

CARING FOR DOLPHINS, OTTERS, AND OCTOPUSES: SPECIESISM IN THE REGULATION OF ZOOS AND AQUARIUMS

By
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Current regulations for zoos and aquariums rely heavily on standards established by industry associations, and the government increasingly expects public display facilities to self-monitor. Unfortunately, the industry associations charged with policing zoos and aquariums lack the enforcement authority necessary to ensure that animals kept in these facilities receive adequate attention or resources. This article argues that marine animals kept in public display facilities, such as zoos and aquariums, should benefit from the same level of regulatory protection as their land-bound counterparts. Even though marine animals demonstrate intellectual abilities equivalent or superior to those of land-bound animals, federal regulations allow facilities to keep marine animals in smaller enclosures with less social contact. This article discusses existing regulations for the following three levels of animals in light of their physical and intellectual needs: dolphins as compared to elephants and nonhuman primates, otters as compared to dogs, and octopuses as compared to hamsters and rabbits. Finally, this article recommends several adjustments to existing regulations for marine animals.

I.	INTRODUCTION	238	R
	A. <i>The Public Display Community</i>	238	R
	B. <i>Regulatory Responsibility</i>	240	R
II.	DOLPHINS	245	R
	A. <i>Basic Behavior and Introduction</i>	245	R
	B. <i>Regulation</i>	246	R
III.	OTTERS	251	R
	A. <i>Basic Behavior and Introduction</i>	251	R
	B. <i>Regulation</i>	253	R
IV.	OCTOPUSES	255	R
	A. <i>Basic Behavior and Introduction</i>	255	R
	B. <i>Regulation</i>	259	R
V.	CONCLUSION	260	R
VI.	APPENDIX A: SAMPLE DRAFT REGULATIONS	262	R

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I. INTRODUCTION

Aquariums provide us an opportunity to view and learn about marine life. They are critical in raising both public awareness about animals and our environment and in raising political support for conservation. The U.S. Department of Agriculture currently monitors the animals' quality of life in these facilities,¹ but this has not always been the case.² Existing federal regulations are minimal, covering only the animals' most basic needs.³ These regulations are the result of a conscious decision by legislators that zoos and aquariums have historically done a more efficient job of regulating animal care through self-policing than the government has done via rulemaking.⁴ Self-monitoring, by individual facilities and by membership groups such as the Association of Zoos and Aquariums (AZA), provides more protection than government supervision.⁵ However, self-monitoring may still be inadequate, especially for the most intelligent animals kept in public display facilities.

This article reviews the relevant regulatory history and will compare regulations currently affecting three marine animals: dolphins, otters, and octopuses. To evaluate existing regulations, this article will briefly discuss the needs and abilities of these animals. These needs and demonstrated intelligence levels certainly raise questions about whether these animals should be held in captivity at all. If facilities are going to keep these animals for public display, facilities should do their best to care for them. Many aquariums and zoos are at the cutting edge of determining and providing what these animals require, and regulations should be updated to reflect these best practices.

Dolphins are among the most intelligent animals known to man.⁶ Facilities should provide them with protections comparable to those existing for other animals of similar intelligence, such as elephants and nonhuman primates. As the result of a public outcry and new research on the intelligence and needs of elephants, many zoos have closed their elephant exhibits.⁷ This article proposes that a similar trend is necessary for dolphins: If facilities cannot provide adequate physical and emotional care for dolphins, those exhibits should be closed. The minimum space required for dolphins under the federal regulations is shockingly inadequate and should be increased dramati-

¹ 7 U.S.C. §§ 2131, 2132, 2146 (2008).

² See Eugene H. Buck, *CRS Report for Congress: MMPA: Reauthorization Issues*, 2 (1993) (stating that prior to the MMPA, management of marine mammals fell under state jurisdiction). Additionally, see *infra*, section I(B) for a discussion on the transition from the MMPA to the Animal Welfare Act.

³ 7 U.S.C. § 2131 (2008).

⁴ 103 Cong. Rec. S3302 (daily ed. Mar. 21, 1994).

⁵ *Id.* ("Self regulation among America's zoos, aquariums, and marine parks significantly exceeds minimum Federal and State standards.") (statement of J. James Exon (D-Neb.)).

⁶ *Infra*, section II(A).

⁷ *Infra*, section II(B).

2009] *CARING FOR DOLPHINS, OTTERS, AND OCTOPUSES* 239

cally.⁸ At the very least, dolphins should have the enrichment activities currently guaranteed to primates. Otters are social, playful animals that are accustomed to traveling vast distances in the wild. Facilities displaying otters should address the physical and intellectual needs of these animals.⁹ Although federal regulations require only a small space for housing otters, the cost of requiring new facilities at this time may be unjustifiable. However, these animals should also have the opportunity for regular enrichment activities and exercise.¹⁰ For example, they should have enough space to run and swim at top speeds during exercise periods.

The octopus is another incredibly intelligent animal, but existing regulations do not offer it any protections.¹¹ Other countries, such as the United Kingdom, deem the octopus to be an “honorary vertebrate.”¹² The United States should take a similar step and provide these animals with at least minimal protections. Existing laws should be amended to allow animals, such as the octopus, which demonstrate a certain level of intelligence into at least the most basic class of protected animals.

The public display community excels in self-monitoring. Although the government relies on the public display community’s heightened standards to justify decreased supervision, these standards are not available for public review,¹³ do not cover facilities that choose not to apply for accreditation, and do not carry the weight of federal regulatory enforcement.¹⁴ Current regulations should be updated to reflect at least the basic recommendations outlined here.

A. *The Public Display Community*

Organizations within the public display community vary widely in both size and mission. In 2001, the public display community in the United States included 129 institutions engaging in display, education and research.¹⁵ In 1997, 116 public display facilities held more than 1,400 marine mammals.¹⁶

The public display community is not limited to zoos and aquariums but also includes research and rehabilitation facilities, theme and

⁸ *Infra*, section II(B).

⁹ *Infra*, section III(A).

¹⁰ *Infra*, section III(B).

¹¹ *Infra*, section IV(A).

¹² Zip Code Zoo, *Octopus*, http://zipcodezoo.com/key/animalia/octopus_Genus.asp (last accessed Apr. 12, 2009).

¹³ E-mail from Rachel Penrod, Conserv. Program Asst., Assn. of Zoos & Aquariums, to Marla Conley, author, Aquarium Question (Apr. 30, 2008) (on file with *Animal L.*).

¹⁴ See Doug Donovan, *Accreditation for Zoo at Risk; Aging Facility in Baltimore Must Fix Fire Alarms, Worn Buildings, Low Wages*, *Balt. Sun* 1A (March 26, 2008) (discussing the Baltimore Zoo’s potential loss of AZA accreditation).

¹⁵ Eugene Buck, CRS Report for Congress, *MMPA: Reauthorization Issues for the 107th Congress*, 3 (2001).

¹⁶ *Id.* at 8747.

amusement parks, travelling exhibits, and resorts.¹⁷ The 116 facilities included forty aquariums, seventy zoos, and six research facilities.¹⁸ Demographic research showed that

[o]f the aquariums, 28 are private, 5 belong to small cities, and 7 are owned by States. Of the zoos, 19 are private, 12 are owned by large cities, 23 are owned by small cities, 3 are owned by counties, and 13 belong to States. Of the research facilities, 2 are privately owned and 4 are owned by the public (such as State universities).¹⁹

In 2001, the Congressional Research Service estimated that the largest public display facilities held between fifty and seventy animals while others held only two or three animals.²⁰

Although theme parks, circuses, and other for-profit entities are a part of the public display community, these organizations are not generally wealthy corporate ventures. Almost 95% of these facilities qualify as small businesses because their annual revenues are less than \$5 million.²¹ In 1999, visitor admission fees supplied less than 30% of zoo and aquarium annual budgets, although this figure varied widely among facilities.²²

The two primary membership organizations for public display facilities are the Association of Zoos and Aquariums (AZA) and the Alliance of Marine Mammal Parks and Aquariums. Founded in 1924, the AZA currently has more than 200 accredited members.²³ The Alliance of Marine Mammal Parks and Aquariums was founded in 1987²⁴ and has more than fifty members.²⁵ These organizations engage in research and education and are vital sources of supervision and best practice information.

B. Regulatory Responsibility

Over time, different agencies have been responsible for supervising the care of marine animals. Marine mammals were first protected under the Animal Welfare Act (AWA) when it was amended in 1970.²⁶ In response to public concern for dolphins and other marine mammals, Congress later enacted the Marine Mammal Protection Act (MMPA) in 1972.²⁷ For a period of time, marine mammals enjoyed dual protection

¹⁷ Sen. Rpt. 103-220 at 4 (1994) (reprinted in 1994 U.S.C.C.A.N. 518, 521).

¹⁸ 64 Fed. Reg. 8735, 8746-47 (Feb. 23, 1999).

¹⁹ *Id.*

²⁰ Sen. Rpt. No. 103-220 at 521.

²¹ 64 Fed. Reg. at 8747.

²² *Id.*

²³ Assn. of Zoos and Aquariums, *About the Association of Zoos and Aquariums*, <http://www.aza.org/AboutAZA> (last accessed Apr. 12, 2009).

