the second "narrows" (Venegas 1973). The species only rarely occurs in Tierra de Fuego (and not at all on the Estado Islands).

The subspecies *pitanay* is found from northern Ecuador (where it is a locally uncommon to rare breeding resident) along the coast of Peru and Chile as far as Chiloé, but does not occur further south. In both its Peruvian and Chilean range it is a locally fairly common breeding resident. There are scattered records along the Pacific coast of Colombia, which may represent a zone of intergradation between nominate *palliatus* and *pitanay* (Murphy 1925). The isolated race *galapagensis* is restricted to the Galapagos Islands.

MIGRATION

Only those *H. palliatus* in the latitudinal extremes of their range are truly migratory, and even then, they are short distance, partial migrants. In the United States, most oystercatchers breeding north of the state of New Jersey move south for the winter (Brown *et al*. 2005). In central and southern U.S. breeding areas it is less clear what factors influence the decision to migrate or remain as a resident. Recent banding data from North Carolina show that this decision is highly individual. Even within a family group some members may choose to migrate, while others remain near their nesting site all winter (Simons and Schulte 2009). Similar migratory patterns are observed among birds banded on breeding territories in Virginia (R. Boettcher & A. Wilke in litt 2009).

In late July and August in the United States, oystercatchers begin to gather in staging flocks before fall migration. Most individuals migrate from breeding territories in the fall, though some only move to nearby roost sites adjacent to feeding habitat. Southward migration occurs gradually from the end of August through November. During migration, as in the rest of the year,

oystercatchers stay strictly within the coastal zone. Although banding records have shown that some oystercatchers cross the Florida peninsula during migration, oystercatchers do not use interior sites during migration. On Monomoy Island, Massachusetts, oystercatcher numbers in staging flocks peak in late August and early September (Schulte and Brown 2003). In Georgia, oystercatcher numbers at stopover sites peak in mid-September and October (B. Winn, cited in Schulte *et al*. 2007).

Northward migration begins in late winter. On the Outer Banks of North Carolina, oystercatchers begin to arrive on breeding territories in late February (Simons and Schulte 2009). In Massachusetts, birds begin to arrive by the end of March (Nol and Humphrey 1994).

In southernmost South America, oystercatcher movements are less well documented, but at least some birds in the extreme south of the range would appear to move north during the winter. For instance, the species is only present during the breeding season in the Río Gallegos estuary, Santa Cruz Province, Argentina (Albrieu *et al*. 2004), and Gandini & Frere (1998) report the species to only be present during the spring and summer at Puerto Deseado, also in Santa Cruz Province. The species is believed to be resident elsewhere in South America, although local movements are believed to occur, *e.g.* in Rio Grande do Sul (Belton 1984) and even in Colombia, where numbers on the Pacific coast increase during February (Ruiz-Guerra in litt. 2009).

MAJOR HABITATS

Oystercatchers are specialized to feed on bivalves and other marine invertebrates (Nol 1989) using their laterally compressed bill to server the adductor muscle that holds the shells together (Nol & Humphrey 1994). Because of this specialized diet, *H. palliatus* are primarily found in coastal areas that support intertidal shellfish beds, both during the breeding and nonbreeding seasons.

Breeding Range

Traditional breeding habitat for *Haematopus palliatus* includes undeveloped barrier beaches, sandbars, shell rakes (linear bars of dead shells), and to some extent, salt marsh islands (Nol and Humphrey 1994). In recent years, nesting in salt marsh habitat has been more extensively documented (Wilke *et al.* 2005, Shields and Parnell 1990, Lauro and Burgur 1989),

though the use of this habitat for breeding may not be new (see Wilke *et al*. 2007). *H. palliatus* have also been found nesting in non-traditional habitats, including dredge spoil islands, and even rooftops in Florida and North Carolina (R. Paul, and J. Fussell cited in Schulte *et al*. 2007). Nesting density varies widely by location and habitat type. On remote barrier beaches density may vary, but is generally highest near prime feeding territories, especially on sand flats near inlets (McGowan *et al.* 2005). A recent study comparing nesting success on barrier beaches (~70 kilometers) and dredge spoils (~3 kilometers) found an average density of 0.6 pairs/km of shoreline on barrier islands, while on dredge spoil islands in the Cape Fear River of North Carolina, *H. palliatus* nested in densities as high as 10.6 pairs/km of shoreline (McGowan *et al*. 2005).

Dredge spoil islands may contain very high densities of nesting *H. palliatus*, but it is unclear whether the birds nesting in this habitat are more productive than those in more traditional sites. Hatching success was higher on the dredge spoil islands than on barrier beaches (McGowan *et al*. 2005), but overall nesting success was similar, indicating that birds on dredge spoil islands were having difficulty raising chicks.

Shell rakes are another habitat type of high importance to oystercatchers. In the mid-Atlantic and southeast United States, shell rakes are used by nesting *H. palliatus* (Sander *et al.* 2008) and serve as roost sites for the majority of wintering flocks (Brown *et al.* 2005). In the state of Virginia, *H. palliatus* make extensive use of shell rakes in the seaside lagoon system as both nesting and winter roost sites (Wilke *et al.* 2007).

In the Bahamas, all nests observed have been on small rocky cays offshore of larger islands and not on the larger islands themselves (Kushlan *et al*. in press). This appears also to be the case elsewhere in the West Indies (Raffaele *et al.* 1998). In their apparent choice of nesting habitat, Caribbean oystercatchers thus differ from birds nesting on the east coast of North America.

Nonbreeding Range

In the United States, after the breeding season, many *H. palliatus* move off of their breeding territories and gather in roosting flocks at the edges of marshes and sand flats. In the southeast states, some resident pairs remain on breeding territories throughout the year (Sanders *et al*. 2004). U.S. *H. palliatus* typically roost on sites that are near feeding areas, and not

connected to the mainland (Brown *et al*. 2005). In the mid-Atlantic and southeastern United States, *H. palliatus* commonly use shell rakes as winter roost sites (Brown *et al*. 2005; Sanders *et al*. 2004). Other habitat types used by wintering oystercatchers include small sandy islands, inlet beaches and accreting sand spits, edges and interior mudflats on marsh islands, and occasionally long docks and jetties.

CONSERVATION STATUS

At a global level, *Haematopus palliatus* is considered to be in the category "Least Concern" of the IUCN Red List, given that it "has a large range, with an estimated global Extent of Occurrence of 860,000 kilometers² " and "a large global population estimated to be 34,000–110,000 individuals (Wetlands International 2002)" (BirdLife International 2008). NatureServe (2007) also considers the species to be "Secure" (category G5) due "primarily to extensive range, while recent range expansion has occurred in some areas." The species is not listed by the Convention on Migratory Species (CMS), nor by the Convention on International Trade in Endangered Species (CITES).

