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HABITATTITUDE™: GETTING A BACKBONE ABOUT THE PET RELEASE PATHWAY

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Abstract: Many people would not consider their family complete without a pet. Unfortunately, for some pet owners, circumstances arise that prevent them from being able to properly care for their companions and pet abandonment has become one of the most common pathways of vertebrate species introduction. It is also one of the most challenging pathways to address—once the animals become established, eradication and control programs face significant public scrutiny and are often challenged by "animal rights" groups. Prevention measures are thus the key to minimizing the size and impacts of the "pet release pathway." Habitattitude™ is a proactive campaign designed and implemented by the Pet Industry Joint Advisory Council and partners to prevent the introduction of unwanted pets into natural systems. The campaign has three components: (1) educating consumers to make wise pet choices, (2) providing resources to enable high standards in animal care and maintenance, and (3) encouraging pet owners to choose among several alternatives to the release of their pets if problems do arise. Habitattitude™ messages are being promoted in pet stores, product advertisements, industry trade shows, and industry-relevant magazines.

Key Words: education, Habitattitude™, industry, invasive species, pathway, pets, public-private partnerships.

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INTRODUCTION

Many people would not consider their family complete without a pet – whether it be a dog (*Canis lupus familiaris*), cat (*Felis silvestris catus*), parakeet (*Melopsittacus undulates*), goldfish (*Carassius auratus*), or bearded dragon (*Pogona vitticeps*). The American Pet Product Manufacturers Association (APPMA) estimates that there are 360 million pets in the United States (US) and nearly 63% of American households have at least one companion animal (APPMA 2007a). The same percentage holds for Australian households, with 53% owning a cat or dog (Hill 2006). In the United Kingdom, approximately half of the households include pets (McNicholas et al. 2005). Pet purchase and care supports a thriving industry, with the annual market value estimated at $40.8 billion in the US alone (APPMA 2007b).

Pets bring considerable joy and security into people's lives and studies show that their companionship substantially benefits human health and wellbeing (Barker 1999, Mayon-White 2005). The emotional bond between owner and pet can be as vital to the owner as many human relationships and confer similar psychological benefits (Voith 1985, McNicholas et al. 2005). A sampling of statistics reflecting the depth and scope of the human-animal bond is presented in Table 1.

Although research results are not always consistent (e.g., Parslow and Jorn 2003) and vary among species (Friedman 1995), health benefits commonly attributed to pet ownership include: stress reduction (Friedman et al. 1983, Katcher 1984), reduced risk of cardiovascular disease (Anderson et al. 1992, Patronek and Glickman 1993), higher survival rates from myocardial infarction (Friedman et al. 1980), reduced risk of asthma and allergic rhinitis in children exposed to pets during the first year of life (Nafsted et al. 2001, Ownby et al. 2002), and better physical and psychological well-being in older people (Siegel 1990, Raina et al. 1999). Research has also demonstrated significantly less sickness-related school absenteeism among children who live with companion animals (McNicholas et al. 2005). The psychiatric profession is increasingly employing pets for their therapeutic benefits (Barker 1999).

Pets have the potential to foster better people. Through pet ownership, children can learn to take responsibility, as well as extend care and love to others. Studies indicate pets may contribute to a child's sense of identity, autonomy and initiative, industriousness, and trust (Bryant 1990, Robin and Ten Bensel 1990, Brown et al. 1996). Children brought up with pets show better self-esteem, social skills, and empathy with others than children with

Table 1. Statistics reflecting the scope of the human-animal bond.

1. 99% of pet owners consider their pets family members (Voith 1985)
2. 83% refer to themselves as their pet's mom or dad (AAHA 2001)
3. 63% of pet owners say "I love you" to their pet at least daily (AAHA 2001)
4. 59% celebrate their pet's birthday (AAHA 2001)
5. Children are more likely to have pets than siblings or fathers (Melson 2001)
6. 57% would prefer their pet as their only companion if stranded on a desert island (APPMA 2001/2002)
7. 52% believe their pets listen to them best (AAHA 2001)

no pets (Poresky and Hendrix 1990, Van Houtte and Jarvis 1995).