²⁴ Alliance of Marine Mammal Parks and Aquariums, *About the Alliance*, <http://www.ammpa.org/about.html> (last accessed Apr. 12, 2009).

²⁵ Alliance of Marine Mammal Parks and Aquariums, *Our Members*, <http://www.ammpa.org/ourmembers.html> (last accessed Apr. 12, 2009).

²⁶ 7 U.S.C. § 2131 (2006).

²⁷ 16 U.S.C. § 1361 (2006).

2009] *CARING FOR DOLPHINS, OTTERS, AND OCTOPUSES* 241

as they were covered under both laws. However, lobbyists in the public display community argued that the overlap of administrative burdens resulted in unclear lines of authority and extreme delays in paperwork.²⁸ Consequently, as part of the 1994 amendments to the MMPA, Congress withdrew protection for marine mammals in public display facilities.²⁹ Currently, the only protection for marine mammals, like other zoo animals, exists through the AWA.³⁰

The first of the two acts, the AWA, was amended in 1970 to protect animals by regulating “the transportation, purchase, sale, housing, care, handling, and treatment of animals” used for exhibition purposes.³¹ The AWA made the Department of Agriculture responsible for the supervision of all warm-blooded animals in public display facilities, including marine mammals.³² The Department of Agriculture administers this program through the Animal and Plant Health Inspection Service (APHIS).³³ The agency published its first regulations on marine mammals in 1979.³⁴

The second piece of legislation was prompted by public outcry. In the 1960s, more than 400,000 dolphins were killed each year as a result of the tuna fishing industry in the Eastern Pacific.³⁵ In response, Congress enacted the MMPA in 1972, expressing its concern that some marine mammals were “in danger of extinction or depletion as a result of man’s activities.”³⁶ The legislative history of the MMPA Amendments of 1994 also demonstrates Congress’ recognition that public display facilities play a crucial function in raising public awareness regarding the “esthetic, recreational, and economic significance of marine mammals and their role in the ocean ecosystem.”³⁷

The MMPA prohibits taking any marine mammal,³⁸ unless the taking is for the “purposes of scientific research, public display, photography for educational or commercial purposes, or enhancing the survival or recovery of a species or stock.”³⁹ If one of these exceptions applies, the Act requires the entity taking the marine mammal to first

²⁸ See H.R. Subcomm. on Env. and Nat. Resources of the Com. on Merchant Marine and Fisheries, *The MMPA*, 103rd Cong. 19 (Feb. 10, 1994) (lobbyist stating that simple language would clarify the unclear jurisdiction lines); *id.* at 8 (lobbyist stating that currently, too much bureaucratic waste is occurring).

²⁹ Buck, *supra* n. 15, at 19.

³⁰ *Id.* at 16.

³¹ 7 U.S.C. § 2131.

³² Buck, *supra* n. 15, at 17 n. 43.

³³ *Id.*

³⁴ Eugene H. Buck, *CRS Report for Congress: Marine Mammals in Captivity: Background and Management Issues in the United States* (available at <http://ncseonline.org/nle/crsreports/marine/mar-21.cfm>) (last accessed Apr. 12, 2009).

³⁵ *Id.* at 4.

³⁶ 16 U.S.C. § 1361(1).

³⁷ Sen. Rpt. No. 103-220, at 4.

³⁸ See 16 U.S.C. § 1372(13) (2006) (stating that the MMPA defines take as “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.”).

³⁹ *Id.* at §§1371(a), (a)(1).

obtain a permit.⁴⁰ The Act initially provided supervision for whales, porpoises, seals, and sea lions through the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA).⁴¹ The National Marine Fisheries Service is the arm of the NOAA that currently oversees the program.⁴² The MMPA also provided that the Department of the Interior would supervise other marine mammal species, such as walrus, polar bears, sea otters, and manatees, through the Fish and Wildlife Service.⁴³

The permit requirement did not have a significant adverse effect on the ability of public display communities to acquire marine mammals. Between 1973 and 1989, approximately 145 facilities in the United States obtained marine mammals through permits issued by the NOAA.⁴⁴ The total number of marine mammals held by public display facilities in 1989 was estimated to be 1,300 individuals representing twenty-seven different species.⁴⁵ In fact, in 2001, there was a surplus of marine mammals in captivity, which has led to greater concern about rehabilitation and release programs.⁴⁶

In 1994, Congress substantially amended the MMPA, eliminating the supervisory authority of the National Marine Fisheries Service over the care of animals held in public display facilities.⁴⁷ This change was in large part a result of substantial lobbying efforts by the public display community arguing that the MMPA was too restrictive.⁴⁸ To remove the National Marine Fisheries Service as a supervisory authority, Congress altered the language in the portion of the MMPA regulating permits. In its original form, the Act required the National Marine Fisheries Service to specify "methods of supervision, care, and transport" for marine mammals.⁴⁹ The amendments limit this jurisdiction to "marine mammals being captured from the wild or imported for the first time without benefit of a previously issued permit."⁵⁰ As a result, once a marine mammal is sold or exported or possession is otherwise transferred to a public display facility that already holds a permit under the AWA, that facility may possess, sell, or transport the animal

⁴⁰ *Id.* at (a)(1).

⁴¹ *Id.* at § 1362(12)(A)(i).

⁴² See *NOAA Organization*, http://www.pco.noaa.gov/org/NOAA_Organization.htm (outlining NOAA structure and responsibilities) (last accessed Apr. 12, 2009).

⁴³ 16 U.S.C. § 1375a (2006).

⁴⁴ Sen. Rpt. 103-220 at 4.

⁴⁵ *Id.*

⁴⁶ Buck, *supra* n. 15, at 23.

⁴⁷ Whale and Dolphin Conserv. Socy. & Humane Socy. U. S., *Biting the Hand that Feeds: The Case Against Dolphin Petting Pools* 3, http://www.wdcs-de.org/docs/Biting_the_hand_that_feeds.pdf (Spring 2003) (last accessed Apr. 12, 2009).

⁴⁸ George A. Chmael II, Keith R. Ainsworth, & Robert P. Kramer, *The 1994 Amendments to the MMPA*, 9 Nat. Resources & Env. 18, 19 (1995).

⁴⁹ U.S. Dept. Com., Natl. Oceanic and Atmospheric Administration, Natl. Marine Fisheries Serv., *1994 MMPA Annual Report* 6 (1994).

⁵⁰ *Id.*

2009] *CARING FOR DOLPHINS, OTTERS, AND OCTOPUSES* 243

without obtaining additional permits under the MMPA.⁵¹ To qualify for sole APHIS supervision, the seeker of a permit must (1) offer “a program for education or conservation purposes that is based on professionally recognized standards of the public display community,” (2) register or hold a license issued under the AWA, and (3) maintain facilities “for the public display of marine mammals that are open to the public on a regularly scheduled basis and that access to such facilities is not limited or restricted other than by charging of an admission fee.”⁵² By eliminating the jurisdiction of the Fish and Wildlife Service to supervise public display facilities holding marine mammals beyond the initial import or capture from the wild, these amendments granted APHIS exclusive jurisdiction in this area.

The language of the amendments also significantly limits the ability of the National Marine Fisheries Service to deny a public display facility’s permit application to take an animal from the wild or to import an animal from a foreign facility. The 1994 amendments to the act also removed the requirement that scientific research not be “duplicative,”⁵³ thereby increasing the number of instances in which the “taking” of a marine mammal is permissible. More importantly, as noted above, the facility must provide a program “for education or conservation purposes that is based on professionally recognized standards of the public display community.”⁵⁴ By changing the standard of review to revolve around the internal standards of the industry, the amendments eliminated the ability of the National Marine Fisheries Service to set those standards itself.

Legislative history shows Congress intended to provide the public display community with more freedom. In introducing the amendment regarding permits, Senator J. James Exon (D-Neb.) stated, “America’s public display institutions . . . have taken their responsibilities to the public, their animals and future generations very seriously. Self-regulation among America’s zoos, aquariums, and marine parks significantly exceeds the minimum Federal and State standards.”⁵⁵

All of the regulatory agencies involved have some familiarity with the relevant issues, but none are clearly best suited to the supervision of marine mammal care. The National Marine Fisheries Service and the Fish and Wildlife Service are not typically involved with animal husbandry and have little experience with the maintenance and care of animals,⁵⁶ but they have a great deal of experience with and knowl-

⁵¹ MMPA Amendments of 1994, Pub. L. No. 103-238, § 5 (Apr. 30, 1994); 108 Stat 532, 537–38 (1994).

⁵² 16 U.S.C. § 1374(c)(2)(A) (2006).

⁵³ U.S. Dept. Com., Natl. Oceanic and Atmospheric Administration, Natl. Marine Fisheries Serv., *1994 MMPA Annual Report* 6 (1994).

⁵⁴ 16 U.S.C. § 1374(c)(2)(A)(i) (2006).

⁵⁵ 140 Cong. Rec. S5492-93 (daily ed. Mar. 21, 1994).

