

Disclaimer: We have created a fictitious threatened species, the Potomac Highlands hedgehog and mapped it within Jefferson County as a training aid for our Habitat Conservation Planning Course ECS 3117.

**Habitat Conservation Plan for the Proposed Incidental Take
of the Threatened Potomac Highlands Hedgehog as a Part of
the Development of West Highlands Estates,
City of Charles Town Tract 90210
Jefferson County, West Virginia**

FINAL

May 14, 2002



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West Highlands Estates Limited Partnership

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Revised 2 May 2002

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I. PURPOSE, SCOPE AND PLANNING CONTEXT

West Highland Estates is a previously approved residential subdivision located just east of Route-15, and just south of Old Mine Road, in the city of Charles Town. The 200-acre property contains habitats occupied by the “threatened” **Potomac Highlands Hedgehog** (*Erinaceus americanus virginianus*). The presence of the species listed under the federal Endangered Species Act (ESA) elicits the need for this Habitat Conservation Plan (HCP)

As a result of comments received during the public review process, the draft HCP was modified to remove the on-site mitigation (revegetation) component of the HCP and additional off-site mitigation obligations were inserted. The HCP now mitigates project impacts at a greater than 3:1 ratio.

A. PURPOSE OF THE HCP

The specific purpose of this HCP is to allow the incidental take of approximately seven Potomac Highlands hedgehogs, and to allow the incidental take of approximately 50.2-acres of open hardwood forest habitat. The basis for the determination of this “take” is complex and is founded on the unique characteristics of this essentially developed site. The basis for the take calculation is explained in detail in the following sections of this report.

The Federal Endangered Species Act (ESA) permits the take of a listed species when such a taking action is incidental to an otherwise lawful activity and when such a taking has been “permitted” under section 10(a)(1)(B). In order to obtain a take authorization under section 10(a)(1)(B), a Habitat Conservation Plan (HCP) must be processed. The HCP must demonstrate that minimization and mitigation of the “take” will be accomplished.

This HCP addresses the anticipated incidental take of the Potomac Highlands Hedgehog in conjunction with the build out of the West Highlands Estates and ongoing agricultural activities to continue, in the City of Charles Town, Jefferson County, West Virginia.

The Estates were originally approved by the City of Charles Town in approximately 1989. However, due to economic considerations portions of the property have been used for cattle grazing and corn production since then. Approximately 50-acres has remained in open hardwood forest. The applicant would like to maintain the on-going agricultural operations until such time as the development project is feasible.

The biological resources that would be affected by development of the 110-lots and on-going agricultural operations are limited. The only two potentially significant affects are (1) the possibility for incidental take of seven individuals in 50.2-acres, and, (2) the possibility for indirect effects on the adjacent Shaughnessy river dispersal corridor.

In order to allow hedgehogs to disperse through the property during the on-going agriculture operations phase, the applicant has agreed to plant and maintain old growth hedgerows. In addition, several onsite minimization measures will be implemented to reduce edge effects to the Shaughnessy River. Given the anticipated incidental take during development phase the applicant proposes to purchase 151-acres of high quality habitat within a conservation bank. It is proposed that the mitigation property be transferred to a 501(c)(3) conservation organization along with an appropriate endowment.

It is the applicant's intent that implementation of the minimization and mitigation measures will assure that (1) the survival and recovery of the hedgehog in the wild will not be appreciably reduced by implementation of West Highland Estates, and, (2) the biological goals and objectives for the species will be realized.

B. SCOPE OF THE HCP

1. Plan Area Defined

This HCP addresses the potential for the incidental take of the Potomac Highlands Hedgehog, incidental to the development of 110-lots within the City of Charles Town's previously approved Tract 90210, and during ongoing agricultural operations. An HCP is required to delineate a 'boundary' within which the anticipated take could potentially occur. This boundary, in some logical manner, must delineate the portion of the species' habitat that is either directly or indirectly affected by the proposed project.

The HCP boundary for Tract 90210 is illustrated in Figures 1 and 2. The area includes the 150-acre area that will be used for agricultural operations and will be subject to the development project. The adjacent property that contains the Shaughnessy River is privately owned, and therefore is not included in the Plan Area.

2. Species Covered by the HCP

This HCP addresses the Potomac Highlands Hedgehog (*Erinaceus americanus virginianus*). No other listed or candidate species have been encountered during the numerous surveys of the project site and the immediately surrounding terrain.

3. Duration of the Permit

It is anticipated that the 110 single family lots will be built out sometime in the next 20 years when the project becomes economically viable. Charles Town is a rapidly growing urban area and the Estates should be realized in the near future. Therefore, it is intended that this HCP addresses a 20 year permit.

C. PLANNING CONTEXT

West Highland Estates is actually part of a residential subdivision approved by the City over ten years ago. The Tract is part of a larger Specific Planning area which was subject to environmental review a decade ago, before the listing of the hedgehog under the federal ESA.

1. History of the Project

Tract 90210 is a single-family residential subdivision in the City of Charles Town. It is located in the mouth of Valley Fill Canyon, below the City of Charles Town. More specifically, the property lies south of Old Mine Road and north of the Shaughnessy River, and east of Route 15 (see Figures 1 and 2).

The Tract was originally approved by the City of Charles Town in the early 1990's. The economic downturn right after the approval caught the builder, and the Tract has been in agricultural production since that time.