Due to changing demographic patterns, pets are increasingly the only animals that people have an opportunity with which to interact (Katcher and Beck 1987, Louv 2005). Katcher and Beck (1988) argued that caring for pets and other animals gives rise experiences of nurturing and being nurtured that are increasingly lacking in interchanges among people. Sobel's (1996) developmental approach to ecological literacy indicates that 4-7 year-old children exposed to pets are more likely to build empathy for and a sense of connectedness to "creatures" (live and imaginary), suggesting that people who interact with pets may be more likely to develop an interest in wild animals and protecting the environment. Marks et al. (1994) found that scores associated with the level of pet owner attachment were significantly and positively correlated with generativity (concern for the next generation), further supporting the theory that pet owner's may be more likely to care about environmental issues. Unfortunately, for some pet owners, circumstances arise that prevent them from being able to properly care for their companions (Table 2). Some well-meaning pet lovers try to solve such problems by setting their pets free, i.e., releasing them into the natural environment (Courtenay 1999, Fuller et al. 1999). Of course, there are also individuals who abandon pets as a result of callousness or boredom. According to APPMA's 2007-2008 Pet Owner's Survey (APPMA 2007a), pet abandonment is the least common choice when pet owner's make arrangements for a pet for which they can no longer provide (Table 3).

For the pets, "freedom" is often a traumatic experience; they may not be able to find adequate food and shelter, and may become vulnerable to other animals, traffic, and people who consider them a nuisance. Abandoned pets that do survive can cause significant harm to the environment by preying on or competing with native fish and wildlife, spreading disease and parasites, and destroying fragile habitats (Moyle 1996, Genovesi and Bertolino 2001, Algar et al. 2002). In short, they can become invasive species: non-native species that cause harm, or have the potential to cause harm, to the environment, economies, or human health (Federal Register 1999).

Invasive species are one of the most significant drivers of environmental change worldwide (Sala et

Table 2. Reasons people give up their pets.

1. A family member develops allergies
2. The owner's lifestyle changes unexpectedly
3. Housing location and/or policies change
4. The pet outgrows its housing
5. The animal's behavior becomes problematic
6. The pets reproduce and are too many to care for
7. The animal becomes sickly (and costly)
8. The pet's needs are not compatible with the owner's wants
9. Children leave home or develop other interests
10. Fear of zoonotic disease transmission

Table 3. Alternative arrangements identified, by percentage, by pet owners when they are unable to provide continual animal care.

	Pet Choice and No. Surveyed				
	Dog	Cat	Bird	Small Animal	Reptile
Selected	580	492	342	301	333
Arrangements	%	%	%	%	%
Give to friend/relative	74	71	77	68	61
Bring to humane society	12	15	8	15	10
Give to school	1	*	6	12	19
Other (e.g., sell)	4	4	8	1	14
Bring to shelter	7	9	4	4	4
Bring to vet's office	3	5	2	3	2
Put to sleep	5	4	2	1	-
Abandon	*	-	*	6	1

*Less than 0.5%. Adapted from APPMA 2007a.

al. 2000, McNeely et al. 2001). They have been implicated in the endangerment of specific species (Wilcover et al. 1998), degradation of aquatic and terrestrial environments (Cartlon 2001, D'Antonio and Kark 2002), and the alteration of biogeochemical cycles (D'Antonio and Vitousek 1992, Mack and D'Antonio 1998). Consequently, they can contribute to social instability and economic hardship, placing constraints on the conservation of biodiversity, sustainable development, and economic growth (McNeely 2001, Pimentel 2002, GISP 2006). The globalization of trade, travel, and transport is greatly increasing the number of invasive species (both individual animals and species) that are being moved around the world, as well as the rate at which they are moving (McNeely et al. 2001, Burgiel et al. 2006). At the same time, changes in climate and land use are rendering some habitats more susceptible to biological invasion (Mooney and Hobbs 2000).