⁵⁶ Buck, *supra* n. 29, at 17.

edge about marine animals.⁵⁷ Although APHIS has less experience with the care of marine animals than both the National Marine Fisheries Service and the Fish and Wildlife Service, APHIS supervises the care of a wide variety of other animals in research and public display facilities.⁵⁸ This supervision often includes animals in the same facilities as those housing marine mammals, especially in the case of larger zoos and amusement parks.⁵⁹

Reaction to APHIS supervision has varied. Critics of APHIS argue that the agency fails to take aggressive action when necessary and instead prefers to wait for a facility to fix a recurring problem on its own initiative.⁶⁰ They also allege that APHIS often accepts a facility's reported measurements for tank size rather than taking their own independent measurements.⁶¹ In contrast, some activists argue that supervision has improved since APHIS acquired sole responsibility of supervising animals in research and public display facilities. In a report to Congress, the Congressional Research Service noted that some individuals in the public display community think that most of the problems related to caring for marine mammals took place before the 1994 amendments. Some argue that these issues occurred in unregulated private facilities, not in supervised public display facilities.⁶² In 1999, APHIS reported that about 90% of all licensed facilities holding marine mammals were already meeting or exceeding their proposed requirements.⁶³

Supervision by any regulatory agency will come with standard bureaucratic difficulties, such as slow responses to problems and a perceived lack of knowledge about the actual practice of running an aquarium. However, these regulations also come with enforcement authority unavailable to membership agencies such as the AZA. The AZA has standards that are much stricter than any regulations Congress is likely to enact. However, the only punitive measure available to the AZA is revocation of a facility's accreditation. Although the loss of accreditation can be a blow to a facility's public image, it does not force the facility to close or even to lose its animals.⁶⁴ Facilities may operate without applying for accreditation from the AZA or other membership organizations, leaving them solely under the supervisory authority of APHIS. The most effective method of ensuring that public display facilities provide for animals in their care is to require them to do so

⁵⁷ NOAA Fisheries, *About National Marine Fisheries*, <http://www.nmfs.noaa.gov/aboutus.htm> (last accessed Feb. 25, 2009).

⁵⁸ APHIS, *Animal Welfare*, http://www.aphis.usda.gov/animal_welfare/index.shtml (last accessed Apr. 12, 2009).

⁵⁹ APHIS, *Animal Exhibitors*, http://www.aphis.usda.gov/publications/animal_welfare/content/printable_version/fs_awexhibitr.pdf (last accessed Apr. 12, 2009).

⁶⁰ Buck, *supra* n. 29, at 17.

⁶¹ *Id.*

⁶² *Id.*

⁶³ 64 Fed. Reg. at 8747.

⁶⁴ See *supra* Donovan, n. 14 (discussing the Baltimore Zoo's potential loss of AZA accreditation).

through federal regulations. These regulations would provide necessary authority to both federal officials and animal advocates to force noncompliant organizations to change their practices.

II. DOLPHINS

A. *Basic Behavior and Introduction*

The intelligence and social behavior of dolphins is more widely known and acknowledged than that of otters and octopuses and will, therefore, be discussed in less depth. Dolphins demonstrate high levels of intelligence in a variety of ways. Some populations have been reported using tools, such as marine sponges, for hunting.⁶⁵ They use complex systems of communication, and each individual may use unique vocal signals.⁶⁶ The size⁶⁷ and complexity of their brains suggest “exceptional information-processing power.”⁶⁸ In particular, studies show that dolphins have extraordinary auditory skills that they use in both learning and remembering complex tasks.⁶⁹ They have demon-

⁶⁵ Richard C. Connor et al., *The Bottlenose Dolphin: Social Relationships in a Fission-Fusion Society*, in *Cetacean Societies: Field Studies of Dolphins and Whales* 91, 91 (Janet Mann et al., eds., U. Chicago 2000).

⁶⁶ Peter L. Tyack, *Functional Aspects of Cetacean Communication*, in *Cetacean Societies: Field Studies of Dolphins and Whales*, *supra* n. 65, at 270, 307.

⁶⁷ The size of a dolphin’s brain is comparable to that of a human. See U.S. Department of State, *Dolphin, Humans Share Similar Brain Size, Scientists Say: Dolphins Recognize Themselves in Mirrors, Communicate in Symbols*, available at <http://www.america.gov/st/washfile-english/2004/October/20041028134023lcnirellep5.062503e-02.html> (Oct. 28, 2004) (last accessed Apr. 12, 2009) (stating that, “Dolphin brains are four to five times larger than would be expected for their body size when compared to another animal of similar size. In humans, the measure is seven times larger.” The article further quotes Lori Marino, lead scientist on a project funded by the National Science Foundation, “[essentially], the brains of primates and cetaceans arrived at the same cognitive space while evolving along different paths What the data says to me is that we, as humans, are not that special. Although we are highly encephalized [have large brains], it’s not by much compared with cetaceans.” It should be noted, however, that the relevance of the relationship between brain size and body size for determining an animal’s intelligence is greatly debated. It is unclear if this measurement is related to an animal’s intelligence or how the measurement should handle the differences in brain size among various species of dolphins and whether blubber or bone should be included in an animal’s overall body weight. See J. B. Callicott, *Whaling in a Sand County: A Dialectical Hunt for Land Ethical Answers to Questions About the Morality of Norwegian Minke Whale Catching*, 8 *Colo. J. Intl. Envtl. L. & Policy* 1, 27 (1997) (citing Margaret Klinowska, *Brains, Behaviour and Intelligence in Cetaceans (Whales, Dolphins and Porpoises)* in *Whales and Ethics* (Orn D. Jonsson ed., 1992) (explaining that brain size is a poor indicator of intelligence). Moreover, the dolphin neocortex contains “vast cortical fields for which we have no ascribable functions.” *Id.* at n. 108 citing Peter Morgane & Ilya I. Glezer, *Sensory Neocortex in Dolphin Brain*, in *Sensory Abilities of Cetaceans: Laboratory and Field Evidence* (Jeanette A. Thomas & Ronald A. Kastelein eds., 1990).

⁶⁸ Louis M. Herman, *Cognition and Language Competencies of Bottlenosed Dolphins*, in *Dolphin Cognition and Behavior: A Comparative Approach* 221, 221 (Ronald J. Schusterman, Jeanette A. Thomas & Forrest G. Wood eds., Lawrence Erlbaum Assoc. 1986).

⁶⁹ *Id.* at 223.

strated the ability to understand sentences, including previously unencountered constructions, and they are capable of consistently distinguishing between direct and indirect objects and understanding other syntactic rules of language.⁷⁰

Bottlenose dolphins typically engage in “fission-fusion” grouping.⁷¹ This means that individuals live in small groups, but the individuals in the groups change constantly, often on a daily or even hourly basis.⁷² Dolphins living in open water farther from land tend to live in larger groups.⁷³ The median group size is typically ten to twelve, although dolphins in the eastern tropical Pacific are sometimes found in groups of thousands.⁷⁴ Many of these animals have strong social bonds and develop long-term social relationships.⁷⁵

The distance a dolphin travels during an average day varies greatly.⁷⁶ A dolphin typically travels about 25 miles a day, generally swimming one to three miles an hour. However, dolphins have been observed traveling 34 miles in a twelve-hour period or staying within a 2 mile range for several days.⁷⁷

B. Regulation

Federal regulations promulgated by APHIS provide basic protections for dolphins held in public display facilities. Their housing facilities must be kept in “good repair,” and they must be protected from the viewing public by uniformed employees or physical barriers, such as fences or glass partitions.⁷⁸ They must have reliable sources of water and electric power with planned contingencies for power failure.⁷⁹ The temperature in their enclosure must be set to “prevent discomfort,” and there must be adequate ventilation and light.⁸⁰ Any outdoor water pools for dolphins must be kept free of ice.⁸¹ Dolphins are to be fed at least once each day, and food may not be out of the freezer for more than twenty-four hours before consumption.⁸²

The minimum required size of the enclosure for dolphins is exceptionally small. The animal must be “able to make normal postural and social adjustments with adequate freedom of movement.”⁸³ A facility

⁷⁰ *Id.* at 229, 235, 247.

⁷¹ Connor, *supra* n. 65, at 91.

⁷² *Id.*

⁷³ *Id.* at 102.

⁷⁴ *Id.*

⁷⁵ *Id.* at 204.

⁷⁶ *Id.* at 102.

⁷⁷ Connor, *supra* n. 65, at 102.

⁷⁸ 9 C.F.R. § 3.101(a)(1)–(2) (2008).

⁷⁹ *Id.* at § 3.101(b).

⁸⁰ *Id.* at § 3.102.

⁸¹ *Id.* at § 3.103(a)(2).

⁸² *Id.* at § 3.105(a)(d).

⁸³ *Id.* at § 3.104(a).