2. Legal context of the Permit Request

This Habitat Conservation Plan (HCP) is a mechanism whereby an affected party can be permitted to commit the incidental take of an endangered species. While that may be the result of the law, the intent is that the HCP is a tool whereby it can be demonstrated that both (1) the anticipated incidental take will not result in jeopardy to a listed species, and, (2) the proposed mitigation more than offsets the anticipated loss. "Congress intended the HCP process to . . . provide a framework for 'creative partnerships' between the public and private sectors in endangered species conservation."

The required content of the HCP document may be described as follows (Fish and Wildlife Service and National Marine Fisheries Service, 1996):

1. It is necessary to define an HCP boundary. This sets the physical limits inside which take will be authorized.
2. The applicant must collect and synthesize biological data for the covered species. This effort will, quite naturally, focus on the biological resources within the HCP boundary and within the proposed mitigation area.
3. Quantify the anticipated levels of take. The HCP requires explicit information as to the quantification of take and mitigation.
4. Provide information to assist the Service in satisfying Section 7. This will include information on indirect effects to listed species and information addressing jeopardy to federally listed plants. Section 7 implementing regulations (50 CFR Part 402) require, among other things, analysis of the direct and indirect effects of a proposed action, the

cumulative effects of other activities on listed species, and effects of the action on critical habitat, if applicable. While plant species are not addressed as a part of Section 10, they are a part of the Section 7 process. For this reason, a discussion of sensitive plant species has been included as a part of this HCP document.

In order for the Fish and Wildlife Service to issue a 10(a)(1)(B) permit, the following issuance criteria must be met:

1. The taking will be incidental. Take of a listed species must be incidental to an otherwise lawful activity (such as an approved land development).
2. The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking. Mitigation program must be consistent with these issuance criteria, that is will minimize and mitigate “. . . to the maximum extent practicable.” In order to assure that the mitigation program is functioning, monitoring for a period of time may be necessary. Monitoring measures described in the HCP should be as specific as possible and be commensurate with the project’s scope and the severity of its effects.
3. The applicant will ensure that adequate funding for the HCP and procedures to deal with unforeseen circumstances will be provided. “Whatever the proposed funding mechanism is, failure to demonstrate the requisite level of funding prior to permit approval or to meet funding obligations after the permit is issued is grounds for denying a permit application or revoking or suspending an existing permit respectively.”
4. The proposed taking will not appreciably reduce the likelihood of survival and recovery of the endangered species in the wild. The proposed action cannot be approved (the proposed take cannot be permitted) if it will place the target species in jeopardy.
5. The applicant will ensure that other measures that the Service may require as being necessary or appropriate will be provided. This includes the general permit conditions described at 50 CFR Part 13, Subpart D, and such instruments as an Implementing Agreement.
6. The service will receive such other assurances as may be required that the HCP will be implemented. There must be a mechanism that assures the Service of the long term implementation of the conditions of the HCP. Such assurances could be through the local governments planning, zoning and permitting powers. The permits could be conditioned such that actions that modify the agreements upon which the permit is based could invalidate the permit. Typically, a 10(a)(1)(B) permit runs with the land and can be transferred to a new owner. However, the new owner must agree to the conditions of the permit. In order to transfer the permit, the permittee must notify the Service.

Typically an HCP is encouraged to include species that may be listed. This is clearly the intent of congress. However due to the temporal brevity of this project and the anticipated “take” under

the HCP, the inclusion of proposed, candidate, or unlisted species in an HCP is voluntary and is the decision of the applicant. For this reason, no additional species will be addressed in this HCP.

II. PLAN AREA PROFILE

The subject property, Tract 90210, is located in one of the fastest growing areas of Jefferson County, mainly due to the proximity of this area to the Washington-Metro areas. Residential development in this part of the County is rapid and is encouraged by many local agencies.

A. LOCATION

The City of Charles Town is located in Jefferson County. Mature hardwood forest, agricultural lands, brush land and open fields cover the rolling hills which range in elevation from 350 to 700 feet.

West Highland Estates is an approved residential subdivision located in the western part of the City, immediately east of Route-15, south of and adjacent to the Shaughnessy River and Old Mine Road (see Figure 2).

B. SETTING

1. Urban Context and Surrounding Land Uses

The proposed project for which a Section 10(a)(1)(B) take authorization is requested is the development of 110 single family detached home lots in an approved residential subdivision, West Highland Estates. The anticipated “take” of the Potomac Highlands Hedgehog would be incidental to the otherwise lawful construction of an approved land development project. Tract 90210 is illustrated in Figure 4.

Neighboring land uses are illustrated in Figure 2 and are summarized below:

- a. Mallard Homes Tract. The complex of streets south of this property is a series of 223 lots, originally approved at the same time as Tract 90210. However, the developer of this subdivision immediately began construction after approval with the utilities and roads associated with the project. The developer subsequently went bankrupt before the homes could be completed. This complex of lots also supports the hedgehog and an HCP is presently in progress for this subdivision. The details of that HCP and the associated “take” were not available to the author of this document.
- b. Immediately to the north of Tract 90210 is Old Mine Road and south is the Shaughnessy River. The Old Mine Road was the main line during the 1800's used to

access the Valley Coal Mine 5 miles to the north of this property. The mine was shut down in 1910. Old Mine Road is today a two-lane prime arterial. The adjacent Shaughnessy River is occupied by a well developed Riparian Forest. It is possible that the riparian of the river is utilized by the hedgehog as a dispersal corridor.