The global Extent of Occurrence (EOO) of the species warrants further consideration. EOO is defined by IUCN (2001) as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred, or projected sites of present occurrence of a taxon, excluding cases of vagrancy." The figure cited by BirdLife International (2008) presumably includes large areas of unsuitable (*i.e.*, not coastal) habitat which can be excluded from the calculation of EOO. The length of the coastlines where *H. palliatus* occurs (and to which it is restricted) totals, at most, 65,000 kilometers (CIA 2009). Allowing for an average coastal zone width of 0.5 km provides an EOO estimate of 32,500 km². However, even with this redefinition of the EOO, the species does not appear to approach the thresholds for the IUCN Red List categories of threat.

At the national level in the United States and Canada, *Haematopus palliatus* is considered to be a "Species of High Concern" (Donaldson *et al*. 2000, Brown *et al*. 2001, U.S. Fish and Wildlife Service 2004), and a species of "National Concern" in the federal listing of Birds of Conservation Concern (U.S. Fish And Wildlife Service 2002). At a subnational level in the United States, all thirteen states along the Atlantic Coast list *Haematopus palliatus* as either officially threatened or endangered, or as a "Species of Greatest Conservation Need" in their

state wildlife action plans. The species is also listed as "Endangered" in El Salvador (MMARN 2004), and is considered as "Near Threatened" in Guatemala (Eisermann & Avedaño 2006, though this is not an official listing). In Brazil, *H. palliatus* is listed as "Vulnerable" in Sao Paulo State (Figueiredo 2004).

POPULATION GOAL(S)

Inadequate information exists about the current and historic global population size and trends for *Haematopus palliatus* on which to base a quantitative population goal. It is clear that at least some populations (such as in the United States) declined dramatically in historical times. In addition, current populations are isolated on a small ribbon of habitat along coastlines which are highly vulnerable to development and loss from sea-level rise. Therefore it is prudent to set a minimum goal of no net loss in the current *H. palliatus* population, and ideally to increase the current population size to offset expected future decreases from habitat loss. Schulte *et al*. (2007) recommended that the U.S. population be stabilized and then gradually increased from its current level to at least 1.5 times its current size. Meanwhile, the U.S. business plan for the species predicts a 10% loss over 10 years in the absence of conservation action, and recommends a goal of increasing the U.S. population by 30% over the next 10 years (American Oystercatcher Working Group & NFWF 2008).

CONSERVATION SITES

This section of the plan identifies the key sites of conservation importance for *Haematopus palliatus*. These sites are identified for holding 1% or more of the biogeographic population of the species. Defining "biogeographic populations" of *H. palliatus* is complicated by the uncertainty regarding subspecific taxonomy and the extensive range of the nominate race (along the Atlantic and Caribbean coastlines from the northeastern United States to Uruguay). For the purposes of this plan, each subspecies is considered to represent a separate biogeographic population. However, future research may show that the nominate race (as defined here) warrants treatment as several discrete biogeographic populations.

For each biogeographic population, a 1% threshold level was determined based on the revised population estimates presented in this plan. These are summarized in Table 4. Threshold levels were calculated using a precautionary approach, using the minimum population estimate for each subspecies.

Table 4: Biogeographic population 1% thresholds for *Haematopus palliatus* subspecies.

Subspecies	**1% level**
palliatus	200
frazari	30
pitanay	100
durnfordi	100
galapagensis	3
All subspecies	430

Given the limited migration of *Haematopus palliatus*, the following list of sites is not separated between breeding, migration, and wintering sites, but is rather presented per subspecies. Sites holding 1% of the corresponding biogeographic population are considered as "Regionally Important," while sites holding 1% or more of the global population are considered to be "Globally Important."

One disadvantage of using a 1% of the biogeographic population approach to defining key sites of conservation importance is that it may under-emphasize the importance of breeding sites. As breeding oystercatchers are often highly dispersed, the identification of breeding sites becomes dependent on geographic scale, with only the very largest sites identified as important.

Without a standard geographic scope to consider when defining a site, the possibilities are endless for grouping or splitting areas and regions and the status designations unfortunately become somewhat arbitrary. This problem (of identifying key areas for dispersed breeders) has befuddled shorebird conservation efforts since the creation of the Western Hemisphere Shorebird Reserve Network (WHSRN). A number of approaches have been proposed, from defining state/country level thresholds, to density measures (with sites holding densities above a certain threshold defined as of international importance). A hierarchical ranking system that selects (for example) based on total number of pairs, then area of habitat, then average productivity (if known) might be the most practical approach, combined with data on land management units. However, in the absence of an internationally agreed upon approach, and given the paucity of data regarding breeding numbers and productivity, we have, for the moment, simply defined any site holding 20 or more pairs as an "important breeding site," which are presented in a separate table. Determining a more robust approach, applicable throughout the species's range, is a priority action item for the *Haematopus palliatus* Working Group.

No key sites have been identified for *galapagensis*. This form is scattered throughout the Galapagos archipelago in low densities, and birds appear to move around considerably (D. Wiedenfeld in litt. 2008), with no indication of large congregations ever forming. Sites where the subspecies occurs with regularity include Punta Espinosa (Fernandina) and Punta Suarez (Española) (L. Navarete in litt. 2007).

Abbreviations used in the tables below are as follows: *Seasonal Use:* B – Breeding, Non-b: Non-breeding; *Import. (Importance)*: R – Regional (≥ 1% subspecies population), G – Global (≥ 1% global population); *Source:* NWC data – Neotropical Waterbird Census (provided by Wetlands International 2008).