2009] *CARING FOR DOLPHINS, OTTERS, AND OCTOPUSES* 247

keeping an animal in a smaller enclosure for more than two weeks must have written justification from an attending veterinarian.⁸⁴

An enclosure is measured by its minimum horizontal dimension (MHD), depth, and overall volume. The regulations assume that the enclosure will be a cylindrical pool, and the MHD is measured as the diameter of a horizontal circular slice.⁸⁵ The required MHD for a Group I Cetacean is the greater of twice the average length of an adult animal or 24 feet.⁸⁶ The average length of a Pacific bottlenose dolphin, which is categorized as a Group I Cetacean, is 10 feet.⁸⁷ For a Group II Cetacean, the required MHD is the greater of four times the average length or 24 feet.⁸⁸ The average length of a common dolphin, which is categorized as a Group II Cetacean, is 8.5 feet.⁸⁹ If animals are housed together, the animal requiring the largest space determines the MHD.⁹⁰

The minimum depth required for the enclosure is the greater of 6 feet or one half of the average adult length.⁹¹ Once a pool meets the MHD and depth requirements, it may hold up to two Group I Cetaceans or four Group II Cetaceans.⁹² The overall surface area and volume of the pool only need to be measured when it houses additional animals.⁹³ The regulations may require an increased volume or surface area if additional animals are added to the tank. In other words, a pool that is 6 feet deep and 24 feet wide at its greatest point can be used to permanently hold two Pacific bottlenose dolphins. The same tank could be used to house four common dolphins. This is an incredibly small space for an animal that is used to traveling vast distances and encountering a wide variety of environments and intellectually stimulating situations. The exercise needs of a dolphin cannot be met in the minimum space required by APHIS regulations.

The regulations require that marine mammals, which are known to be primarily social, must be kept with at least one compatible animal unless a veterinarian determines that doing so is not in an animal's best interest.⁹⁴ To house an animal alone, the facility must have a written plan approved by a veterinarian.⁹⁵ This mandatory regulation actually provides more protection than the regulation for social, nonhuman primates, which only requires that the animal's environment enhancement plan must "address the social needs of non-

⁸⁴ 9 C.F.R. § 3.104(a).

⁸⁵ *Id.* at § 3.104(b)(4)(ii) n.10.

⁸⁶ *Id.* at § 3.104(b)(1)(i).

⁸⁷ *Id.* at § 3.104 Table III.

⁸⁸ *Id.* at § 3.104(b)(1)(ii).

⁸⁹ *Id.* at § 3.104 Table III.

⁹⁰ 9 C.F.R. § 3.104(b)(1)(iii).

⁹¹ *Id.* at § 3.104(b)(2).

⁹² *Id.* at § 3.104(b)(3).

⁹³ *Id.*

⁹⁴ *Id.* at § 3.109.

⁹⁵ *Id.*

human primates”⁹⁶ and that “[individually] housed non-human primates must be able to see and hear non-human primates of their own or compatible species.”⁹⁷

Dolphins are some of the most intelligent and social animals humans have encountered. Their confinement in such small quarters without sufficient enrichment is comparable to the problems many zoos have begun to acknowledge in keeping elephants. The AZA updated its standards for elephant care in 2003, requiring immediate compliance with some practices from current members and compliance with their minimum housing standards by 2006.⁹⁸ The requirements also specified that it is inappropriate to hold single female elephants because they are social animals; each institution should hold a minimum of three female elephants.⁹⁹ The combination of a public outcry objecting to elephant exhibits and the expense of enhancing facilities to comply with the new guidelines led to an acknowledgment by many zoos that they are incapable of providing for the needs of these animals.¹⁰⁰ At least fourteen zoos with accreditation from the AZA have closed or plan to close their elephant exhibits.¹⁰¹ Detroit Zoo officials stated that much more than preventive care and enrichment objects are needed to “meet the physical and psychological demands of elephants in captivity.”¹⁰² As their knowledge of elephants grew, it became clear that captivity was not appropriate for these animals.¹⁰³ Many of these zoos placed their elephants with sanctuaries such as The Elephant Sanctuary in Hohenwald, Tennessee and the Performing Animal Welfare Society (PAWS) Wildlife Sanctuary in California.¹⁰⁴

⁹⁶ 9 C.F.R. § 3.81 (a).

⁹⁷ *Id.* at § 3.181 (a)(3).

⁹⁸ Assn. of Zoos and Aquariums, *The Accreditation Standards and Related Policies* 27 (2009), (available at <http://www.aza.org/Accreditation/AccreditationIntro/index.html>) (last accessed Apr. 12, 2009).

⁹⁹ *Id.* at 30.

¹⁰⁰ Diane Jennings, *Elephant Programs Fight for Trunk Space: As Standards for Care Rise, So Do Calls to Shut Down Facilities*, available at <http://www.dallasnews.com/sharedcontent/dws/news/nation/stories/030506dnnatelephants.1bef2b2.html> (last accessed Apr. 12, 2009).

¹⁰¹ See In Defense of Animals, *Elephant Facts*, http://helpelephantsinzoos.org/pdf/_elephant_business.pdf. (last accessed Apr. 12, 2009) (stating that the following zoos have closed or will close their exhibits: Detroit Zoo, San Francisco Zoo, Chehaw Wild Animal Park (Ga.), Henry Vilas Zoo (Wis.), Gladys Porter Zoo (Tex.), Louisiana Purchase Gardens and Zoo, Mesker Park Zoo (Ind.), Frank Buck Zoo (Tex.), Sacramento Zoo (Cal.), and Chicago’s Lincoln Park Zoo and Philadelphia Zoo, Lion Country Safari (Fla.), Santa Barbara Zoo (Cal.) and Bronx Zoo (N.Y.). The following zoos have sent elephants to elephant sanctuaries located in Tennessee or California: Milwaukee Zoo (Wisc.), El Paso Zoo (Tex.), Detroit Zoo, San Francisco Zoo, Mesker Park Zoo (Ind.), Louisiana Purchase Gardens and Zoo, Chehaw Wild Animal Park (Ga.), Henry Vilas Zoo (Wis.), Philadelphia Zoo, and Los Angeles Zoo.).

¹⁰² Detroit Zoological Society, *Questions and Answers About Not Having Elephants at the Detroit Zoo* http://www.detroitzoo.org/News%10Events/In_the_News/Elephants_-_Questions_and_Answers/ (last accessed Apr. 12, 2009).

¹⁰³ *Id.*

¹⁰⁴ *Id.*

2009] *CARING FOR DOLPHINS, OTTERS, AND OCTOPUSES* 249

These sanctuaries provide hundreds and sometimes thousands of acres where the elephants can wander freely and engage in natural behaviors.¹⁰⁵

As our knowledge of dolphins grows, it is becoming apparent that the average zoo is not capable of providing for them. In fact, many aquariums do not keep dolphins because they lack adequate space.¹⁰⁶ Many of the facilities that do hold dolphins focus on “swim with the dolphin” programs, which can be extremely dangerous for both the animal and human participants.¹⁰⁷ Although some facilities with substantial resources may be able to handle these animals, many of the organizations that keep dolphins should reevaluate their exhibits. The regulations should be much stricter in this area, requiring significantly larger enclosures.

Given their intelligence, dolphins should benefit from regulations like those currently protecting nonhuman primates. For example, nonhuman primates can only be restrained with specific limitations.¹⁰⁸ Animals that must be kept in long-term restraints must be provided daily exercise time when they can engage in unrestrained activity.¹⁰⁹ The most important provision relevant here is the regulatory requirement that facilities provide enrichment activities to nonhuman primates. To ensure the psychological well-being of nonhuman primates kept in public display facilities, the regulations require these facilities to “develop, document, and follow an appropriate plan for environment enhancement.”¹¹⁰ This plan must be directed by an attending veterinarian and must be “in accordance with the currently accepted professional standards as cited in appropriate professional journals or reference guides.”¹¹¹

The plan required for nonhuman primates must address a variety of concerns. First, it must address the needs of animals that are typically social in the wild.¹¹² Although exceptions exist for overly aggressive animals or animals with contagious diseases, the regulations require that social animals be grouped with other compatible animals.¹¹³ Unless a veterinarian determines that it would be harmful for

¹⁰⁵ *Id.*

¹⁰⁶ See e.g. E-mail from Sabreena Kasbati, Educ. Specialist, Aquarium of the Pacific in Long Beach, Cal., to Marla Conley, author, Aquarium Animals (Apr. 8, 2008) (copy on file with Animal L.) (stating that the aquarium interviewed did not have sufficient space to keep dolphins).

¹⁰⁷ See World Socy. for the Protec. of Animals, *What's Wrong with Swimming with Dolphins?*, available at http://www.wspa-usa.org/pages/272_what_s_wrong_with_swimming_with_dolphins_cfm (last accessed Apr. 12, 2009) (stating that “swim with the dolphin” programs are commercially successful, yet not regulated, and result in countless, unrecorded dolphin deaths).

¹⁰⁸ 9 C.F.R. § 3.81(d).

¹⁰⁹ *Id.*

¹¹⁰ *Id.* at § 3.81.

¹¹¹ *Id.*

¹¹² *Id.* at § 3.81(a).

¹¹³ *Id.* at §§ 3.81(a)–(a)(2).

the animal, nonhuman primates that are housed alone must be able to see and hear animals of their own species.¹¹⁴ In addition, their enclosures must provide opportunities for environmental enrichments that are specific to the animal's species.¹¹⁵ These can include perches, swings, and mirrors as well as other objects the animal can manipulate.¹¹⁶ Any animal not included in the plan must receive an individual evaluation and approval for its exemption by a veterinarian.¹¹⁷ These regulations provide some protection for the quality of life of these animals, although the provisions still do not provide as much protection as some activists seek.¹¹⁸

Dolphins, like nonhuman primates, also need regular enrichment and opportunity for mental stimulation to ensure quality of life in captivity, and regulations should be enacted to fill this need. Environmental enhancement programs specific to the animal's species should be required for dolphins as they are for nonhuman primates. For example, further research should be conducted, and regulations adopted, to address the psychological effects of noise pollution on dolphins. In the wild, dolphins are not exposed to noise as they are when they live close to human civilization. Research further indicates that dolphins in public display facilities may be adversely affected by the noise in their environments.¹¹⁹ Moreover, dolphins should regularly have the opportunity to interact with other dolphins to meet the social needs of their natural fission-fusion grouping. Dolphins should also have access to a wide variety of training, toys, and puzzles to provide for their mental stimulation.