- c. Properties to the northeast, east and southeast are (with one exception) privately held properties. Most of these properties are occupied by a open hardwood forest habitat and are known (or suspected to be) habitat occupied by the hedgehog.

Further to the north of the subject Tract is the residential community of Washington Hills and to the northeast is Harpers Ferry. To the east of the Tract is a large, approved, but as yet undeveloped (although portions of the site have been graded) residential community known as East Fields.

2. Existing and Anticipated Reserves in the Vicinity

The County of Jefferson and a number of the incorporated cities within the county are presently in the process of considering formation of an “MSHCP” (Multiple Species and Habitats Conservation Program) planning effort along with an associated regional HCP. This proposed MSHCP effort and other major biological conservation efforts operable within the County may be described as follows:

1. **Multiple Species and Habitats Conservation Program (MSHCP).** In 2001, in anticipation of the listing of the hedgehog under the ESA, Jefferson County began moving forward with a regional planning effort that is goal orientated towards a target list of species and habitats. The intent is to establish, for those species and habitats, a series of core preserves and associated linkages or corridors that are of sufficient size as to preserve in perpetuity the target species.
2. **Green Hills Conservation Bank.** The Green Hills Conservancy is in the final stages of the establishment of a 773-acre Conservation Bank on a portion of the lands within their ownership, located west of the project site. This conservation bank includes 698-acres of open hardwood forest (of all types) that is occupied by 22 mated pairs of hedgehogs. The credits in this proposed bank would be available for purchase as mitigation for other development sites.

These existing biological reserves and other mitigation lands and conserved sites need to be interconnected with a series of movement corridors to assure gene flow and the potential for re-establishment of populations after catastrophic losses. Individually, none of these preserves are of sufficient size as to insure the continuity of all of the contained sensitive/target species in the long-term (defined as a century or more). However, if connected with movement corridors or linkages it is possible that the larger system formed will be of sufficient size as to be able to sustain most species well into the next millennium.

One of the key corridors envisioned for the Jefferson County is one that connects east of Charles Town west to the hills along the Shaughnessy river. This “corridor” is coincident with the primary distribution of the hedgehog in the county.

C. BIOLOGICAL RESOURCES

The following discussion is based on a series of survey efforts conducted on the subject tract, 90210, and on the adjacent properties. These field efforts were conducted by West Virginia Consultants and may be summarized as follows:

- An initial general survey was conducted in October of 2000. This effort involved several field dates and the information obtained is utilized in the following discussions of vegetation, general wildlife, and sensitive species.
- On eleven evenings in the period May 5 through May 16, 2001, a federal protocol presence-absence survey for the Potomac Highlands Hedgehog was conducted within Tract 90210. This field effort also included the north bank of the Shaughnessy River along the length of the Tract, from east to southwest. All hedgehog sightings made during both this and the preceding field effort are individually plotted in Figure 1.
- In March of 2002, a comprehensive, quantitative assessment of the vegetation on the Tract was completed.

1. Vegetation of the Plan Area

Tract 90210. The 200-acres that are the primary subject of this HCP were originally put into agriculture in the early 1800's. Since that time approximately 50-acres has regrown into open hardwood forest. [black cherry (*Prunus serotina*), white oak (*Quercus alba*), and tulip tree (*Liriodendron tulipifera*). The agricultural activities have not maintained hedgerows along the border of the property.

The Shaughnessy River. the adjacent riparian forest of the Shaughnessy River are generally ruderal in nature. {black willow (*Salix nigra*), and swamp white oak (*Quercus bicolor*)}

2. Sensitive Plant Species

The West Virginia Native Plant Society (WVNPS) maintains an active program of evaluating and listing the endangered, threatened, rare or sensitive plant species found within the State. The WVNPS database of sensitive plant species is geographically based and is subject to approximately biannual updates. The latest version of the WVNPS Electronic Inventory (WVNPS, 1999) was queried to identify all of those sensitive plant species known to occur with



a ten-mile radius of West Highland Estates. Five plant species were identified and are listed on Table 1. However, based on the habitat characteristics on site only the swamp pink has the potential to occur.

3. Sensitive Animal Species

Of the 16 species listed in Table 1, only one might possibly be found within the bounds of the property and none are anticipated within the bounds of the agricultural portions of Tract 90210. All of the species, except the eastern wood toad, appearing on the table have habitat requirements inconsistent with the habitats within the bounds of the HCP Area Boundary.

4. Target Species Accounts

a. General

Wildlife utilization of the subject and adjacent properties within the HCP area boundary is typical of that of ongoing agricultural operations in semi-urban settings. The large mammalian fauna is depauperate and smaller mammals abound. The reptilian fauna is either cryptic or depauperate while the avifauna is the most obvious element.

As would be expected, there is generally a tight correlation between the amount of cover present and the biodiversity of the wildlife. On the adjacent parcel containing the Shaughnessy River, where open hardwood forest diversity is relatively high and where the partially closed canopy affords both vertical and horizontal cover, we find a number of wildlife species at least equal to that of any adjacent habitat. The least diversity of wildlife was observed on the agricultural portion within Tract 90210.



Sign of larger mammals included track and scat assignable to the Bobcat (*Lynx rufous*). This species is a common predator where there are large blocks of remaining habitat in the County. Scat and track characteristic of the Grey Fox (*Urocyon cinereoargenteus*) was also found along the access road adjacent to the Shaughnessy River.