Key Sites *palliatus* – northern population

Site name	State/Prov.	Country	High Count	Seasonal Use	Import.	Source
Monomoy Island National Wildlife Refuge and South Beach	Massachusetts	USA	215	Staging	R	Schulte *et al*. 2007
Jones Beach State Park	New York	USA	~200	Non-b	R	Schulte *et al*. 2007
Great Bay Boulevard Wildlife Management Area	New Jersey	USA	250	Non-b	R	Brown *et al*. 2005
Absecon inlet - city of Brigantine	New Jersey	USA	225	Non-b	R	Brown *et al*. 2005

Stone Harbor Point and Nummy Island	New Jersey	USA	254	Non-b	R	Brown *et al.* 2005
Eastern Shore of Virginia – seaward of the Delmarva Peninsula	Virginia	USA	B: 615 pairs Non-b ~2,530	B/Non-b	G	Wilke *et al.* 2009 and unpubl. data Brown *et al.* 2005
Back Bay	North Carolina	USA	250	Non-b	R	Brown *et al.* 2005
Lower Cape Fear River	North Carolina	USA	200–300	Non-b	R	Brown *et al.* 2005
Cape Romain National Wildlife Refuge	South Carolina	USA	B: 230 pairs Non-b: 1,800–1,900	B/Non-b	G	Sanders *et al.* 2004, Brown *et al.* 2005
Folly Island	South Carolina	USA	195	Non-b	R	Brown *et al.* 2005
North Edisto River	South Carolina	USA	237	Non-b	R	Brown *et al.* 2005
Trenchard's Islet	South Carolina	USA	~ 650	Non-b	G	Brown *et al.* 2005
Altamaha Delta	Georgia	USA	450	Non-b	G	Brown *et al.* 2005
Intracoastal waterway near Amelia Island	Florida	USA	~200	Non-b	R	Brown *et al.* 2005
Tampa and Hillsborough Bay	Florida	USA	B: 120 pairs Non-b: 250–300	B/Non-b	R	Brown *et al.* 2005
Cedar Keys	Florida	USA	500-1,000	Non-b	G	Brown *et al.* 2005, Leary pers comm
Lower Suwannee River NWR	Florida	USA	280-500	Non-b	R	Schulte *et al.* 2007, Leary pers comm

Key Sites *palliatus* – southern population

Site name	State/Prov.	Country	High Count	Seasonal Use	Import.	Source
Southern coast	Rio Grande do Sul	Brazil	1,480 along 361 km coast; concentrations in the Barra region (mouth of the lagoon): 401 individuals.	-	G	Carmem Elisa Fedrizzi and Caio José Carlos in litt. 2007
Laguna de Rocha	Rocha	Uruguay	210	-	R	NWC data
Aº Valizas y Laguna de Castillos	Rocha	Uruguay	470	-	G	NWC data

Key sites *frazari*

Site name	State/Prov.	Country	High Count	Seasonal Use	Import.	Source
Ojo de Liebre/Guerrero Negro	Baja California	Mexico	458	-	G	WHSRN 2009 *unpubl. data*
Laguna San Ignacio	Baja California	Mexico	287	-	R	WHSRN 2009 *unpubl. data*
Bahia Magdalena	Baja California	Mexico	423	-	R	WHSRN 2009 *unpubl. data*
Río Colorado Estuary	Sonora/Baja California	Mexico	121	-	R	Morrison & Ross 2008

Key sites *pitanay*

Site name	State/Prov.	Country	High Count	Seasonal Use	Import.	Source
Bahía Coquimbo	Region IV	Chile	198	-	R	NWC data
Estero Conchalí	Region IV	Chile	111	-	R	NWC data
Estero de Mantagua	Region V	Chile	150	-	R	F. Schmitt in litt. 2007
Mouth Río Maipo	Region V	Chile	420	-	G	F. Schmitt in litt. 2007
El Yali	Region V	Chile	123	-	R	NWC data
Mouth Río Aconcagua	Region V	Chile	150	-	R	NWC data
Estero Nilahue	Region VI	Chile	135	-	R	R. Barros in litt. 2007
Mouth Río Reloca	Region VII	Chile	250	-	R	NWC data
Coihuín, Pelluco	Region X	Chile	600	-	G	NWC Data
Santuario Nacional Lagunas de Mejia	Arequipa	Peru	50 pairs	B	R	E. Málaga in litt. 2007

Key sites *durnfordi*

Site name	State/Prov.	Country	High Count	Seasonal Use	Import.	Source
Playas de Monte Hermoso	Buenos Aires	Argentina	120	-	R	NWC data
Balnearios San Cayetano y Reta	Buenos Aires	Argentina	125	-	R	NWC data
Reserva de Biosfera Albufera de Mar Chiquita	Buenos Aires	Argentina	1,866		G	Savigny *et a*l. 2007
Playa de la Avenida Ducós	Chubut	Argentina	435	-	G	NWC data
Rocas Blancas	Chubut	Argentina	550	-	G	NWC data
Puerto de Comodoro Rivadavia	Chubut	Argentina	185	-	R	NWC data

Itmas-Punta Delgado	Río Negro	Argentina	177	-	R	NWC data
Puerto San Antonio Este	Río Negro	Argentina	122	-	R	NWC data
Laguna Alamos	Río Negro	Argentina	104	-	R	NWC data
Playa de La Tranquera	Santa Cruz	Argentina	250	-	R	NWC data

Important Breeding Sites (holding 20 or more pairs)

Site name	State/Prov.	Country	High Count	Source
Eastern Shore of Virginia	Virginia	USA	~ 525 pairs	Wilke *et al.* 2005, Brown *et al.* 2005
Bay – Western Shore	Virginia	USA	21 pairs	Schulte *et al.* 2007
Bay – Accomack Shore	Virginia	USA	42 pairs	Schulte *et al.* 2007
Tampa and Hillsborough Bay	Florida	USA	120 pairs	Brown *et al.* 2005
Monomoy Island National Wildlife Refuge and South Beach	Massachusetts	USA	30-35 pairs	Schulte *et al.* 2007
Nantucket Harbor and Great Point	Massachusetts	USA	~ 40 pairs	Schulte *et al.* 2007
Stone Harbor Point and Nummy Island	New Jersey	USA	38 pairs	Schulte *et al.* 2007
Island Beach State Park and adjacent Sedge Island Marine Conservation Zone	New Jersey	USA	41 pairs	Schulte *et al.* 2007
Edwin B. Forsythe National Wildlife Refuge, Holgate Division and adjacent saltmarsh	New Jersey	USA	77 pairs	Schulte *et al.* 2007
Cape Hatteras National Seashore	North Carolina	USA	~30 pairs	Schulte *et al.* 2007
Cape Lookout National Seashore	North Carolina	USA	60 pairs	Schulte *et al.* 2007
Lower Cape Fear River	North Carolina	USA	40-55 pairs	Schulte *et al.* 2007
Cape Romain National Wildlife Refuge	South Carolina	USA	230 pairs	Sanders e*t al*. 2004, Brown *et al*. 2005
Santuario Nacional Lagunas de Mejia	Arequipa	Peru	50 pairs	E. Málaga in litt. 2007
Punta Teatinos beach	Region IV	Chile	21 pairs	Cortés Barrios 2004

Ritoque-Mantagua beach	Region V	Chile	55 pairs	R. Barros in litt. 2009
Beaches between mouth of river Mataquito and Loanco (Faro Carranza)	Region VI	Chile	309 pairs	R. Barros in litt. 2009

CONSERVATION THREATS

As an obligate coastal species, *Haematopus palliatus* is at risk throughout its range from the changing patterns of land use in the coastal zone. Human population growth is widespread in coastal areas, and recreational use is also on the rise. Many visitors to the coast seek out undeveloped beaches. As coastal islands and beaches are developed, more visitors are concentrated onto the remaining undeveloped areas. These anthropogenic changes place growing pressure on natural communities along the coast. As a beach-nesting species, *H. palliatus* is particularly vulnerable because the nesting season typically coincides with the peak of human activity on beaches. Primary limiting factors for the species would appear to be habitat loss and degradation through coastal development, and disturbance of nesting birds, including nest predation.