If regulators are concerned with the cost required to undertake renovations, there are additional avenues available to provide for the needs of these animals. For example, the regulations addressing the humane handling of dogs and cats by dealers and research facilities currently require that dogs kept in kennels be provided with opportunity to exercise.¹²⁰ This exercise can be provided either by keeping them in much larger enclosures or by affording access to a run or open area.¹²¹ A similar provision could be enacted that would provide dolphins with an opportunity to exercise on a regular basis. Dolphins kept in enclosures that are close to the minimum required size should have daily opportunities to exercise. For at least several hours a day, they

¹¹⁴ 9 C.F.R. § 3.81(a)(3).

¹¹⁵ *Id.* at § 3.81(b).

¹¹⁶ *Id.*

¹¹⁷ *Id.* at § 3.81(e).

¹¹⁸ See *Animal Leg. Def. Fund, Inc. v. Glickman*, 204 F.3d 229 (D.C. Cir. 2000) (ruling against plaintiff who argued that the regulations failed to set minimum standards for the enrichment available in nonhuman primate enclosures and that the Secretary's deference to on-site veterinarians constituted an impermissible delegation of regulatory authority).

¹¹⁹ Buck, *supra* n. 29, at 23.

¹²⁰ 9 C.F.R. § 3.8(a) (2008).

¹²¹ *Id.* at § 3.8(3).

should be able to swim in a tank large enough to reach and maintain speeds of 1 to 3 miles per hour.

III. OTTERS

A. *Basic Behavior and Introduction*

Both sea and river otters are discussed in this section, although the species are quite different in many respects, particularly in physical size. The otter is related to the ferret, the badger, the wolverine, and the mink.¹²² Sea otters are larger than river otters; adult male sea otters average 60 pounds while a male river otter typically weighs less than 35 pounds.¹²³ With the exception of humans, sea otters and river otters do not have any natural enemies.¹²⁴

Sea otters were hunted for their pelts beginning with their discovery by Russian explorers in 1741.¹²⁵ Subsequent hunting almost led to their extinction.¹²⁶ Sea otter hunting reached a peak in California between 1786 and 1868 when more than 200,000 were killed.¹²⁷ By 1911, when sea otter hunting was banned by international agreement, the world population of sea otters was estimated to be less than 2,000 individuals.¹²⁸ In 1913, California banned owning or taking a sea otter without a special permit.¹²⁹

Sea otters eat an enormous amount of food; they consume approximately a quarter of their body weight, up to 20 pounds, in food every day.¹³⁰ Sea otters can consume as much food as do polar bears, animals ten times their size.¹³¹ Other types of otters, however, typically require no more than 1.5 to 2 pounds of food each day.¹³² Sea otters must keep their coats extremely clean to stay alive, and they spend a significant portion of their day grooming.¹³³ In groups, otters engage in grooming to strengthen social bonds.¹³⁴ There have been incidents

¹²² Roy Nickerson, *Sea Otters: A Natural History and Guide*, 19 (Chronicle Books 1984).

¹²³ *Id.* at 20.

¹²⁴ *Id.* at 21.

¹²⁵ *Id.* at 28.

¹²⁶ *Id.* at 40.

¹²⁷ *Id.* at 37.

¹²⁸ Nickerson, *supra* n. 122, at 41.

¹²⁹ *Id.*

¹³⁰ Defenders of Wildlife, *Sea Otter*, http://www.defenders.org/wildlife_and_habitat/wildlife/sea_otter.php (last accessed Apr. 12, 2009); Monterey Bay Aquarium, *Sea Otter Cool Facts*, http://www.montereybayaquarium.org/modules/coolfacts/popup_coolfacts_all.asp?cat=3 (last accessed Apr. 12, 2009).

¹³¹ Anita Srikameswaran, *Be Glad You're Not Feeding Otters: Zoo's Bill is \$40,000*, <http://www.post-gazette.com/pg/07214/806156-34.stm> (Aug. 2, 2007) (last accessed Apr. 12, 2009).

¹³² C.J. Harris, *Otters: A Study of the Recent Lutrinae* 6 (Weidenfeld & Nicholson 1968).

¹³³ Nickerson, *supra* n. 122, at 22.

¹³⁴ Harris, *supra* n. 132, at 4.

where sea otters kept in cages for just a few hours before being released died as a result of dirty coats.¹³⁵

Otters have been described by researchers as “great wanderers.”¹³⁶ Although most species of otters do not migrate, they cover a substantial area in their daily lives. Otters can reach a top speed of about 6 or 7 miles per hour under water and can swim up to a quarter mile without surfacing.¹³⁷ They also swim to great depths and have been reported captured in crab pots 60 feet below the surface of the water.¹³⁸ Otters often travel long distances over land, 10 or 15 miles at a time.¹³⁹ Researchers have found that some otters regularly travel a route 50 miles in length.¹⁴⁰ Male river otters have home ranges that are approximately three times greater than those of female river otters.¹⁴¹

River otters display a wide range of social systems, from solitary to social, including both single and mixed gender groups.¹⁴² Studies show that river otters share their space with at least one other animal and frequently live in proximity to other otters.¹⁴³ Research also shows that otter social groups are based more on frequency of contact and interaction than family or gender groups.¹⁴⁴

Both river and sea otters are social. Otters cooperate with one another and are often trapped themselves while trying to help a trapped otter calling for rescue.¹⁴⁵ They have long memories and have been known to recognize items and people two years after their last meeting.¹⁴⁶ They are very vocal animals, and each species has a different set of noises.¹⁴⁷ Researchers have identified different noises indicating apprehension, frustration, anguish, fear, greeting, and other daily communication.¹⁴⁸ Otters are not typically gregarious; adults are usually seen alone except during the mating season.¹⁴⁹ However, otters in zoos are usually best kept in pairs, and several females can be kept with one male. If otters are not kept with other otters, they “frequently

¹³⁵ Nickerson, *supra* n. 122, at 22.

¹³⁶ Marie N. Stephens, *The Natural History of the Otter: A Report to the Otter Committee*, 8 (R.S.R. Fitter & H.N. Southern eds., UFAW, 1954).

¹³⁷ Harris, *supra* n. 132, at 2.

¹³⁸ Stephens, *supra* n. 136, at 12.

¹³⁹ Harris, *supra* n. 132, at 3.

¹⁴⁰ *Id.* at 8.

¹⁴¹ Thomas A. Gorman, John D. Erb, Brock R. McMillan & Daniel J. Martin, *Space Use and Sociality of River Otters (Lontra Canadensis) in Minnesota*, 87 *J. Mammology* 740, 743–45 (2006) (available at http://filebox.vt.edu/users/gormant/Gorman_files/Gorman.et.al.2006b.pdf) (last accessed Apr. 12, 2009).

¹⁴² *Id.* at 740.

¹⁴³ *Id.* at 744.

¹⁴⁴ *Id.* at 741.

¹⁴⁵ Harris, *supra* n. 132, at 8.

¹⁴⁶ *Id.*

¹⁴⁷ *Id.* at 4.

¹⁴⁸ *Id.* at 4–5.

¹⁴⁹ *Id.* at 24.

2009] *CARING FOR DOLPHINS, OTTERS, AND OCTOPUSES* 253

become bored and listless.”¹⁵⁰ Their enclosure should have a wide variety of branches, rocks, sand, logs, slides, and running water.¹⁵¹

Otters are known for spending a lot of time playing.¹⁵² These activities “appear in the main to be unconnected with reproductive, territorial, or prey/predator processes.”¹⁵³ Although otters use sliding or “tobogganing” for locomotion, research suggests that it is also a form of play.¹⁵⁴ They play with other animals or alone. Biologists have studied the extent of otter play and recorded their observations:

An otter alone will choose a small pebble, carry it to the water, swim out and drop it; before it can reach the bottom the otter will dive and come up underneath the stone and catch it on the flat top of its head. It will then indulge in a series of underwater acrobatics – continuing to balance the stone on its head.¹⁵⁵

* * *

One Indian otter . . . delighted in a game with an ice cube. This was placed on the broad flat arm of a sofa, with the otter on one side of the arm and my wife or myself on the other, the object being to flick the ice with the hand past one’s opponent and onto the floor The otter was very good at this game and frequently won it; this was perhaps just as well, for if beaten too often he sulked!¹⁵⁶

Researchers have shown, through the use of fecal glucocorticoid assays, that otters feel stress.¹⁵⁷ Stress levels of wild river otters held captive during a reintroduction project were particularly high at the beginning of their time in captivity and also the morning of and the morning after veterinary examinations.¹⁵⁸

B. Regulation

Otters and dolphins enjoy similar protections under federal regulations. As discussed above, they must have housing facilities in “good repair,” and they must be protected from the viewing public by uniformed employees or physical barriers such as fences or glass partitions.¹⁵⁹ They must have reliable sources of water and electric power with contingencies for power failure.¹⁶⁰ The temperature in their enclosure must be set to “prevent discomfort” with adequate ventilation and light.¹⁶¹ Any outdoor water pools for sea otters must be kept free

¹⁵⁰ *Id.* at 96.