Pet abandonment has become one of the most common pathways of vertebrate species introduction (Courtenay 1999, Fuller 2003, Kraus 2003) and one of the most challenging to address once the animals become established. Eradication and control programs face significant public scrutiny and are often challenged by "animal rights" groups. In some cases, natural resource managers have been unable to eradicate or control these feral invasives due to interference and threats presented by "animal rights" advocates (e.g., Genovesi and Bertolino 2001). Prevention measures are thus the key to minimizing the size and impacts of the "pet release pathway." To be successful, these initiatives need to target the riskiest aspect of the pathway, namely pet owners, and carefully consider the motivators and implications of the human-animal bond.

THE CAMPAIGN

Public education is a major tool to minimize pet releases (Wittenberg and Cock 2001). In 2005, The Pet Industry Joint Advisory Council (PIJAC) joined with the US Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Sea Grant program to create Habitattitude™, a proactive campaign designed to prevent the release of unwanted pets. This innovative, partnership-based initiative emerged out of the shared vision and commitment of several US federal and state agencies, as well as the pet and aquaria industries. The program initially focused on aquatic species and promoted a "Protect our environment: Do not release fish and aquatic plants" message (www.habitattitude.net/). Habitattitude™ is now growing to address all pets, engage an even wider range of additional affiliates (over 70 as of July 2007), and expand its messaging. To have a Habitattitude™ is to "Do right by your pet. Do right by our environment."

Both the PIJAC and its Canadian counterpart have launched consumer-focused websites (www.pijac.org/habitattitude and

www.habitattitude.ca/en/aboutus/, respectively) that promote and provide information on the three primary goals of the campaign: (1) protect the natural environment (habitats) from the impacts of unwanted pets (i.e., potentially invasive species), (2) ensure that pets are carefully selected and well cared for (habits), and (3) help pet lovers find alternatives to the release of their pets (attitudes).

The first goal is supported by messaging that addresses the later two. In brief, the campaign communicates the following information to consumers.

Before Selecting a Pet

When it comes to pets, a quick decision is often a poor decision. Ideally, a pet lover carefully considers how to be a responsible pet owner and environmental steward (caretaker) before choosing an animal companion. A person's intent for a companion, lifestyle, family composition, work schedule, income, health and physical fitness, and even their personality will make some pets more suitable for them than others.

Pet Care

Healthy pets make for happy pet owners. When a person brings a pet into their home, they become its care taker – it is their responsibility to provide for its every need – proper diet, clean water, adequate housing and shelter, exercise, entertainment, and even emotional well-being. While many companion animals are short-lived, others can live for decades and some (turtles and parrots, for example) can live for more than 100 years. And, although most pets are small and remain small, others will grow to very large sizes and require specialized feeding and housing. The amount of joy a person receives from having a pet and the pet's well-being are completely up to the person. Care for the pet properly and both person and pet will benefit from a healthy relationship.

Responsible Pet Placement

Releasing a pet into the natural environment puts both the pet and the environment at risk. Furthermore, in many locations, it is illegal to release a pet into the natural environment. Unfortunately, for some pet lovers, circumstances do arise that prevent them from being able to properly care for their pet companions. (Table 2). A number of options are available in these cases (Table 3), but release or abandonment should not be one of them.

Through the PIJAC websites, supportive information tools (e.g., articles, guidelines, and website links) are provided. Consumers are also encouraged to discuss their pet options, care, and placement needs with local veterinarians, animal breeders, pet store staff, hobbyists, and friends who have pets, as well as to consult relevant books and magazines.

SPECIAL FOCUS PROGRAMS

The campaign has developed a special focus on two aspects of consumer activities that pose the greatest risks for pet release.

Water Gardening Hobby

Backyard pond and water gardening is the fastest growing segment of both the pet and horticulture industries and involves the intentional release of animals (most commonly fish) into outdoor environments. PIJAC is working with the American Nursery and Landscape Association to create codes of conduct for water gardening retailers and consumers.