CLIMATE CHANGE

Haematopus palliatus is an obligate coastal species, and uses low-lying coastal habitats for nesting and roosting, and also as wintering areas. This makes the species particularly vulnerable to effects of sea-level rise. The Intergovernmental Panel on Climate Change predicts that global temperature will rise between 1.4 and 5.8°C by 2100, a temperature increase that is likely without precedent in the last 10,000 years (IPCC 2001). As a result of thermal expansion of ocean water and increased melting of landfast ice, sea level is expected to rise between 0.09 and 0.88 meters by 2100. Furthermore, more recent estimates suggest that sea-level rises will be even higher, likely to reach 1 meter, and potentially even 2 meters (Rahmstorf 2007, Pfeffer *et al*. 2008). In addition, global climate change is expected to include increased severity of coastal storms (IPCC 2001), which can both damage habitat and destroy nests. These factors can be expected to affect *H. palliatus* habitat, but the specific impacts are difficult to predict accurately without detailed study. Overwash is known to destroy nests when storms occur during the

nesting season (*e.g.* Muñoz del Viejo *et al*. 2004), and can also destroy beach habitat. Storms can also have the effect of building barrier island or beach habitat, or removing vegetation that made it unsuitable for nesting, so the overall effects are difficult to predict. In addition, effects of sea-level rise on availability of food sources are unknown, but potentially serious since *H. palliatus* depend on foraging for shellfish and other marine organisms, often at low tide, and the ability of these organisms to adjust rapidly to rising sea levels is unknown. Changing climatic conditions also lead to variation in the marine environment, such as periodic shifts in ocean currents, upwellings, and weather patterns. The best known of these phenomena is the El Niño Southern Oscillation (ENSO). It is likely that the periodicity of such events will change as a result of global climate change, though the effects of such events on *H. palliatus* populations are currently unknown.

CONTAMINATION

Damage to food resources is a potentially serious threat to *Haematopus palliatus*. The species feeds primarily on bivalves, which accumulate toxins and are susceptible to changes in sedimentation (Bretz *et al.* 2002, Andres 1999). Development along the coast can lead to increases in non-point source pollution and sedimentation rates in estuaries (Basnyat *et al.* 1999), and this has been considered a potential threat to the species in several countries throughout its range, such as Argentina (from plastics, Gandini & Frere 1998) and Ecuador (D.F. Cisneros-Heredia in litt. 2007, J.F. Freile in litt. 2007). Oil spills are another potential source of damage to shellfish beds as well as direct mortality of foraging birds (Andres 1996). Marine debris has been identified as a threat to the *galapagensis* subspecies (J.J. Alava in litt. 2007, J.F. Freile in litt. 2007) which, combined with urban expansion and the potential threat from oil spills and introduced predators (Wiedenfeld & Jiménez-Uzcátegui 2008), and the small overall population size, suggests that this threat warrants conservation attention especially considering that the *galapagensis* subspecies may actually merit recognition as a separate species (Hockey 1996).

HUMAN DISTURBANCE

As the human population in coastal areas increases and more people use beaches and waterways for recreational purposes, impacts on *Haematopus palliatus* populations will become

more pronounced. Researchers have documented a negative relationship between human disturbance and reproductive success in African Black Oystercatchers (*Haematopus moquini*, Jeffery 1987) and Canarian Black Oystercatchers (*Haematopus meadewaldoi*, Hockey 1987). The effects of human disturbance on nesting success, density, and survival of *H. palliatus* are not completely understood, but several studies have documented lower nest survival and higher chick mortality in high-disturbance sites (McGowan and Simons 2006, Sabine 2005). Novick (1996) and Davis (1999) documented lower nesting success for *H. palliatus* in North Carolina (USA) in areas where human disturbance was higher. Davis also noted that *H. palliatus* avoid nesting in areas with high levels of human activity. As more people make use of beaches, sandbars, and other nesting habitat, many undeveloped areas may become effectively unusable. McGowan and Simons (2006) found evidence to suggest that *H. palliatus* disturbed by vehicles on the beach suffered higher rates of nest predation. Beach disturbance is highest during the summer when pedestrian, vehicle, and boat traffic are at their peak. While there are no formal studies of the impacts of disturbance within the Neotropical range of the species, correspondents from throughout the range cited human disturbance, and especially beach tourism and vehicular traffic, as major threats to the species. Disturbance from livestock and dogs was also considered to be an important threat at a number of sites in Rio Grande do Sul state, Brazil (C.E. Fedrizzi & C.J. Carlos in litt. 2007), in Chile (I. Azocar in litt. 2007) and in Ecuador (J. Freile in litt. 2007). Studies are currently underway in Massachusetts to determine appropriate setback distances for fencing to reduce disturbance of nesting birds (S. Brown pers. comm.).

Disturbance also affects oystercatchers at wintering and staging sites. Peters and Otis (2005) used focal animal sampling to relate vigilance behavior to boat and predator activity. They found that *H. palliatus* showed increased vigilance during periods of increased boat and predator activity, suggesting that boat traffic could be a source of stress for wintering oystercatchers. Oystercatchers in winter flocks normally use several roost sites among which they move depending on tide level and wind direction (Sanders *et al.* 2004, Wilke *et al*. 2007). Roost sites near developed areas can also be subjected to high levels of disturbance. Recreational boaters are often the source of disturbance at roost sites, especially in the southern United States where they can operate year-round. The impact of this disturbance on survival and site use is unknown.

Hunting of adult oystercatchers (either for food or for sport) has generally not been considered a major factor affecting populations (see Hockey 1996), although it has been postulated to occur at Lagoa do Peixe National Park in Rio Grande do Sul, Brazil (C.E. Fedrizzi & C.J. Carlos in litt. 2007), and it would seem reasonable to expect that opportunistic hunting of the species occurs occasionally throughout the Neotropical range of the species. Trade in shorebirds for pets occurs in parts of the Pacific coast of Colombia (including within Isla Salamanca National Park) and *H. palliatus* is the most prized of all the shorebird species (R. Strewe in litt. 2009).