¹⁵¹ Harris, *supra* n. 132, at 96.

¹⁵² *Id.* at 6.

¹⁵³ *Id.*

¹⁵⁴ Sadie S. Stevens & Thomas L. Serfass, *Sliding Behavior in Nearctic River Otters: Locomotion or Play?*, 12 *Ne. Naturalist* 241, 243 (2005).

¹⁵⁵ Harris, *supra* n. 132, at 6.

¹⁵⁶ *Id.* at 7.

¹⁵⁷ Devon M. Rothschild, et al., *Using Fecal Glucocorticoids to Assess Stress Levels in Captive River Otters*, 72 *J. Wildlife Mgt.* 138.

¹⁵⁸ *Id.* at 140.

¹⁵⁹ 9 C.F.R. § 3.101(a).

¹⁶⁰ *Id.* at § 3.101(b).

¹⁶¹ *Id.* at § 3.102.

of ice.¹⁶² They must be fed at least once each day, and their food may not be out of the freezer for more than twenty-four hours before consumption.¹⁶³ Because otters are social, they are required to be housed with at least one other compatible animal.¹⁶⁴

Sea otter enclosures must include a pool and a dry resting area.¹⁶⁵ The length of the pool (or MHD, discussed above) must be three times the length of the average adult otter¹⁶⁶ in the pool, and the pool must be at least three feet deep.¹⁶⁷ This length and depth is sufficient to keep at least two otters.¹⁶⁸ A table in the regulations shows the increased area required if more than two otters are kept in the same enclosure.¹⁶⁹

Otters are quite expensive to maintain at an aquarium. One facility estimates that its river otter care costs \$93 a day¹⁷⁰ while another estimates the annual cost of caring for each sea otter to be more than \$20,000.¹⁷¹ At the facility described, otters are provided with enrichment toys, such as KONG toys or PVC pipes attached in different configurations.¹⁷² Some researchers concluded that orphaned juvenile otters become easily bored, yet plastic baby toys can help keep them diverted.¹⁷³

Regulations provide for space requirements much smaller than the distances otters travel in the wild. If otters are regularly kept in such small spaces, facilities should provide them with opportunities for exercise, such as the option discussed above for dolphins. A new regulation, similar to the exercise provision for dogs, should be enacted to protect otters. Otters that are kept in enclosures close to the minimum required size should have several daily hours of exercise in a much larger space. They should have ample area for normal movement at all times but should also have enough area to run and swim at top speeds during any exercise periods. They should also be provided with regular enrichment, such as regular access to varying toys and puzzles. Many

¹⁶² *Id.* at § 3.103(a)(2).

¹⁶³ *Id.* at § 3.105.

¹⁶⁴ *Id.* at § 3.109.

¹⁶⁵ 9 C.F.R. § 3.104(f)(1).

¹⁶⁶ Average length depends whether otter is a river or sea otter. See Maryland Department of Natural Resources, *River Otter*, available at <http://www.dnr.state.md.us/wildlife/riverotter.html> (last accessed Apr. 12, 2009) (stating that average size for a river otter is 40 inches). See The Alaska Sea Otter and Steller Sea Lion Commission, *Sea Otter Facts*, available at <http://www.seaotter-sealion.org/seaotter/factsseaotter.html> (last accessed Apr. 12, 2009) (stating that average length of sea otters is 5 feet).

¹⁶⁷ 9 C.F.R. § 3.104(f)(1).

¹⁶⁸ *Id.* at § 3.104(f)(2).

¹⁶⁹ *Id.* at § 3.104(f)(1).

¹⁷⁰ Kasbati, *supra* n. 106.

¹⁷¹ See Anita Srikameswaran, *supra* n. 131 (stating that feeding cost per otter is \$13,200 per year).

¹⁷² *Id.*

¹⁷³ Nickerson, *supra* n. 122, at 81.

aquariums with otters already provide regular enrichment,¹⁷⁴ so this would not create an additional burden.

IV. OCTOPUSES

A. *Basic Behavior and Introduction*

Octopuses are one of the 700 species of living cephalopods, all of which are mollusks.¹⁷⁵ There are 150 different species of octopuses, and different octopus species can be found all over the world.¹⁷⁶ “Cephalopods are considered to be the most highly evolved marine invertebrates with elaborate sense organs, large brains and complex [behavior].”¹⁷⁷ Octopus behavior is comparable to the behavior of higher vertebrates, and they have the largest brains of any invertebrate.¹⁷⁸

Most cephalopods live for one to two years, or in the case of the giant *Octopus dofleini*, three to five years.¹⁷⁹ The giant Pacific octopus grows to weigh over 550 pounds,¹⁸⁰ and specimens have been found as large as 32 feet long.¹⁸¹ Octopuses live in salt water, anywhere from the tide levels to more than a mile and a half deep in the ocean.¹⁸²

Although octopuses are not generally social animals, they do travel significant distances on a daily basis. Octopuses are mostly solitary creatures; they have few interactions with other octopuses except for reproduction.¹⁸³ They tend to be most active at night.¹⁸⁴ Octopuses typically use a temporary den, which they keep from one day to five months, as a home base for their activities.¹⁸⁵ They collect shells and stones and arrange them around their den.¹⁸⁶ From their home base, individual octopuses can travel over enormous areas. Some octopuses,

¹⁷⁴ See e.g. Vancouver Aquarium, *Live Sea Otter Cam*, available at <http://www.vanaqua.org/ottercam/> (last accessed Apr. 11, 2009); Oregon Coast Aquarium, *Sea Otters*, available at <http://www.aquarium.org/exhibitsSeaOtters.asp?sid=2> (last accessed Apr. 11, 2009); North Carolina Aquariums, *What's New*, available at <http://www.ncaquariums.com/ri/whatsnew.htm> (last accessed Feb. 25, 2009) (all stating that otters receive enrichment such as toys).

¹⁷⁵ Roger T. Hanlon & John B. Messenger, *Cephalopod Behaviour* 5, 7 (Cambridge U. Press 1996).

¹⁷⁶ Frank W. Lane, *The Kingdom of the Octopus: The Life-History of the Cephalopoda* 6 (Sheridan House 1960).

¹⁷⁷ Hanlon, *supra* n. 175, at i.

¹⁷⁸ M. J. Wells, *Brain and Behaviour in Cephalopods* 2 (S.A. Barnett ed., Stanford U. Press 1962).

¹⁷⁹ Hanlon, *supra* n. 175, at 149.

¹⁸⁰ *Id.* at 1.

¹⁸¹ Lane, *supra* n. 176, at 6.

¹⁸² Hanlon, *supra* n. 175, at 1.

¹⁸³ *Id.* at 94.

¹⁸⁴ Wells, *supra* n. 178, at 13.

¹⁸⁵ Jean Geary Boal, Andrew W. Dunham, Kevin T. Williams & Roger T. Hanlon, *Experimental Evidence for Spatial Learning in Octopuses* (*Octopus bimaculoides*), 114(3) *J. Comp. Psych.* 246, 246 (2000).

¹⁸⁶ Marion Nixon & J.Z. Young, *The Brains and Lives of Cephalopods* 276 (Oxford U. Press 2003).

such as those around Japan, migrate, traveling up to 2.5 miles per day.¹⁸⁷ The home range of an octopus, the distance the octopus travels in its regular foraging activity, has been reported as being around 2000 square feet.¹⁸⁸ Octopuses change their foraging grounds each day and often take different routes home than they took out.¹⁸⁹

Octopuses have highly refined senses. Like most cephalopods, octopuses have enormous eyes, and some octopuses have visual abilities “comparable to those of vertebrates.”¹⁹⁰ They typically hunt their prey by sight.¹⁹¹ Early studies showed that octopuses are sensitive to vibrations created by tapping the walls of their tank.¹⁹² More recent research shows that cephalopods are extremely sensitive to low frequency vibrations, around and below 10 Hz.¹⁹³ These animals are also highly sensitive to touch and can distinguish between a wide variety of textures.¹⁹⁴ However, they do not have a sense of the orientation of their suckers in space and therefore cannot distinguish between horizontal and vertical grooves in the surface of an object.¹⁹⁵ Octopuses use their suckers to taste food and are sensitive to differences such as sweet, sour, and bitter.¹⁹⁶ They can distinguish objects soaked in different solutions, such as sucrose or quinine, and they can detect the difference at 10 to 1,000 times lower concentrations than can humans.¹⁹⁷

Octopuses use color changes to hide in their environment and to communicate with other animals, both predators and other octopuses.¹⁹⁸ Some researchers claim that the variety of signals and body patterns used by octopuses constitute a language.¹⁹⁹ A cephalopod’s color change is controlled by the brain; this color change happens more quickly and in more varieties than anywhere else in the animal kingdom.²⁰⁰ During their daily foraging, octopuses were observed to change their body pattern nearly 1,000 times during seven hours.²⁰¹ When hiding from predators, some octopuses enhance their natural

¹⁸⁷ Hanlon, *supra* n. 175, at 159.

¹⁸⁸ *Id.* at 58.