Both Grey Squirrels (*Sciurus carolinensis*) and cottontail rabbit (*Sylvilagus floridanus*) were flushed within the heavier vegetation throughout the HCP Area Boundary. Both species were most common with the Shaughnessy River parcel. Surprisingly, almost no Eastern woodrats (*Neotoma floridana*) were observed within the HCP Area but other forms of rodents were abundant. Raccoons (*Procyon lotor*) are widely distributed through the area.

As part of a parallel study for Tract 90210, a protocol presence/absence survey for the Potomac Highlands Hedgehog was conducted over portions of the 200-acre property and along the reach

of the Shaughnessy River adjacent to the proposed subdivision. The report of that survey (WV Consultants, 1999) has been previously submitted to the Fish and Wildlife Service.

Both population size and the diversity of the fauna is correlated with the vertical and horizontal heterogeneity of the vegetation. The overall diversity of small mammalian species on the lots themselves is far less than the diversity found either within the Shaughnessy River parcel or within the riparian forest along the Shaughnessy River. As a consequence, not only is the overall faunal composition simpler on the 110-lots proposed for development, the Hedgehog only utilizes the lots for foraging during dispersal.

b. Potomac Highlands Hedgehog

Biology

Physical Characteristics - The hedgehog is a squat, rounded creature with five-toed, well padded feet. The second, third and fourth toes are the same length with strong claws, while the first and fifth toes are smaller with smaller claws. The hind feet are slightly longer but the same width as the forefeet. The hedgehog has a mobile pointy snout, round eyes, and short, rounded ears that are almost hidden in the fur. Body length ranges from 135-265 cm, with males being slightly larger than females. The total mass of the hedgehog can range from 800 to 1200 g. The dental formula is: 3/2, 1/1, 2/3, 3/3. The hedgehog's upper incisors are spaced widely apart so that the lower incisors fit between them.

In the adult, the dorsal and lateral surfaces, excluding the facial area and legs, are densely covered with very coarse hair which has not completely modified itself into spines. The young are naked at birth, but quickly grow a thick soft fur. At maturity, the fur begins to change into a rough hair, but for reasons unknown, hard spines are never created. At the base of each hair is a small ball or bulb that sits below the skin surface to root it firmly. Each hair follicle is attached to an arrector pili muscle so that it can be raised and lowered, and is highly innervated. The panniculus carnosus muscle is a sheet of muscle covering the back, surrounded by the orbicularis which, when constricted, acts like a drawstring in pulling the animal's body into the curve of the panniculus carnosus. This curling brings the hairs together across the opening of the "pouch" and stretches the arrector muscles of the hairs so that the more tightly the hedgehog curls, the fluffier it becomes. This is the same action found in the European varieties that they exhibit to curl into a spiny ball for a defensive posture. The normal hair on the hedgehog's face, legs and ventral body surface is coarse and yellow-white to dark brown.

Biology – Hedgehogs can live for up to 10 years, but this is exceptional; over half die before their first birthday and average life expectancy is about 2-3 years. Although recent information suggests that a pair will remain monogamous for life, the male hedgehog is solitary and the female mostly so, except during breeding season. Hedgehogs can carry several diseases, but none are dangerous to humans. They also carry fleas, ticks and mites. Hedgehogs swim well but prefer to avoid open water whenever possible. Although hedgehogs can swim, they have been known to easily drown due to the inability to escape from smooth-sided stream banks or farm ponds.

Hedgehogs travel about 1-2 km each night, males more than females, but stay within about a 30-acre home range territory. The males return to the same daytime burrow for a few days then use another, perhaps returning to an old burrow at a later date. The male's winter burrow is made of leaves, tucked under a bush or log pile or anywhere that offers support and protection. Female hedgehogs build burrows in hedgerows or in the forest edge, while the males burrow in brush piles, under rocks or in other crevices. Females tend to use the same burrow for spring and summer, creating a new burrow for hibernation. Hibernation in their winter burrows lasts from November to April, and juveniles of both sexes hibernate with their mothers. In the spring they commonly spend a few days active then enter hibernation again during a cold snap.

Hedgehogs are able to squeeze under and through tight spaces. This is partly due to the loose nature of the hedgehog's skin--a feature which also allows it to curl up into a tight little ball when threatened by predators. Such predators include man and dogs, foxes, polecats, badgers and tawny owls. Because the hedgehog does not dash away from larger animals like some of its smaller relatives, *E. europaeus* is thought to be slow and ponderous, however when it wishes, the hedgehog can run quite quickly.

Habitat - The Potomac Highlands Hedgehog requires multiple habitat types where plenty of food is available. The preferred habitat is large, open hardwood forests. Intensively farmed arable land is a poor habitat, as is conifer forests, but un-mowed pastures and old-fields are utilized. Forest edges and shrubby hedgerows are used for movement while searching for food during the night. Young dispersing males often take up residence in shrubby hedgerows or along riparian corridors while looking for new territory. In winter, males use oak hardwood forest, utilizing mast and rooting for grubs and insects in the bark of old, soft logs.

Food Habits - The hedgehog has been known to eat a wide range of invertebrates but prefers earthworms, slugs and snails. Its favorite arthropods seem to be millipedes and ground beetles. The hedgehog will also eat frogs, small reptiles, young birds and mice, carrion, small bird eggs, acorns, and berries. Young hedgehogs are weaned on insects in the spring, which make up over 90 percent of their diet. The high protein content allows them to grow quickly, and they soon learn to forage for themselves, although they continue to forage with their mother. In the winter, while the female is hibernating, the male hedgehog's diet focuses on beetle larvae found underneath the bark of dead hardwood trees. Mast (primarily acorns) is also frequently eaten.