As oystercatchers are specialist predators of shellfish, they have the potential to come into conflict with humans at commercial shellfish farms. For instance, in the United States, *H. palliatus* prey on commercial oyster beds, especially during the winter, but it is not known whether they have any economic impact as they concentrate on smaller oysters (Hockey 1996). It would seem likely that there is some limited hunting of oystercatchers under the guise of protecting commercial activities.

Finally, egg collecting by local people has been considered a threat at one breeding site in Ecuador (in Manabi Province) (Henry 2005), and probably occurs, at least opportunistically, throughout the Neotropical range of the species.

HABITAT LOSS AND DEGRADATION

Coastal development is a serious threat to *H. palliatus* populations throughout their range. Commercial and residential development of barrier islands has already destroyed significant areas of traditional nesting, foraging, and roosting habitat throughout the U.S. range of the species. Urban expansion was identified as a threat to the species by various correspondents in Brazil, Ecuador, Panama, and Peru. In Costa Rica, the top coastal tourism area coincides with the main part of the species's range in the country. Coastal development is rife, and oystercatchers are now only frequently seen on the main beaches outside of the tourist season (L. Sandoval in litt. 2009). Similarly, in Sao Paulo state, Brazil, *H. palliatus* is officially classified as "Vulnerable" primarily due to habitat loss due to tourism-related development (Barbieri in litt. 2009). Shrimp farming has been considered a threat in Rio Grande do Norte state, Brazil (J.B. Irusta in litt. 2007), and this is presumably the case wherever shrimp farming occurs within the range of the species. Shoreline development affects nearby habitat as well. Oystercatchers tend

to nest at higher densities and fledge more chicks when they have direct access to foraging areas (Nol 1989, Ens *et al*. 1992). Roads and artificial dunes along nesting beaches can prevent access to marshes and flats along the back side of islands and thereby severely reduce habitat quality. Similarly, the development of coastal coconut plantations has been considered a threat in Ecuador (D.F. Cisneros-Heredia in litt. 2007). Nesting and roosting sites can also be lost when jetties and revetments alter the normal process of long-shore transport of sand and cause significant erosion of adjacent beaches. Hardened shorelines also alter or stop overwash processes on barrier islands which are the fundamental disturbance events that create open beach habitat preferred by many beach-nesting bird species.

However, not all coastal developments may be detrimental to the species. The local population of *H. palliatus* has gradually increased at the Salinas salt extraction lagoons in Ecuador since the early 1990s (B. Haase pers. comm. 2007), possibly due to increased habitat availability.

COMPETITION FOR FOOD

Haematopus species use their laterally compressed bill to feed on bivalves and other marine invertebrate (Sabine 2005, Nol 1989). They open bivalves by rapid stabbing to sever the adductor muscle that holds the shells together (Nol and Humphrey 1994). Their specialized diet presumably reduces competition for food resources with other species. Where *Haematopus* species coexist, differences in preferred habitats and/or the morphology of their bills (length and width) segregate their foraging roles (Lauro & Nol 1995a, b). For instance, Pacheco & Castilla (2000) found that in northern Chile *H. palliatus pitanay* feeds most frequently on soft-bodied tunicates, while *H. ater* favors prey with calcareous shells, such as limpets, snails, mussels, and sea urchins. While direct competition would appear to be limited, a number of studies have documented kleptoparasitism of *H. palliatus* by gulls (*Laridae*), including two studies at Mar Chiquita lagoon, Buenos Aires Province, Argentina. Martinez & Bachmann (1997) found that oystercatchers lost 30% of 136 prey items to Brown-hooded Gulls (*Larus maculipennis*), Grey-headed Gulls (*L. cirrocephalus*), and Band-tailed Gulls (*L. belcheri*); Khatchikian *et al*. (2002) consider the influence of environmental variables on the occurrence and success of kleptoparasitism by the same species, recording a total of 358 kleptoparasitic attempts (at a rate of 1.2 ± 1.3 attempts per 5 minutes) of which 42% of attempts were successful. Human activities

(such as expansion of the fishing industry and waste disposal practices) can lead to increases in gull populations, which could lead to an increased incidence of kleptoparasitism, in addition to increased direct predation.

PREDATION

Every study of the breeding success of *Haematopus palliatus* has identified predation as a major source of nest failure (Davis 1999, McGowan *et al.* 2005, Nol 1989, Novick 1996, Sabine *et al*. 2005, Schulte and Brown 2003, Simons and Schulte 2009, Wilke and Watts, 2004). Confirmed nest predators from such studies in the United States (in the states of Massachusetts, Virginia, North Carolina, and Georgia) include Raccoon (*Procyon lotor*), Red Fox (*Vulpes vulpes*), Coyote (*Canis latrans*), feral cats (*Felis catus*), Bobcat (*Lynx rufus*), American Mink (*Mustela vison*), Herring Gull (*Larus argentatus*), Great Black-backed Gull (*Larus marinus*), Laughing Gull (*Larus atricilla*), American Crow (*Corvus brachyrhynchos)*, Fish Crow (*Corvus ossifragus*), and Ghost Crab (*Ocypode quadrata*).

Twelve years of nest monitoring on barrier beaches in North Carolina showed that mammalian nest predators were responsible for more than 50% of nest failures in cases where the cause of failure could be identified (McGowan *et al.* 2005, Simons and Schulte 2009). Raccoons and feral cats were the primary predators in this area, and both of these species thrive in the presence of humans. Researchers on Cumberland Island National Seashore (USA) used video monitoring to document sources of *H. palliatus* nest failure and found that raccoons were the primary nest predator on the island (Sabine *et al.* 2005).

Little has been documented regarding the breeding success of *H. palliatus* throughout its Neotropical range. However, it seems likely that Neotropical populations also suffer from nest predation as a major source of failure. For instance, of 11 nests along 10 kilometers of Hermenegildo Beach in Rio Grande do Sul state, Brazil, in 2006/7, just three chicks hatched, and none survived to fledging. Disturbance and nest predation (by dogs) appeared to be the major factors (C.E. Fedrizzi & C.J. Carlos in litt. 2007). Predation by gulls has also been postulated to be a threat in southern Argentina, where the tons of waste generated by the fishing industry has probably led to a Kelp Gull (*Larus dominicus*) population increase (Gandini & Frere 1998). In the Caribbean, the small population that breeds on Petite-Terre Nature Reserve, Guadeloupe, has been considered potentially threatened by rats preying on eggs (A. Levesque in litt. 2007), while

the subspecies *galapagensis* is considered to be potentially threatened by introduced predators (Wiedenfeld & Jiménez-Uzcátegui 2008).