¹⁸⁹ *Id.*

¹⁹⁰ Nixon, *supra* n. 186, at 289.

¹⁹¹ Wells, *supra* n. 178, at 7.

¹⁹² Hanlon, *supra* n. 175, at 14.

¹⁹³ *Id.* Hz., or “hertz,” is defined as “a unit of frequency of a periodic process equal to one cycle per second.” *Webster’s Third New International Dictionary* 1061 (Philip B. Gove ed., Merriam Webster Inc. 1993).

¹⁹⁴ Hanlon, *supra* n. 175, at 15.

¹⁹⁵ *Id.*

¹⁹⁶ Wells, *supra* n. 178, at 73.

¹⁹⁷ Hanlon, *supra* n. 175, at 16.

¹⁹⁸ *Id.* at 41.

¹⁹⁹ *See id.* at 129 (discussing M. Moynihan, A.F. Rodaniche, *The Behavior and Natural History of the Caribbean Reef Squid Sepioteuthis Sepioidea. With a Consideration of Social, Signal, and Defensive patterns for Difficult and Dangerous Environments*, 25 *Advances in Ethology* 1 (1982)).

²⁰⁰ *Id.* at 38, 45.

²⁰¹ *Id.* at 59.

2009] *CARING FOR DOLPHINS, OTTERS, AND OCTOPUSES* 257

ability by using extra material to camouflage themselves; they hold pebbles or sponge-covered shells with their suckers.²⁰²

The cephalopod brain is enormous when compared to that of other invertebrates.²⁰³ They have excellent spatial ability; they are able to remember the location of their dens throughout long periods of time and significant distances, and they keep track of where they have recently foraged.²⁰⁴ Large parts of the octopus' brain are used for memory, and learning may occur during a significant part of an octopus' life.²⁰⁵ Research shows that octopuses learn quickly, even when compared to vertebrate animals, and they demonstrate flexible and adaptive behavior.²⁰⁶ In the lab, an octopus that first fled from people will learn to take food from a person's hand even before the hand is lowered into the water.²⁰⁷ They typically learn to avoid a situation that has been painful after just two or three repeated trials.²⁰⁸

Octopuses are capable of "conditional discrimination," which is a complex form of learning typically associated with vertebrates.²⁰⁹ For example, they have been taught to feed themselves by attacking a lever and to distinguish between varieties of shapes.²¹⁰ Additionally, they are capable of navigating mazes and selecting the correct exit from among several options.²¹¹ Further, they have been taught to retrieve crabs from glass jars, although their performance in this particular task is somewhat erratic.²¹² Research has also demonstrated social learning among octopuses; an untrained octopus learns to select a specific shape more quickly after watching a trained octopus select the correct shape.²¹³

Octopuses have both short-term and long-term memories.²¹⁴ Over the course of a day, they can learn the location of an environmental feature that could help them in the future, even if they do not presently need the information.²¹⁵ They retain this information for at least a week.²¹⁶ Research has shown that different parts of the octopus brain are used for visual and tactile memories.²¹⁷ Though octopuses are unrelated to vertebrate animals, the learning and memory areas of

²⁰² *Id.* at 68.

²⁰³ Hanlon, *supra* n. 175, at 1.

²⁰⁴ Boal, *supra* n. 185, at 246.

²⁰⁵ Hanlon, *supra* n. 175, at 28.

²⁰⁶ *Id.* at 1.

²⁰⁷ Wells, *supra* n. 178, at 15.

²⁰⁸ *Id.* at 38.

²⁰⁹ Lauren M. Hvorecny et al., *Octopuses (Octopus bimaculoides) and Cuttlefishes (Sepia pharaonina, S. officinalis) Can Conditionally Discriminate*, 10 *Animal Cognition* 449, 449 (2007).

²¹⁰ Hanlon, *supra* n. 175, at 138–39, 143.

²¹¹ Hvorecny, *supra* n. 209.

²¹² Hanlon, *supra* n. 175, at 140.

²¹³ *Id.* at 141.

²¹⁴ *Id.* at 144.

²¹⁵ Boal, *supra* n. 185, at 251.

²¹⁶ *Id.*

²¹⁷ Wells, *supra* n. 178, at 137.

the octopus brain have abilities for long-term memory similar to that in vertebrates.²¹⁸ There is even evidence that while an octopus is at rest, its brain remains alert.²¹⁹ The electrical patterns during this time are similar to vertebrate sleep and memory processing.²²⁰ This suggests that octopuses may dream.²²¹

Research further shows that octopuses will play with an object, like a Lego block, after exploring and getting used to it.²²² Although scientists have not been able to identify specific receptors, it is almost certain that cephalopods respond to pain.²²³ They react to electric shocks as a human would when stung by a nettle, and scientists have deliberately inflicted pain during laboratory experiments to change their behavior.²²⁴ They also have distinguishable personalities, and the variance in their personalities is similar to the dimensions of personality tested in humans and monkeys.²²⁵ Researchers hypothesize that, much like humans, octopuses may have “temperaments that are shaped into adult personality by experience.”²²⁶

Octopuses are some of the least expensive animals for aquariums to maintain mainly because they have slow metabolisms, so they do not consume large amounts of food.²²⁷ One aquarium estimates keeping one octopus costs \$25 a week.²²⁸ Although their food requirements are minimal, the octopuses become bored without mental stimulation from new experiences.²²⁹ Therefore, some aquariums provide them with enrichment items, such as puzzle toys, at least a few times a week.²³⁰

²¹⁸ Binyamin Hochner et al., *A Learning and Memory Area in the Octopus Brain Manifests a Vertebrate-Like Long-Term Potentiation*, 90 *J. of Neurophysiology* 3547, 3547 (2003).

²¹⁹ Euan R. Brown et al., *Brain and Behavioural Evidence for Rest-Activity Cycles in Octopus vulgaris*, 172 *Behavioural Brain Research* 355, 359 (2006).

²²⁰ *Id.*

²²¹ *Id.*

²²² Jennifer Mather et al., *When Do Octopuses Play? Effects of Repeated Testing, Object Type, Age, and Food Deprivation on Object Play in Octopus vulgaris*, 120 *J. of Comp. Psychol.* 184, 188 (2006).

²²³ Hanlon, *supra* n. 175, at 21.

²²⁴ *Id.*

²²⁵ Jennifer A. Mather & Roland C. Anderson, *Personalities of Octopuses* (*Octopus rubescens*), 107 *J. Comp. Psychol.* 336, 339 (1993).

²²⁶ *Id.* at 340.

²²⁷ Telephone Interview with Denise Aster, Dir., Husbandry Dept., Adventure Aquarium in Camden, N.J. (Apr. 7, 2008).

²²⁸ Kasbati, *supra* n. 106.

²²⁹ Tennessee Aquarium, *Featured Creatures: The Aquarium's most popular residents*, <http://www.tnaqua.org/Newsroom/faqsanimals.asp> (last accessed Apr. 12, 2009).

²³⁰ See e.g. Telephone Interview with Denise Aster, *supra* n. 227; Tennessee Aquarium, *supra* n. 229 (describing octopuses receiving enrichment activities); The National Aquarium, *Giant Pacific Octopus*, http://www.aqua.org/animals_giantpacificoctopus.html (last accessed Apr. 12, 2009) (Describing the enrichment activities for octopuses at facilities).

B. Regulation

The AWA covers dogs, cats, monkeys, guinea pigs, hamsters, rabbits, and any other “warm blooded animals” used for exhibition purposes.²³¹ Octopuses are not covered. Therefore, their care is not regulated or supervised in any way.²³² Given the evidence of their intelligence, they should be provided with at least basic protections.

In contrast to the complete lack of protection provided to octopuses, guinea pigs and hamsters on display must have structurally sound facilities, heating, ventilation, lighting, and regular waste disposal.²³³ The care of hamsters must be provided by a sufficient number of employees who are supervised by a caretaker with a background in animal husbandry.²³⁴ They must have access to clean food and water and clean bedding material.²³⁵ Their enclosures must be large enough for “normal postural adjustments with adequate freedom of movement.”²³⁶ The regulations even lay out the precise time frame for cleaning their cages and the temperature of the water to be used.²³⁷ Rabbits are provided with similar protections to those available for guinea pigs and hamsters.²³⁸ They must have fresh air, and the ventilation must minimize drafts, odors, excessive heat, and moisture condensation.²³⁹ If the regulations make such extensive provisions for the comfort and care of these animals, there is no reason to exclude octopuses from similar protections.

In the United Kingdom, the Animals (Scientific Procedures) Act, enacted in 1986, provides protection to all vertebrate animals and to any invertebrates that the Secretary may decide to include.²⁴⁰ In 1993, octopuses were added to the list of animals protected by the statute.²⁴¹ Because they are the only invertebrates to receive such specific coverage, they are essentially treated as honorary vertebrates. By law, to perform any procedure that may cause the animal “pain, suffering, distress or lasting harm,” an individual must obtain both a personal license and a project license for a specific research program requiring the use of the animal.²⁴² The legislation provides several additional protections for animals. For example, animals that have been used for a procedure resulting in severe pain or distress cannot be used for further procedures that would cause pain or distress.²⁴³ There are also

²³¹ 7 U.S.C. § 2132(g).