Reproduction – Mating occurs within large forested areas during early spring. Several male hedgehogs will gather in an open area of the forest and some sort of pecking order within the group will fall into place. They make a variety of snuffling and snorting vocalizations and also clack their teeth. Although some sort of behavior, akin to fighting, does occur, rarely is there any injury to the hedgehogs involved. This group behavior by the males appears to be intended to attract the females for mating. It is unknown if some sort of scent is released, but the effect does seem to draw females to the area for investigation and mating. Once the female of the pair is located, the male will point his nose to the ground and tail into the air, make a high pitch squeal and rapidly turn half-circles back and forth. This is a highly sensitive time during the season for

hedgehogs that are generally solitary, and mating adults are easily disturbed by bright lights and loud noises.

Site Specific Studies.

Two overlapping studies were conducted to determine the distribution of the Potomac Highlands Hedgehog within and around Tract 90210. The first study was focused on the subject property and the second on the entire reach of the Shaughnessy River to the east and south of the Tract (see Figure 1). All sightings of the Hedgehog were recorded with Garmin 12 XL GPS receiver. This GPS receiver affords a ninety percent confidence within a circle of radius 60-feet. Individual locations of the observed Hedgehogs have been plotted and are illustrated in Figure 1. As can be seen in an examination of that Figure, virtually all of the sightings were located in the hardwood forest at the southern part of the property adjacent to the Shaughnessy River.

1. A female with young was observed traveling at the edge of the Shaughnessy riparian forest, on open space lands held by the City of Charles Town, just south of the property. The hedgehog was observed on 22 October, possibly trying to locate a burrow for hibernation.
2. On 5 May, a pair of hedgehogs, an adult male and female. The hedgehogs were observed by both authors near the southern property line in the boundary between the forest and the agriculture area.
3. On 6 May, 4 adults were seen moving to the west along the boundary of the property and the Shaughnessy Riparian Forest. The observer noted that these adults moved west outside the study area boundary that evening. It is assumed that these were dispersing juveniles.

c. Other Sensitive Species

Eastern wood toad. The habitat requirements of this species include open sandy banks along stream course. These requirements are not met on the adjacent reach of the Shaughnessy River. The River environment adjacent to the Tract is one of a closed canopy of older trees that completely shades the underlying stream flow. Lacking suitable habitats, this species will not be adversely affected by the anticipated buildout of the Tract.

Wood toads use upland habitats for shelter and foraging. They have been found up to one kilometer, and regularly several hundred meters, from water courses in upland areas. Overland movement, both to and from breeding areas and within upland habitats, is often closely tied to rainfall, particularly outside of the breeding season.

There are no records of wood toads in the portion of the Shaughnessy River which is adjacent to the project site. The proposed project is not expected to affect the wood toad.

Swamp Pink. The swamp pink has been listed as federally threatened, since Sept. 9, 1988. A new population has recently been located in West Virginia and recent discoveries within Big Bog County Park have created new interest.

Swamp pink is an obligate wetland species occurring along streams and seepage areas in freshwater swamps and other wetland habitats. It is found mainly in large wetland areas surrounded by buffers of intact forest which provide protection to the wetland site. The most important factor determining suitability of habitat is a constant water supply. There is a strong correlation between the presence of conifer tree species and the occurrence of *Helonias*.

Swamp pink is a smooth perennial herb with thick stocky rhizomes. Plants bloom as early as March and as late as May, while seed production occurs in June. Both self and cross fertilization occurs but few plants with a population produce flowers. The species exhibits extremely low seedling establishment which appears to be a significant limitation on colonization of new sites.

Site specific studies: Because of the adjacency of the Shaughnessy River to the development site, a focused survey was conducted in May of 2002. No *Helonias* was found on site, which may be due to the lack of conifers in this area.

The proposed project is not expected to affect Swamp Pink.

III. CONSIDERATION OF POTENTIAL IMPACTS AND ALTERNATIVES

Build out of the 110 single-family lots within West Highland Estates will result in a potential incidental take of seven Potomac Highlands Hedgehogs. The incidental “take” will most likely be the result of removing habitat for the construction of the homes. There will be no take (direct or indirect) of any other listed or candidate species. The anticipated take of seven hedgehogs is a summation of the loss of 50.2-acres of “occupied habitat” is an assumption based on the open nature of the hardwood forest and amount of edge on the 50.2-acres in question.

Perhaps most significant is the **regional context** of Tract 90210 relative to the distribution of the Potomac Highlands Hedgehog in Jefferson County. The bulk of the population of the species is constrained (for reasons of habitat and elevation) to the west foothills. One of the challenges facing regional planners is the maintenance of a dispersal corridor (linkage) through this area, thereby allowing genetic connectivity between the hedgehog populations in the east and western portion of the County.

West Highland Estates lies roughly in the middle of the corridor. The adjacent Shaughnessy River is of regional significance in that it will ultimately (with other adjacent lands) serve as one of the hedgehog dispersal corridors (linkage) through the middle of the county.