CONSERVATION STRATEGIES AND ACTIONS

GENERAL OVERVIEW

In this section, we present the priority conservation strategies and actions for the species at a rangewide scale. Progress toward completion of these actions is dependent on suitable funding levels and workloads. A comprehensive list of conservation issues and actions currently proposed for the U.S. Atlantic and Gulf coast population of *Haematopus palliatus*, including items of lesser priority not presented here, are addressed in the corresponding regional plan (Schulte *et al.* 2007).

Implementation of these conservation measures for *Haematopus palliatus* will provide benefits for the entire barrier island/salt marsh community. There is a large ecological overlap with other species in these habitats, including Piping Plovers (*Charadrius melodus*), Wilson's Plovers (*Charadrius wilsonia)*, and many colonial nesting seabirds. These species will benefit from conservation actions taken at wintering, migration, and breeding sites. Partnering with efforts to conserve these species will help maximize the overall effect of conservation actions in the coastal zone.

NATIONAL STATUS ASSESSMENTS AND LEGISLATION

Currently, *Haematopus palliatus* is federally listed as a Bird of Conservation Concern in the United States (U.S. Fish and Wildlife Service 2002), as "Endangered" in El Salvador (MMARN 2004), and as "Vulnerable" in Sao Paulo state, Brazil (Figueiredo 2004), but does not appear to have been considered in national or subnational legislation elsewhere. A priority should be national, or where appropriate, subnational assessments of the status of the species, and inclusion in corresponding national/subnational Red List/threatened species legislation as warranted. This could be particularly important for the two subspecies with very small populations (*frazari* and *galapagensis*).

CONSERVATION OF KEY SITES

Many key breeding and wintering locations currently lack protection. Site specific information is listed under Conservation Sites above. Acquiring legal protection for as many sites as possible should be a medium- to long-term goal. In the short term, their recognition, where appropriate and feasible as Important Bird Areas (IBAs), WHSRN Sites, and Ramsar Sites can be an important step in achieving legal protection. Creating new national protected areas can be a slow and time-consuming process, and it may be more effective to seek protection at the subnational (*e.g.* state or provincial protected areas) or local (municipal protected areas) level, or through private reserve schemes. Decentralization processes in many countries in Latin America favor the creation of such reserves. An additional international designation which may be appropriate for some sites is as a World Heritage site (under the World Heritage Convention).

Many other sites, while officially protected, lack effective management regimes. Examples of the type of activities which are required are listed below. Conservation action at key sites should start with a detailed assessment of the threats and an understanding of the pressures behind them and the stakeholders that are involved. This is best achieved through a participatory stakeholder analysis (for each site), during which all relevant stakeholders are identified and the threats and their drivers systematically assessed. Additional analyses that can help guide conservation action include an institutional analysis (of any local partners to identify key capacity needs), a problem analysis leading to production of a detailed project plan and logical framework (of project goal, objectives, activities, results, and expected outcomes), a 'participatory livelihoods analysis' to find out more about the situation of local people and how their livelihoods relate to the coastal environment, and a baseline conservation assessment of the site (using the WHSRN Site Assessment Tool).

CONSERVATION OF IMPORTANT HABITATS

A priority action is to map the overlap (existing and potential) between human activities and the distribution and abundance of *Haematopus palliatus*. This will help determine the areas where conflicts are occurring or are likely to occur in the near future, allowing for appropriate actions to be planned, including the incorporation of *H. palliatus* needs into coastal development plans. As a first step, knowledge of the distribution and abundance of breeding, migrating, and

wintering *H. palliatus* needs to be improved (see research recommendations), and a geospatial database of coastal developments, recreation uses, and development plans compiled. The latter will undoubtedly require a collaborative approach, working with local and national nongovernmental organizations, government agencies, and researchers to compile information at an appropriate level.

An important and increasingly threatened habitat type is emerging sandbars and sand-spits. Sandbars may be an excellent habitat type because they are often close to feeding areas and have fewer ground predators than the adjacent mainland or large islands. Wherever possible, sandbars should be closed to the public during the breeding season. Acquisition and management of these habitats may be an important part of *H. palliatus* conservation. In the United States, shell rakes are a potentially important habitat for *H. palliatus*.

IMPLEMENTATION OF BENEFICIAL MANAGEMENT PRACTICES

Manage existing protected areas to reduce disturbance

Eliminating or reducing human disturbance at important breeding sites can be important in ensuring local persistence of the species through higher fledging rates and increased density of nesting pairs. Even in many protected areas, breeding *H. palliatus* are still under pressure from predators and disturbance (McGowan and Simons 2006, Simons and Schulte 2009, Wilke *et al.* 2005, Sabine 2005). More study is needed to fully document the impact of disturbance at breeding and wintering sites. Land managers with the ability to carry out predator control and to limit human disturbance should implement programs for both issues whenever feasible. In many areas, achieving this can be difficult and controversial, as it requires restricting access to beaches; outreach and education campaigns targeting beach users are thus critical in these areas.

Control populations of nest predators

Nest predators, especially meso-carnivores such as foxes (*Cerdocyon*, *Pseudalopex*, *Urocyon*, *Vulpes*), raccoons (*Procyon*), and feral cats (*Felis catus*) and dogs (*Canus lupus familiaris*) are the primary source of nest failure at many sites. These predators thrive in the presence of humans and can quickly learn to hunt shorebird eggs and chicks. Trapping and other removal methods have been effective at improving nesting success in the short term at some

sites. A consistent policy of control of non-native and artificially abundant predators could have significant positive effects on oystercatcher breeding success.

Restore nesting and roosting habitat

Coastal developments, such as jetties and revetments, can lead to the erosion of beaches and stop overwash processes that create open beach habitats. At key sites where this is known to have happened, appropriate habitat should be restored or created (see below), such as the clearance of beach vegetation to create the open habitat favored by nesting *H. palliatus* (and many other beach-nesting species). Appropriate mitigation measures (such as the artificial maintenance of open beach habitats), or the creation of new habitat (see below) should be included within coastal development plans.

Create and maintain new habitat

In areas where *Haematopus palliatus* populations are limited by nesting sites, creating new nesting habitat may allow young birds to acquire territories sooner and contribute more offspring over the course of their lifetime. *Haematopus palliatus* readily use dredge spoil islands for nesting and roosting. Design and placement of new islands may be crucial. In some areas the U.S. Army Corp. of Engineers is working with state agencies and private organizations to build and maintain dredge spoil islands that will support colonial nesting birds (McGowan *et al.* 2005). These islands seem to benefit *H. palliatus* because their basic habitat requirements are similar, but placement of the island in relation to *H. palliatus* foraging areas and gull colonies may be important to maximizing productivity. Pairs raising chicks on islands close to foraging habitat and away from nest predators may be more successful (MacGowan *et al.* 2005). Opportunities to use dredge spoil for *H. palliatus* habitat creation should be pursued by management agencies.