Water gardens are intended to be places of beauty and tranquility. When designed thoughtfully, a person can help ensure that the project doesn't become stressful for them, their pond pets, or native fish and wildlife. Water gardening is blossoming in popularity. At least 5% percent of the US population is estimated to have a water garden, for a total of more than 15 million water gardens in the US alone (Fins and Flowers 2007). Water gardens add beauty and tranquility to backyards and other landscapes. However, if they are not established or maintained thoughtfully, water gardens can also become a source of environmental problems. Despite best intentions, many water gardeners unknowingly introduce harmful animals, plants, and diseases to their ponds. When these introduced organisms (especially fish and small, floating plants) find their way into natural waterways, they can cause substantial impacts to native species and their habitats.

In designing water gardens, carefully consider aesthetic desires, as well as the local environmental conditions (seasonal rainfall, for example), neighborhood setting, and budget. While wanting a pretty and peaceful garden, a person also should refrain from establishing the water garden within, connected to, or in the close vicinity of natural water bodies (ponds and streams, for example). This will help prevent the unintended introduction

of harmful plants and animals into the natural environment. Ensure that the pond pets and plants are well-contained and thus can not get washed away during rainstorms or flood events into local water bodies or public sewer systems (which often drain into local water bodies).

A person should consider the likelihood that children will collect plants and animals in the pond and release them elsewhere. As is necessary, plan for a fence, relevant signs, and to say "no" to requests to collect from the water garden.

It is important to carefully evaluate the costs and budget. Can the person afford to establish and maintain the garden pond of their dreams? Many people are surprised at the cost of creating and maintaining their water gardens – pond liners, pumps, stones, lights, plants, and fish can be quite expensive (some popular fish can cost more than US$100 each). Pond maintenance requires both additional money and time. The person needs to be sure that they can properly care for the pond pets and plants as long as they own the property.

Water gardening is both an art and a science. When it comes to water garden pets and plants, a quick decision is often a poor decision. When ready to select pond pets and plants, a person should be aware that many horticulture and pet product magazines and websites sell or promote plants and animals that are known to be invasive, or have the potential to become invasive. In some states, it is illegal for these species to be bought and sold. Contact state native plant societies, cooperative extensive agencies, or fish and game departments to find out what plants and animals are the safest for water gardens in the area.

A person should learn the biology and needs of the plants and animals being considered for the water garden. What care do they require? How large do they grow? Are they likely to reproduce? Are they likely to escape or be moved from the pond (by wild animals or neighborhood children)? What diseases are they prone to and how are they treated? What environmentally-friendly options exist if the plants, fish, and other animals get too big or too numerous?

Healthy water gardens make for beautiful, tranquil water gardens. If a person maintains a healthy pond environment, they will reduce the likelihood that the fish and other animals, as well as the plants, will become diseased. Also, releasing pond pets into the natural environment puts these fish and other animals, as well as the natural environment at risk. Furthermore, in many locations, it is illegal to release water garden pets and plants into the natural environment.

Classroom Activities

Pets are often maintained in classroom settings, especially in elementary schools. The practice of raising tadpoles, caterpillars, and other animals is quite popular and often includes an event in which the students release the adults into the natural environment. Furthermore, during holidays and summer breaks teachers must make special arrangements for animal care and may choose to release the animals instead of "rehoming" them.

Only some types of animals make good classroom pets. Pets are often a popular addition to the classroom. They fascinate and entertain, and can become "teachers" themselves – on topics ranging from art to science to personal hygiene. Having a pet in the classroom is, however, a significant responsibility for teachers; pets in the classroom need time, attention, and financial investments that are often above and beyond required duties and budget. It is up to the teacher to ensure that the animals receive the necessary care, and that they create a safe and enjoyable environment for both the students and the pets. The first step in responsible classroom pet care is to consider what kind of pet is most appropriate before bringing an animal into the school environment – the animal's particular needs and behaviors, the age of the students, school schedules (including long holiday breaks), and the teacher's available time and budget are all important variables to consider. The teacher can even make the selection process a learning exercise for the students.

Teachers, perhaps even more often than parents, find themselves faced with the need to locate a new home for a pet. What to do with the animal over summer break? What happens if a child develops allergies, is fearful of animals, or perhaps gets injured? What if school policies on classroom pets change? What if the classroom pets produce too many offspring or grow too large and costly? Who will adopt the chicks hatched out at Easter or the tadpoles raised from eggs?