A. POTENTIAL IMPACTS TO SPECIES

1. Basis for Impact Calculations

The impact calculations are based on the following studies conducted on and adjacent to Tract 90210:

- The protocol presence/absence study conducted over the 110 lots in the fall and winter of 2001. This study resulted in sightings of at least 7 adult hedgehogs within the 110-lots that are the subject of this HCP.
- Concurrent with the above two field efforts, surveys were also conducted along the adjacent reach of the Shaughnessy River. This allowed an assessment of the use of the riparian by the hedgehog and other species. The study resulted in sightings of more than 5 juveniles.

2. Species Impacts — Direct, Indirect and Cumulative

Implementation of Tract 90210 will result in direct effects on the hedgehog population on the property, it will affect the potential use of the Shaughnessy River as a corridor, and it will result in the loss of 50.2-acres of Hedgehog habitat. For the purposes of this HCP, the anticipated “incidental take” has, therefore, been defined as the loss of seven hedgehogs and the loss of 50.2-acres of sub optimum habitat. The anticipated direct, indirect, and cumulative effects that were assessed in defining this “incidental take” are discussed at length in the following three sections.

a. Direct Impacts on the hedgehog — Build-out of the 110 lots covered by this HCP will have the direct effect of removal of occupied breeding habitat for at 7 individuals of the Potomac Highlands Hedgehog. This loss is considered minor due to the fragmented nature of the habitat on site. This particular hardwood forest area is not large enough to sustain a viable breeding population in the long-term, given than only populations of 10 breeding pairs have persisted longer than 10 years. While 7 hedgehogs were seen using this area during the breeding season, they appeared to be young of the year. Based on research in other areas, these seven hedgehogs will most likely move to a more viable site to the west for breeding.

Loss of this vegetation may, however, be considered a long-term direct effect. By conversion of the site to residential we preclude the establishment of a mature open forest on the property through long-term successional processes. Residential development is a permanent conversion of the site.

b. Indirect Impacts on the hedgehog — Edge Effects. Implementation (build out) of the 110-lots within West Highland Estates will have an indirect effect on the hedgehog. There will be an indirect effect of placing homes (with the attendant children, pets, noise, lights, barbecues, and the like) within a hundred feet or less of the adjacent Shaughnessy River. The indirect effects are listed below.

1. Introduction of alien (or subsidized) predators (e.g. domestic dogs).
2. Increased levels of nighttime illumination.
3. Increased sound and vibration levels.
4. Trespass (pedestrian, equestrian and off-road vehicle) and associated habitat alteration.
5. Garbage disposal and pollution drift (e.g. pesticides, etc.).
6. Disease transmission from domestic or commensal animals to wildlife.
7. Shooting (effects on community dynamics: e.g., mortality of natural predators, such as bobcats)."

For the purposes of this HCP it is assumed that the degree of significant effect will extend from the backs of the adjacent lots up to a distance of approximately 200-feet into the adjacent Shaughnessy River. This conclusion is based on the adaptiveness of the species, hedgehogs have been found in a variety of situations within 200-feet of a source of significant indirect disturbance.

c. Cumulative Impacts on the Hedgehog — Corridor Effects. Tract 90210 lies roughly in the middle of the Jefferson County of two concentrations of the Potomac Highlands Hedgehog. The principal population of the species in the County occupies an arc of hills extending to the west.

Tract 90210 lies essentially astride a minor corridor connecting the two main populations. The corridor associated with the location of Tract 90210 is the Shaughnessy River itself. This movement corridor is, of course, restricted at Charles Town (by the developments within that City) but there is some possibility for movement between the west and the Charles Town habitats, and perhaps further upstream to populations along the Potomac River.

B. ALTERNATIVES CONSIDERED

As is required by Federal regulations for the preparation of HCP's, the plan is required to consider those alternatives that do not result in a "take" and to explain why those alternatives are rejected by the applicant. "The challenge of balancing biology with economics is a complex one, but is fundamental to the HCP process" (HCP Handbook, page ii). The HCP Handbook (at page 3-36) specifically allows for the inclusion of economic data as a basis for the rejection of specific alternatives.

1. No Project Alternative

Under this alternative, development would not occur but the agricultural operations would continue, keeping with the same footprint of agricultural operations. With no construction there would be no introduction of new residents with their attendant noise, light, traffic, pets and children. As such, there would be no new introduced indirect effects on the resident Hedgehog population. With no construction, there would be no loss of 50.2-acres of “defined” habitat within the subdivision. The defined incidental take of seven hedgehogs and 50.2-acres of habitat would not occur. In addition, the hedgehog would not get the added benefit of the hedgerows to allow for dispersal to occur to adjacent sites.

Theoretically, the developer could move forward with building homes on the current agricultural operations without direct take of the hedgehog. However, this alternative was rejected by the applicant on economic grounds. The present financial investment in these 110-lots is intimately tied to the costs associated with the initial purchase. Financial success over the subdivision is tied to the development of all of the lots, not a portion thereof. For example, if the applicant proceeded with construction on 60-lots in the northern part of the subdivision, with the remaining 50-lots unbuilt then the developer would be forced to amortize the entire land cost over 55 percent of the lots in the subdivision. Clearly, increasing the land cost for the 60-lots would raise the cost of those individual homes far above what the market would bear in the City of Charles Town.

2. Reduced Project Alternative

This alternative would entail the dedication of the lots along the south side of the property adjacent to the Shaughnessy Rivers. No construction on these periphery lots would be permitted and they would become a buffer between the subdivision and the river. This alternative would have the effect of reducing (or perhaps just altering) the indirect or edge effect of the subdivision on the Hedgehog population within the bounds of the Shaughnessy River property. To the extent that the anticipated effects were reduced then the level of incidental take would be reduced. Ostensibly, the retention of these lots would also reduce the amount of defined habitat take by at least half of the anticipated 50.2-acres.