Pollution control

Pollutants and marine debris may pose threats to some oystercatcher populations. Marine debris should be regularly removed from protected areas and other key sites – this can often be cost-effectively achieved through the use of local volunteers. Plans for the cleaning of areas which are susceptible to oil and/or chemical pollutant spills should be developed, and the costs of

clean-ups included within the plans and budgets for developments in such areas. Toxin levels within bivalves and other oystercatcher food sources should be regularly monitored, especially at key sites which are close to contaminant point sources.

EDUCATION

Outreach and education are critical to the long-term health of *Haematopus palliatus* populations because so many different recreational groups use the same habitats where the species nests, roosts, and feeds. The primary targets of educational outreach efforts aimed at reducing human disturbance should be marinas, beachgoers, and other segments of the recreating public that use beachfront habitats. Efforts should focus on informing beachgoers on how to recognize breeding territories and avoid disturbance within them (such as keeping pets leashed within breeding areas), and on informing boat users about how to avoid swamping nests with wakes during the periods of highest tides. These efforts will have to be tailored locally with appropriate materials and methods of outreach. However, as this is a rangewide need, regional exchanges of approaches and materials will prove invaluable. The first steps in developing an education and outreach program at any one site should be the clear (and ideally participatory) identification of the local stakeholders (*e.g.* through a participatory stakeholder analysis) and a baseline assessment of existing environmental awareness and education programs and needs. The results of these assessments should then be used to tailor site-specific outreach and education programs. The linking of local communities, such as through sister school initiatives and experiences exchanges, could prove to be an effective outreach and education tool.

TRAINING

The successful implementation of many of the priority conservation strategies and actions outlined in this section will require appropriately trained conservation practitioners and policy makers. Among priority areas for training are threat assessment, site conservation planning, integration of site and species conservation actions within development agendas, habitat management and creation, public outreach and education, and fundraising.

RESEARCH AND MONITORING NEEDS

Although reasonable data exist regarding the distribution and abundance of *Haematopus palliatus* across its range, only limited real population data are available. With the exception of the U.S. Atlantic and Gulf coast population and the Rio Grande do Sul (Brazil) population, no systematic regional population censuses exist. Data are otherwise limited to primarily opportunistic site-based counts (though an effort to census the Chilean population has recently been completed, F. Schmitt & R. Barros in litt. 2009). Furthermore, almost no reliable data on trends exist, with current information coming primarily from state and local surveys in the United States (and which often vary in methodology and coverage).

Outside of the U.S. *H. palliatus* population, almost no information is available on important breeding sites, or on movements between breeding and wintering areas, and specific information about the seasonal use of key sites is lacking. Data on key ecological and demographic parameters, such as breeding and wintering site fidelity, natal philopatry and dispersal, adult survival, and juvenile recruitment are not available across most of the species's range. Furthermore, the relative importance of various limiting factors and their demographic impacts on different populations throughout the range is unknown. Understanding regional and local differences in the factors responsible for regulating populations is essential for formulating appropriate and effective localized responses.

TAXONOMY

Clarify subspecific taxonomy and define biogeographic populations

Several races have been proposed for *Haematopus palliatus*, though many may be insufficiently distinct to warrant recognition (Hockey 1996). In fact, A. J. Baker (in litt. to Hayman *et al*. 1986) speculated that there are no valid subspecies, and that the differences between the described forms result from clinal variation and hybridization with black oystercatchers. Clarifying *H. palliatus* subspecific taxonomy will help define biogeographic populations and thereby assist with identifying clear conservation priorities (*e.g.* priority sites defined as 1% of a biogeographic population). Among the priorities for taxonomic research are:

- Determine whether particular populations (*frazari* and *durnfordi*) represent valid subspecies, or hybrid swarms resulting from hybridization with black oystercatchers (*H. bachmani* and *H. ater*, respectively).
- Clarify the subspecific identity of Central American Pacific coast *H. palliatus*. Murphy (1925) considered Panamanian birds to be the nominate race, though Wetmore (1965) ascribed them to *pitanay.* Quite possibly they represent a zone of intergradation between these two subspecies. There is at least one record of *frazari* from Costa Rica, and there may also be intergradation between *palliatus* and *frazari* in northern Central America (assuming that *frazari* does not represent a hybrid swarm between nominate *palliatus* and *H. bachmani*).
- Re-assess the validity of *H. p. prattii* from the Bahamas (using larger sample sizes and excluding potential migrants from the nominate U.S. population).
- Clarify the subspecific identity of birds in northern Argentina. Populations from Rio Grande do Sul south have been considered to represent *durnfordi* (Wetlands International 2006). However Rio Grande do Sul birds are indistinguishable from the nominate race (Fedrizzi & Carlos in litt. 2007), which is also the only race documented in Uruguay (Claramunt & Cuello 2004).
- Assess whether the scatter of records along the Pacific coast of Colombia and northernmost Ecuador represent a zone of integradation between nominate *palliatus* and *pitanay* (Murphy 1925).

Evaluate specific status of galapagensis

Hockey (1996) proposed that the race *galapagensis* might best be treated as a separate species, given some differences in adult morphology and plumage, differences in chick coloration, and its geographic isolation. Clarifying the status of this form is a priority as it has a very small population, estimated at best to be probably fewer than 500 individuals (Wiedenfeld & Jiménez-Uzcátegui 2008), with significant potential threats posed by oil spills, introduced predator, marine debris, and urban expansion.

POPULATION STATUS AND TRENDS

The current global population estimate is based largely on extrapolation from a few surveys that rarely have specifically targeted *Haematopus palliatu*s. To date, there has been no systematic effort to census the global population or even regional populations (apart from that in the United States, and a recently started initiative in Chile) in a standardized fashion. Consequently, it is impossible to conduct a meaningful trend analysis for any region of the species's range or population. Although obtaining a more reliable global abundance estimate and the ability to monitor trends in population size are desirable, an intensive rangewide survey would require tremendous effort and expense. Instead, there are some clear priority geographic areas for which standardized data on distribution and abundance are particularly important. These include:

- Southern Argentina (south of Buenos Aires Province), essentially the range of the subspecies *durnfordi*.
- The range of *pitanay* in Chile and Peru, building on the existing census initiative in Chile.
- Caribbean (during both the boreal breeding and nonbreeding seasons, to obtain data for local breeders and migrants).