Questions such as these are ideally answered before choosing a classroom pet. However, surprises do happen and sometimes well-meaning teachers will attempt to do the right thing by releasing the pet into the natural environment. This is neither the best solution for the pet, nor the environment. A person is faced with needing to find a new home for a classroom pet please refer to

www.habitattitude.net in order to make the best possible decision for the animal, and make it a learning experience for the students as well.

IMPLEMENTATION

PIJAC's focus is primarily to implement the Habitattitude™ campaign through the pet industry and pet owning public in the US and Canada, and secondarily to join with program partners and associates in extending the campaign into other sectors and countries. In its first two years of operation, the campaign has made numerous accomplishments (Table 4).

These serve as the foundation for new and upcoming campaign initiatives, including: (1) additional focus on terrestrial species (including new branding and partnership building); (2) supplemental fact sheets, booklets, coloring books and other materials available through the PIJAC (US) website; (3) promotion of the Habitattitude™ brand and message through a growing number of retail store venues and pet products (e.g., store signage, door decals, fish bags, and pet starter kits); (4) inclusion of Habitattitude™ message in PIJAC best practice manuals for store employees (e.g., Doing it Right: A Pet Store Employee's Guide to Professional Success [and Fun!]) and hobbyists; (5) targeted, site-specific partnerships (e.g., with the

Table 4. Examples of Habitattitude™ accomplishments, 2005-2007.

1. Enthusiastic endorsement and support from the PIJAC Board of Directors and other pet industry trade associations, which includes high-level industry representatives from major manufacturers, distributors, and retailers in the pet industry (e.g., PetSmart, PETCO, Central Garden and Pet Supply, Marineland).
2. Enthusiastic endorsement and support from key federal government agencies working on invasive species issues, including the Department of the Interior, Department of Commerce, and Department of State. In the Department of Interior's 2005 report to Congress, the Department explicitly sited engagement in Habitattitude™ as one of its most significant contributions to environmental conservation.
3. Received start up funds from USFWS to establish the Habitattitude™ brand, brand marketing campaign, and brand impact monitoring. USFWS, PIJAC, and NOAA Sea Grant Program were awarded a two-year seed grant for engaging academic and state agencies in the program.
4. Although monetarily small, the seed grant was itself a significant accomplishment for the campaign: it marked the first time that the pet industry had engaged with federal and state government in such a proactive, large-scale public education and outreach program.
5. From 2004-2007, program partners presented Habitattitude™ poster displays at pet industry trade shows, consumer pet shows, numerous aquarium society meetings, the Outdoor Writers Association annual meetings, meetings of all 50 state fish and game agencies, and a number of environment meetings dealing with invasive species issues.
6. Exceptional support from campaign affiliates. For example, PETCO promotes the campaign in newspaper inserts that reach 30-34 million households/month, giving away additional copies of the inserts at their 850+ stores, and placing Habitattitude™ signage, care sheets, and other promotional materials in all their stores. They are now planning to distribute campaign materials in every aquarium they distribute as "PETCO private label starter kits."
7. Adoption and extension of the Habitattitude™ campaign by PIJAC Canada (www.habitattitude.ca/en/aboutus/)

State of Florida and National Park Service in the Everglades); and, (6) expanded partnerships with the media and celebrity spokespersons. PIJAC offers the following lessons learned to individuals who would like to help promote the campaign messages or initiate campaigns in other countries: (1) focus on communicating the key messages (as described in this paper) to pet owners; (2) communicate the message in such as way as to move people toward solutions (choosing, caring, and rehoming pets wisely) as a means of moving them away from problems (pet release) (i.e. it's not enough to say "Don't Release," provide clear directives for the appropriate behavior); (3) work through or closely with pet industry trade associations, corporate leaders, and magazine publishers; (4) when working with the pet industry, be business-oriented in the approach (e.g., use strategic planning and market-based incentives models, and invest in brand research, design, and marketing); (5) recognize that the pet industry is diverse (from large corporations to small "Mom and Pop" stores) and that there is considerable diversity in business approach (e.g., some stores invest considerable amounts of money in signage while others believe it ineffectual). Thus, be sure to build flexibility into the campaign implementation strategy; (6) employ an overall approach based in social marketing and communication psychology (i.e. learn to understand the audience and what motivates them); (7) become familiar with pet ownership surveys and human-animal bond studies so as to understand the connections between pets and people in the area; (8) work with natural resources managers and survey the scientific literature to identify types of pets and locales that are high risk for release; (9) make a long-term commitment to campaign implementation and be patient with potential partners who might initially be defensive or not understand the significance of the issue or their role in relation to it; and, (10) try to make it fun for all involved.