However, this scenario also becomes infeasible when considering the pragmatic and fiscal ramifications. At a purely pragmatic level, these lots by themselves would not form as good a buffer as they would only provide access to the Shaughnessy River. The lots, by themselves, are transparent to dogs, children, light, sound, and the visual perception of movement. Buildout of all 110-lots within the subdivision allows the land costs to be spread over 100 percent of the lots (as originally intended) and allows the developer to amortize the costs associated within minimization over all of the lots.

The applicant was willing to consider a set back on the property of 200-ft, to minimize effects. The developer will also minimize loss of trees, to the maximum extent practicable in this 200 feet set back. This effectively made the lots smaller on this side of the project but is bounded by

woods, which is a desirable position for homes in the County. This desirability offsets the small lot size and allows the developer to sell the homes at the same price. A 300-ft set back was not feasible due to the maintenance of the street width to conform to safety regulations for fire department access.

IV. HABITAT CONSERVATION AND IMPACT MITIGATION MEASURES

The developer of Tract 90210 proposes a series of minimization measures coupled with both on- and off-site mitigation to negate the “defined” incidental take of seven Potomac Highlands Hedgehogs along with 50.2-acres of habitat, and to benefit the species.

A. BIOLOGICAL GOALS AND OBJECTIVES

1. General Guiding Principles of the HCP

In developing the minimization and mitigation program for this HCP the following specific principals were established:

- a. Mitigation must result in the preservation of at seven hedgehogs, as replacement for the defined loss of seven hedgehogs founds on site.
- b. Mitigation must include the preservation of at least 151-acres of Hedgehog habitat, as a greater than 3:1 replacement of the defined loss of 50.2-acres of habitat.
- c. Minimization and mitigation measures must be specifically oriented to the benefit of the long-term survival of the Potomac Highlands Hedgehog.
- d. Indirect effects at the Shaughnessy boundary must be minimized to the greatest extent possible.
- e. Off-site mitigation must contribute positively to the conservation of the hedgehog.
- f. Off-site mitigation lands must be associated with long-term preservation mechanisms. Ideally any such mitigation properties would be managed in perpetuity by an appropriate 501(c)(3) conservation organization approved by the Service. Appropriate long-term funding must accompany any conserved lands.
- g. Off-site mitigation lands shall be managed to the maximum benefit of the Potomac Highlands Hedgehog.

2. Specific Measurable Targets

Through a series of discussion between the developer of Tract 90210 and the Service, a series of specific, quantified target measures were established. These three targets are:

- a. Applicant will provide hedgerows along at least two sides of the on-going agricultural operations.
- b. Acquisition of habitat (see “c” following) that supports at seven hedgehogs.
- c. Purchase of 151 acres of open hardwood forest habitat.

B. HABITAT PRESERVATION AND CREATION

1. Offsite Mitigation Land

The Hedgehog Environmental Trust (HET) has conducted an exhaustive search for mitigation properties within the Jefferson County area proximate to the subject Tract. This effort has resulted in the identification of a 1,000-acre property in the West Hills (see Figure 3). This property is occupied primarily by a mature, diverse, open hardwood forest and supports at least 25 pairs of the Potomac Highlands Hedgehog. As mitigation for the 50.2-acres habitat that lies within the bounds of the Tract, the developer will purchase 151 credits of the occupied habitat within the West Hills Mitigation Bank (a replacement ratio of greater than 3:1).

The West Hills Mitigation Bank will be managed in perpetuity by HET, for the Hedgehog. In addition to the land cost, the developer is required to pay a per acre endowment of \$2,500. This endowment is used for the long-term monitoring and maintenance of the property and to establish a Wobbly Hedgehog Syndrome emergency fund within the Trust. The latter fund is collected on all properties acquired by HET within the Jefferson County area and is retained as a vehicle to finance capture and treatment necessitated by an outbreak of the disease on a given property.

The West Hills Mitigation Bank has a number of specific benefits, including:

- a. The bulk of the site (approximately 950-acres) is occupied by a mature, diverse, open hardwood forest.
- b. The site is presently occupied by at least 25 pairs of the Potomac Highlands Hedgehog.
- c. The site is within the western portion of the County, ultimately providing protection for the long-term survival of the species.
- d. The site will have conservation and management in perpetuity.

C. ON-SITE MINIMIZATION MEASURES

As discussed in the preceding section the primary impact of the buildout of 110 units within Tract 90210 will be a series of indirect effects onto the adjacent Shaughnessy River and concomitantly the adjacent occupied habitat. To the extent that these vectors can be reduced in their severity so will the incidental take be reduced in its severity.

The following factors would minimize the potential for incidental take of the Potomac Highlands Hedgehog on the adjacent Shaughnessy River; the following conditions shall be made a part of the governing rules of the homeowners association:

1. To allow dispersal to occur during the ongoing agricultural phase, the applicant is proposing to plant and maintain old growth hedgerows.
2. The ownership of pet dogs in lots 66 through 108 shall be prohibited by Deed Restriction unless such pets are maintained entirely within the home. Free roaming dogs will not be permitted.
3. Backyard lighting of lots 66 through 108 will be prohibited by Deed Restriction to the extent that such lighting spills beyond the rear property line. This will require shielding of any security lighting, shielding extending at a minimum of 20 degrees below the centerline of the bulb, and perhaps further depending upon the height of the mounting of the fixture.
4. The applicant, as a result of public comment, has included a set back on the property of 200-ft, to minimize effects. The developer will also minimize loss of trees, to the maximum extent practicable in this 200 foot set back.