²³² *Id.*

²³³ 9 C.F.R. §§ 3.25(a), (d), 3.26(a)–(b), 3.27.

²³⁴ *Id.* at § 3.32.

²³⁵ *Id.* at § 3.28(a)(2)–(3).

²³⁶ *Id.* at § 3.28(c)(2)(i).

²³⁷ *Id.* at § 3.31.

²³⁸ *Id.* at §§ 3.50–3.58.

²³⁹ 9 C.F.R. § 3.51(b).

²⁴⁰ Animals (Scientific Procedures) Act, 1986, c 14 § 1.

²⁴¹ Animals (Scientific Procedures) Act (Amendment) Order 1993/2103, Article 3.

²⁴² Animals (Scientific Procedures) Act, 1986, s. 14 §§ 2–3.

²⁴³ *Id.* at s. 14 § 14(1).

strict limits on how many times an animal may be put under anesthesia.²⁴⁴

The AWA should be amended to include protection for animals, such as the octopus, that demonstrate a certain level of intelligence. If humans remove octopuses from their natural environment, humans have a duty to care for them and to provide for their most basic needs. The octopus should have at least as much protection as its land-bound counterparts.

V. CONCLUSION

The regulations providing protection for marine mammals in public display facilities should be revised to reflect our current understanding of the intelligence and needs of these animals. Many marine animals are provided with less protection than their land-bound counterparts. Dolphins should be provided with the same protections as elephants and nonhuman primates, otters should be provided with the same protections as dogs, and octopuses should be provided with at least the same protection as guinea pigs and rabbits.

Of course, the cost of regulations to the public display community should be a significant part of the calculation. For an animal as intelligent as a dolphin, the result of appropriate regulations may be fewer dolphin exhibits. As with elephants, a decrease in the number of exhibits would be acceptable because many existing exhibits are not able to provide for dolphins either physically or mentally. Regulations requiring additional exercise or enrichment activities will be less burdensome than those requiring enlarged enclosures. As noted above, most accredited facilities already provide more than is required by federal regulations. The additions proposed for otters and octopuses should, therefore, not require significant additional expenditures by most facilities.

The following adjustments should be made in existing regulations to reflect the needs of these animals:

Dolphins:

- Completely reevaluate existing standards and facilities holding these animals, as has occurred with elephant exhibits.
- Substantially increase the size of the minimum required enclosures.
- Require an opportunity for regular exercise.
- Require an enrichment program comparable to that for nonhuman primates.

Otters:

- Require an opportunity for regular exercise.
- Require regular enrichment activities.

²⁴⁴ *Id.* at s. 14 § 14(2).

Octopus:

- Give these animals protected status under the AWA, including basic provisions such as clean water, safe enclosures, and regular feeding.

In addition, the standards followed by groups such as the AZA should be made available to the public. NMFS permits are not required for institutions that comply with “professionally recognized standards of the public display community,” and these standards are referred to many times in the regulations.²⁴⁵ In supporting the 1994 amendments to the MMPA, Senator Exon (D-Neb.) noted the excellent job the public display community has done in self-policing.²⁴⁶ If these standards are to be the basis for decreased government regulation, they should be publicly available.

By following AZA standards, most aquariums and zoos are already providing significantly more for the animals in their care than the regulations require.²⁴⁷ The cost, therefore, of the recommendations outlined above should be minimal for most facilities. The AZA’s standards for accreditation are much stricter than regulations promulgated by APHIS.²⁴⁸ These increased standards should be incorporated into the current regulations. They would then cover all facilities holding these animals, not just those accredited by the AZA. By incorporating the standards of the public interest community into the regulations those standards may be more easily monitored and enforced with actual penalties for noncompliance.

²⁴⁵ 16 U.S.C. § 1374(c)(2)(A) (2000).

²⁴⁶ 140 Cong. Rec. S5492-93 (daily ed. Mar. 21, 1994).

²⁴⁷ *Infra*, section I(B).

²⁴⁸ 140 Cong. Rec. at S5492; *See* Assn. of Zoos and Aquariums, *supra* n. 98. (stating, “It is understood that, in some cases, AZA accreditation standards are more stringent than existing laws and regulations.”).

APPENDIX A

SAMPLE DRAFT REGULATIONS

The following sample draft regulations are based on the structure of existing regulations. Although the draft regulations below incorporate many of the recommendations in this article, they are merely a starting point to providing a more appropriate environment for the care of these animals.

Dolphins

- Require an opportunity for regular exercise.

An appropriate plan must be developed, documented, and followed to provide cetaceans with the opportunity for exercise. The plan must be approved by the attending veterinarian. The plan must include written standard procedures to be followed in providing the opportunity for exercise. The plan must be made available to APHIS upon request. The plan, at a minimum, must comply with each of the following:

(a) Cetaceans housed in the minimum space requirements. Cetaceans must be provided the opportunity for regular exercise if they are kept in enclosures that provide less than five times the required pool volume for that cetacean, as indicated by section 3.104 of this subpart.

(b) Exemptions. An exemption to this provision is provided for cetaceans if, in the opinion of the attending veterinarian, it is inappropriate for certain cetaceans to exercise because of their health, condition, or well-being. Such exemption must be documented by the attending veterinarian and, unless the basis for exemption is a permanent condition, must be reviewed at least every thirty days by the attending veterinarian. Records of any exemptions must be maintained and made available to APHIS officials upon request.

- Require an enrichment program comparable to that for nonhuman primates.

An appropriate plan must be developed, documented, and followed to provide environment enhancement adequate to promote the psychological well-being of cetaceans. The plan must be in accordance with the currently accepted professional standards as cited in appropriate professional journals or reference guides, and as directed by the attending veterinarian. This plan must be made available to APHIS upon request. The plan, at a minimum, must address each of the following:

2009] *CARING FOR DOLPHINS, OTTERS, AND OCTOPUSES* 263

(a) Social grouping. The environment enhancement plan must include specific provisions to address the social needs of cetaceans of species known to exist in social groups in nature. Such specific provisions must be in accordance with currently accepted professional standards, as cited in appropriate professional journals or reference guides, and as directed by the attending veterinarian. The environment enhancement plan should also provide for the housing of cetaceans known to be primarily social in the wild as required by section 3.109 of this subpart.

(b) Environmental enrichment. The physical environment in the primary enclosures must be enriched by providing means of expressing noninjurious species-typical activities. Species differences should be considered when determining the type or methods of enrichment. Examples of environmental enrichments include providing balls, puzzles, mirrors, and other increased cage complexities; providing objects to manipulate; varied food items; using foraging or task-oriented feeding methods; and providing interaction with the care giver or other familiar and knowledgeable person consistent with personnel safety precautions.

(c) Special considerations. Certain cetaceans must be provided special attention regarding enhancement of their environment, based on the needs of the individual species and in accordance with the instructions of the attending veterinarian. Cetaceans requiring special attention include the following:

- (1) Infants and young juveniles;
- (2) Those that show signs of being in psychological distress through behavior or appearance; and
- (3) Individually housed cetaceans that are unable to see and hear cetaceans of their own or compatible species.

Otters

- Require regular enrichment activities.

Environmental enrichment. An appropriate plan must be developed, documented, and followed to provide environment enhancement adequate to promote the psychological well-being of marine mammals. The plan must be in accordance with the currently accepted professional standards as cited in appropriate professional journals or reference guides, and as directed by the attending veterinarian. This plan must be made available to APHIS upon request, and, in the case of research facilities, to officials of any pertinent

funding agency. The plan, at a minimum, must address environmental enrichment. The physical environment in the primary enclosures must be enriched by providing means of expressing noninjurious species-typical activities. Species differences should be considered when determining the type or methods of enrichment. Examples of environmental enrichments include providing balls, puzzles, KONG toys, mirrors, and other increased cage complexities; providing objects to manipulate; and varied food items.

Octopus

- Give these animals protected status under the AWA, including basic provisions such as clean water, safe enclosures and regular feeding

Enclosures. Primary enclosures shall be constructed and maintained so as to provide sufficient space for each animal contained therein to make normal postural adjustments with adequate freedom of movement. Enclosures shall be structurally sound and shall be maintained in good repair, to protect the animals from injury, to contain the animals, and to restrict the entrance of other animals. Enclosures shall be cleaned and sanitized often enough to prevent an accumulation of debris.

Water and Electric Power. Reliable and adequate electric power, if required to comply with other provisions of this subpart, shall be available.

Washroom and Sinks. Facilities, such as washrooms, basins, or sinks, shall be provided to maintain cleanliness among animal caretakers.

Heating. Enclosures for octopuses shall be sufficiently heated when necessary to protect the animals from the cold, and to provide for their health and comfort. The temperature shall be kept within ranges which the animals normally experience in the wild.

Lighting. Enclosures for octopuses shall provide lighting as determined by the attending veterinarian. Enclosures shall protect the octopuses from excessive illumination.

Food. Octopuses shall be fed on a regular schedule as determined by the attending veterinarian. The food shall be free from contamination, wholesome, palatable and of sufficient quantity and nutritive value to meet the normal requirements for the condition and size of the octopuses.

Employees. A sufficient number of employees shall be utilized to maintain the prescribed level of husbandry practices set forth in this subpart. Such practices shall be under the supervision of an animal caretaker who has a background in animal husbandry or care.