CONCLUSION

As is true of all human activities, the benefits of pet ownership are not without risks and impacts. The degree to which pet ownership confers benefits to human society is a reflection of pet owners' attendance to individual responsibilities, and the pet industry recognizes that Habitattitude™ alone will not fully address the risks associated with the "pet release pathway." Science-based regulation may be necessary to prevent potential impacts by specific high-risk species. The pet industry has, for example, recently supported a ban on the importation of the Gambian giant pouch rat (*Cricetomys gambianus*) and regulation (including permitting and microchipping) of large constrictors (*Boa* spp.) due to invasion concerns. PIJAC has also encouraged the development of screening processes for first time introductions of all species, irregardless of their intended use. The pet industry maintains its interest in working with regulators and other stakeholders on the development of science-based policies and regulations and is currently engaged in processes associated with the National Invasive Species Council, Invasive Species Advisory Committee, Aquatic Nuisance Species Task Force and its associated regional panels, the Commission for Environmental Cooperation, and state initiatives, such as a Florida Conservation Commission-led risk analysis of marine ornamental fish. PIJAC would welcome the opportunity to work with similar bodies in other countries.

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LITERATURE CITED

AAHA (AMERICAN ANIMAL HOSPITAL ASSOCIATION). 2001. 2001 AAHA Pet Owners Survey. American Animal Hospital Association, Lakewood, Colorado, USA.

ALGAR, D., A. BURBIDGE, AND G. ANGUS. 2002. Cat eradication on Hermite Island, Motebello Islands, Western Australia. Pages 14-18 *in* C. Veith and M. Clout, editors. Turning the tide: The eradication of invasive species. IUCN SSC Invasive Species Specialist Group. IUCN, Gland, Switzerland.

ANDERSON, W. P., C. M. REID, AND G. L. JENNINGS. 1992. Pet ownership and risk factors for cardiovascular disease. Medical Journal of Australia 157:298-301.

APPMA (AMERICAN PET PRODUCT MANUFACTURER'S ASSOCIATION). 2001. 2001-2002 APPMA national pet owners survey. American Pet Product Manufacturer's Association, Greenwich, Connecticut, USA.

APPMA (AMERICAN PET PRODUCT MANUFACTURER'S ASSOCIATION). 2007a. 2007-2008 APPMA national pet owners survey. American Pet Product Manufacturer's Association, Greenwich, Connecticut, USA.

APPMA (AMERICAN PET PRODUCT MANUFACTURER'S ASSOCIATION). 2007b. APPMA unpublished data. American Pet Product Manufacturer's Association, Greenwich, Connecticut, USA.

BARKER, S. 1999. Therapeutic aspects of the human-companion animal interaction. Psychiatric Times XVI, Issue 2. http://www.psychiatrictimes.com/p990243.html).

BROWN, B., H. RICHARDS, AND C. WILSON. 1996. Pet bonding and pet bereavement among adolescents. Journal of Counseling and Development 74:505-509.

BRYANT, B. 1990. The richness of the child-pet relationship: a consideration of both benets and costs of pets to children. Antrhozoýs 3:253-261.

BURGIEL, S., G. FOOTE, M. ORELLANA, AND A. PERRAULT. 2006. Invasive alien species and trade: integrating prevention measures and international trade rules. Center for International Environmental Law and Defenders of Wildlife, Washington, D.C., USA

CARLTON, J. 2001. Introduced species in U.S. coastal waters: environmental impacts and management priorities. Pew Oceans Commission, Alexandria, Virginia, USA.