MIGRATION AND CONNECTIVITY BETWEEN BREEDING AND WINTERING AREAS

Only those *H. palliatus* in the latitudinal extremes of their range are truly migratory, and even then, they are moderate- to short-distance, partial migrants. In the United States, most *H. palliatus* breeding north of the state of New Jersey move south for the winter (Brown *et al*. 2005). In central and southern U.S. breeding areas, it is less clear what factors influence the decision to migrate or remain as a resident, and the coordination of banding and monitoring initiatives is needed to determine what factors are important. The American Oystercatcher Working Group has adopted a coordinated scheme for individually marking birds in North America and maintains a central database for all banding and resighting records.

Both the Central American and Caribbean populations of the species are believed to be augmented by migrants, but it is unclear where these migrants come from (presumably the United States, which would imply that the U.S. breeding population is not insignificantly larger than currently estimated). Breeding and nonbreeding season surveys and widespread banding

schemes are required to determine whether migrants reach Central America and the Caribbean, and from where they originate.

In southernmost South America, virtually no information exists regarding movements of *H. palliatus*. Banding programs are required to determine the extent to which birds migrate, the location of important wintering areas, specific movements between breeding and wintering sites, and interseasonal habitat use.

MONITORING

A coordinated monitoring program is required to assess the effectiveness of conservation and management plans and education on reducing threats and increasing *H. palliatus* populations. To ascertain the effectiveness of the program, information on oystercatcher productivity in disturbed and undisturbed areas will need to be collated or collected. Currently, monitoring efforts are fragmented and carried out piecemeal by partners, generally without dedicated funding to ensure ongoing efforts. The effectiveness of management efforts cannot be measured without dedicated funding to determine population status and trend.

CONSERVATION TIMELINE

By 2009

- Create a hemispheric *Haematopus palliatus* Working Group to include participants from throughout the range of the species, including the existing U.S. working group (which would continue to function autonomously as well).
- Designate all sites of global importance and, where relevant, regional importance for *H. palliatus* as Important Bird Areas for that species.

By 2010

- Develop and build consensus for an approach for defining “important breeding sites” and identify all such sites throughout the species’s range.

- Assess the importance for other species of all globally important *H. palliatus* sites (to facilitate multi-species conservation planning and actions).
- Assess and document the protected status (subnational, national, international, voluntary) for all sites of global importance for *H. palliatus*.
- Clearly establish highest-priority sites for conservation action, and identify priority actions, through a participatory process combining importance for *H. palliatus* (and other species) with urgency of conservation action (level of threat).
- Designate at least three sites of global importance for *H. palliatus* as new WHSRN sites.
- Complete and publish surveys of the Chilean and Peruvian populations of *H. palliatus pitanay*.
- Compile and publish data on the Caribbean population of *H. palliatus* (from multiple sources).

By 2011

- Complete and publish surveys of the Argentine population of *H. palliatus durnfordi*.
- Complete and publish studies of the taxonomic status of *galapagensis* and Bahamian birds (described as *prattii*), including morphological and genetic data.
- Identify all conservation actions required to maintain or increase *H. palliatus* populations within protected areas of global or regional importance for the species.
- Complete training for conservation practitioners at highest priority sites in threat assessment, site conservation planning, and public outreach.

By 2012

- Develop proposals to include threatened national or subnational populations of *H. palliatus* in relevant legislation in all corresponding range states.
- Designate at least five sites of global importance for *H. palliatus* as new WHSRN sites.
- Complete site conservation plans for the highest priority sites for conservation action for *H. palliatus*.

By 2013–2015

- Conservation action underway at all sites of global and regional importance for *H. palliatus*.
- All sites of global importance designated as WHSRN sites and receive at least some level of formal protection as local, subnational or national protected areas, private reserves and/or through international conventions (Ramsar, World Heritage).
- Surveys to census *H. palliatus* global population undertaken throughout the range of the species.

EVALUATION

Evaluating the progress, success, and needs of the conservation strategies and actions outlined in this plan will be challenging. It will involve evaluating a variety of different actions across very different geographic scales, hampered by only limited existing communication between researchers and conservation practitioners throughout the hemisphere, and confounded by language differences (English, French, Portuguese, and Spanish as first languages within *H. palliatus* range states). A first step in the implementation of this plan is to create a rangewide *H. palliatus* Working Group to include researchers, conservationists, and educators from throughout the range of the species, with the goal of fostering and coordinating research, conservation action, and monitoring.

A rangewide *H. palliatus* Working Group should be tasked with monitoring the implementation of the plan's conservation strategies and actions (and revising them as required). A key tool for monitoring the effectiveness of conservation action, built around the "Pressure-State-Response" (threat, condition, conservation action) framework adopted by the Convention on Biological Diversity, is the WHSRN Site Assessment Tool. This tool, which can be used for any site of importance for shorebirds (*i.e.* it does not have to be a formally recognized WHSRN site), permits changes in threats, shorebird populations, and conservation responses to be tracked over time, and correlated, both at individual sites and across networks of sites. Implementation of the tool will require a network of appropriately trained conservation practitioners, local conservation groups, birdwatchers, and professional ornithologists all contributing information to a central coordinator/coordinating group (Working Group). Alignment of the tool with the Open

Standards for the Practice of Conservation (Conservation Measures Partnership 2007) will enable the results of site assessments to be readily integrated with, and feed directly into, any conservation planning which utilizes Miradi (adaptive management software for conservation projects, based upon the Open Standards).

While the Site Assessment Tool provides a means for both general and detailed monitoring targeted for conservation decision makers about the status, threats, and conservation actions needed at a site, measurement of more general indicators of success will be important for communicating progress to a wider audience. Among potential metrics are:

- Number of members of *H. palliatus* Working Group, and their geographic distribution.
- Number of national/subnational/regional threatened species (Red List) assessments undertaken that take into consideration corresponding *H. palliatus* populations.
- The amount of local and national legislation passed that favors/improves the *H. palliatus* conservation.
- Number of hectares of *H. palliatus* habitat newly incorporated within public or private protected areas systems and/or under international designations (Ramsar site, World Heritage site).
- Number of new WHSRN Sites designated entirely or partly for *H. palliatus*.
- Number of sites of international importance (regional or global) for *H. palliatus* with site conservation plans which target the species.
- Number of local conservation groups participating in *H. palliatus* conservation efforts.
- Number of sites of international importance (regional or global) for *H. palliatus* newly identified.
- Clarification of *H. palliatus* subspecific taxonomy.
- Data-rich population estimates available for each subspecies/biogeographic population.
- Clear understanding of migratory movements, in both north and south of species's range.

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