COURTENAY, JR., W. 1999. Aquariums and water gardens as vectors of introduction. Pages 127-128 *in* R. Claudi and J. Leach, editors. Nonindigenous freshwater organisms: vectors, biology and impacts. Lewis Publishers, Boca Raton, Florida, USA.

D'ANTONIO, C. AND S. KARK. 2002. Impacts and extent of biotic invasions in terrestrial ecosystems. Trends in Ecology & Evolution 17:202-204.

D'ANTONIO, C. AND P. VITOUSEK. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. Annual Review of Ecology and Systematics 23:63-87.

FEDERAL REGISTER. 1999. Executive Order 13112: Invasive Species. Office of the President. Federal Register 64:6183-6186.

FINS AND FLOWERS WATER GARDEN LLC. 2007 (24 July 2007; http://www.finsandflowers.com/index.php?option=com_content&task=view&id=8&Itemid=9).

FRIEDMAN, E. 1985. The role of pets in enhancing human well-being: physiological effects. Pages 33-53 *in* I. Robinson, editor. The Waltham book of human-animal interaction: benefits and responsibilities of pet ownership. Elsevier Science Inc., New York, USA.

FRIEDMAN, E., A. KATCHER, J. LYNCH, AND S. THOMAS. 1980. Animal companions and one year survival of patients after discharge from a coronary care unit. Public Health Report 95:307-312.

FRIEDMAN, E., A. KATCHER, J. LYNCH, AND S. THOMAS. AND P. MESSENT. 1983. Social interaction and blood pressure: the influence of animal companions. Journal of Nervous and Mental Disease 171:461-465.

FULLER, P. 2003. Freshwater aquatic vertebrate introductions in the United States: patterns and pathways. Pages 123-151 *in* G. Ruiz and J. Carlton, editors. Invasive species: vectors and management strategies. Island Press, Washington, D.C., USA.

FULLER, P., L. NICO, AND J. WILLIAMS. 1999. Non-indigenous fishes introduced into inland waters of the United States. American Fisheries Society, Special Publication 27, Bethesda, Maryland, USA.

GENOVESI, P. AND S. BERTOLINO. 2001. Human dimension aspects in invasive alien species issues: the case of the failure of the grey squirrel eradication project in Italy. Pages 113-120 *in* J. McNeely, editor. 2001. The great reshuffling: human dimensions of invasive alien species. The World Conservation Union-IUCN, Gland, Switzerland:

GISP (GLOBAL INVASIVE SPECIES PROGRAMME). 2006. Invasive species and poverty: exploring the links. The Global Invasive Species Programme, Capetown, South Africa.

HILL, M. 2006. Contribution of the pet care industry to the Australian economy. BIS Shrapel Pty Ltd., Sydney, Australia.

KATCHER, A. AND A. BECK. 1987. Health and caring for living things. Antrhozoýs 1:175-183.

KATCHER, A. AND A. BECK. 1988. Health and caring for living things. *In* A. Rowan, editor. Animals and people sharing the world. University Press of New England, Hanover, Massachusetts, USA.

KATCHER, A., A. BECK AND H. SEGAL. 1984. Contemplation of aquarium for the reduction of anxiety. Pages 171-178 *in* R. Anderson, B. Hart, and L. Hart, editors. The pet connections: its influence on our health and quality of life. Global Publishing Company, St. Paul, Minnesota, USA.

KRAUS, F. 2003. Invasion pathways for terrestrial vertebrates. Pages 68-92 *in* G. Ruiz and J. Carlton, editors. Invasive species: vectors and management strategies. Island Press, Washington, D.C., USA

LOUV, R. 2005. Last child in the woods: saving our children from nature-deficit disorder. Algonquin Books of Chapel Hill, Chapel Hill, North Carolina, USA.

MACK, M. AND C. D'ANTONIO. 1998. Impacts of biological invasions on disturbance regimes. Trends in Ecology and Evolution 13:195-198.

MARKS, S., J. KOEPKE, AND C. BRADLEY. 1994. Pet attachment and generativity among young adults. The Journal of Psychology 128:641-651.

MAYON-WHITE, R. 2005. Commentary: pets-pleasures and problems. British Medical Journal 331:1254-1255.

MCNEELY, J. 2001. The great reshuffling: human dimensions of invasive alien species. The World Conservation Union-IUCN, Gland, Switzerland.

MCNEELY, J., H. MOONEY, L. NEVILLE, P. SCHEI, AND J. WAAGE. 2001. Global strategy on invasive alien species. The World Conservation Union-IUCN in collaboration with the Global Invasive Species Programme, Cambridge, United Kingdom.

McNicholas, J., A. Gilbey, A. Rennie, S. Ahmedzai, J. Dono, and E. Ormerod. 2005. Pet ownership and human health: a brief review of evidence and issues. British Medical Journal 331:1252-4.

Melson, G. 2001. Why the wild things are: animals in the lives of children. Harvard University Press, Cambridge, Massachusetts, USA.

Mooney, H. and R. Hobbs. 2000. Invasive species in a changing world. Island Press, Washington, D.C., USA.

Moyle, P.B. 1996. Effects of invading species on freshwater and marine ecosystems. Pages 86-92 *in* O. Soutland, P. Shea, and A. Viken, editors. Proceedings of the Norway/UN Conference on Alien Species, Trondheim, 1-5 July, 1996. Directorate for Nature Management and Norwegian Institute for Nature Research, Trondheim.

Nafsted, P., P. Magnus, P. Gaader, and J. Jaakola. 2001. Exposure to pets and atopy-related disease in the first 1 years of life. Allergy 157:298-301.

Ownby, D., C. Johnson, and E. Peterson. 2002. Exposure to dogs and cats in the first year of life and risk of allergic sensitizations at 6 to 7 years of age. Journal of the American Medical Association 288:963-972.

Parslow, R. and A. Jorn. 2003. Pet ownership and risk factors for cardiovascular disease: another look. Medical Journal of Australia 179:166-168.

Patronek, G. and L. Glickman. 1993. Pet ownership protects against the risks and consequences of coronary heart disease. Medical Hypotheses 40:245-249.

Pimentel, D. 2002. Biological invasions: economic and environmental costs of alien plant, animal, and microbe species. CRC Press, Washington, D.C., USA.

Poresky, R. and C. Hendrix. 1990. Differential effects of pet presence and pet-bonding on young children. Psychology Report 67:51-54.

Raina, P, D. Walter-Toews, B. Bonnet, C. Woodward, and T. Abernathy. 1999. Influence of companion animals on the physical and psychological health of older people: an analysis of a one-year longitudinal study. Journal of the American Geriatric Society 17:323-329.

Robin, M. and R. Ten Bensel. 1990. Pets and the socializations of children. Lathum Letter 11:1-23.

Sala, O., F. Chapin III, J. Armesto, E. Berlow, J. Bloomfield, R. Dirzo, E. Huber-Sanwald, L. Huenneke, R. Jackson, A. Kinzig, R. Leemans, D. Lodge, H. Mooney, M. Oesterheld, N. Poff, M. Skyes, B. Walker, M. Walker, and D. Wall. 2000. Global biodiversity scenarios for the year 2100. Science 287:1770-1774.

Siegal, J. 1990. Stressful life events and use of physician services among the elderly: the moderating role of pet ownership. Journal of Personality and Social Psychology 58:1081-1086.

Sobel, D. 1996. Beyond ecophobia: reclaiming the heart in nature education. Great The Orion Society and the Myrin Institute, Barringon, Massachusetts, USA.

Van Houtte, B. and P. Jarvis. 1995. The role of pets in preadolescent psychosocial development. Journal of Applied Developmental Psychology 16:463-479.

Voith, V. 1985. Attachment of people to companion animals. Veterinary clinics of North America: small animal practice 15:289-295.

Wilcover, D., D. Rothstien, J. Dubow, A. Phillips and E. Losos. 1998. Quantifying threats to imperiled species in the United States. BioScience 48:607-615.

Wittenberg, R., and M. Cock. 2001. Invasive alien species: a toolkit of best prevention and management practices. CAB International, Wallingford, Oxon, United Kingdom.