While, admittedly, these *can* be difficult to enforce, they are most certainly *enforceable*. Peer pressure from other residents can be a strong force for compliance — especially within an educated group of residents. In addition, any member of the Home Owner's Association can bring a civil action to require the Association to enforce its own regulations.

In addition to the above steps, additional minimization of take shall be afforded through an informational packet attached to the recorded deed to each of the homes built on lots covered by this HCP. This informational packet shall be part of the deed and shall, therefore, transfer from owner to owner. This informational packet shall specifically address the nature of the Shaughnessy River, it shall specifically address the biological resources and values of these open space areas, and it shall encourage and inform the resident as to the wise use of these resources. The content of the informational packet will be reviewed — prior to use — by the Fish and Wildlife Service.

D. MANAGEMENT AND MONITORING OF MITIGATION LAND

1. Offsite Mitigation

Monitoring and maintenance of the West Hills Mitigation Bank is to be accomplished by HET utilizing trust funds acquired with the sale of the “credits” contained within the bank. An endowment of \$2,500 per acre is to be acquired with each sale of credits. As discussed above, of this endowment amount, \$2,000 is also to be earmarked for annual maintenance and monitoring activities while \$500 is also to be placed into the WHS recovery fund to be earmarked for use only in Jefferson County.

a. Management Goals

The West Hills Mitigation Bank is to be managed with the following specific goals:

- The site is to be maintained primarily as a open hardwood forest.
- The site is to be managed primarily for the benefit of the Potomac Highlands Hedgehog.
- The site is to be maintained as a viable part of the western core area.
- HET will pursue the active participation of surrounding land owners, expanding the mitigation bank to form the largest possible habitat fragment.

b. Management Plans and Measures

A draft management plan for the West Hills property has been prepared by HET and is included in this document as Appendix B. This document will be revised and a final management plan prepared for approval by the Fish and Wildlife Service. The final plan shall contain:

- Specific vegetation species and cover goals, including a weed and invasive species management plan.
- A WHS recovery plan.
- An invasive predator management plan.
- Annual and five-year monitoring and reporting requirements.

E. CHANGED AND UNFORSEEN CIRCUMSTANCES

1. Changed Circumstances

As discussed in the Implementing Agreement (IA) for this Plan, two types of events will trigger an evaluation of whether “changed circumstances” as defined in federal and state regulations have occurred. The two types of events are:

- a. A pack of feral dogs taking up residence within the conservation bank,
- b. An outbreak of the WHS disease in more than 25% of the population

Since these two events are likely to occur in the future, although the timing is unknown, HET has established an insurance fund for these events. This insurance fund is made of a contribution from each of the banks located in the County. The likelihood that these events will occur on all properties at the same time is low; therefore the endowment established from all properties should be sufficient when one of the above circumstances occurs on one property.

If events “a” or “b” occur HET will consult with the FWS and shall implement remedial measures determined in cooperation with the agencies (see the IA for the range of measures that will be considered in response to each type of event).

2. Unforeseen Circumstances

As discussed in the IA, if FWS makes a finding that “unforeseen circumstances” have occurred and warrant implementation of additional measures by either HET or the developer of the remaining lots within the HCP boundary, the additional measures will be restricted to modification of the management of the mitigation lands. Provided that the Plan is in effect and is being properly implemented in accordance with the IA, FWS will not require either HET or the Developer to commit additional land, water, or financial compensation and will not impose additional restrictions on the use of land, water, or other natural resources beyond the level and/or amounts specified in the HCP and the IA.

F. PLAN IMPLEMENTATION AND FUNDING

As described in more detail in the Implementing Agreement (IA), the West Highland Estates Partnership or its successor will assure implementation of and adequate funding for the measures identified in this HCP.

1. Amendments to the HCP

Amendments to this HCP may be proposed by any participating party. The party proposing the amendment shall provide to all other parties to the agreement the reasons for the amendment and an analysis of the effect of the proposed amendment on the Covered Species and on the Take authorization.

Minor amendments are defined as boundary modifications that do not increase the acreage of the development area and which do not materially increase the adverse impacts of the project on the Covered Species. Additional minor amendments would be associated with adaptive management program of the conservation bank. Minor amendments do not require alteration of either the 10(a)(1)(B)-permit or the Implementing Agreement (IA), but do require documentation in the administrative record.

Other proposed amendments to the agreement, which do not meet the definition of a minor amendment, are Standard Amendments. Such amendments will require revision of the

10(a)(1)(B)-permit and of the Implementing Agreement. Standard Amendments will also require publication of the intent in the Federal Register.

2. Implementation Assurances

The West Highland Estates Limited Partnership or its successor will sign the IA, which is a binding contract specifying legal obligations and remedies. In addition, HCP implementation will be documented and monitored through the following measures:

- a. Prior to start of clearing in the Development Area, West Highland Estates shall purchase 151 credits of open hardwood forest habitat from the West Hills Conservation Bank and shall contribute to ongoing management of the Conservation Bank. Management shall be conducted by HET, as part of the management of the Conservation Bank. Prior to the start of clearing activities, the 1,000 acre Conservation Bank Parcel will be encumbered by a conservation easement and the Conservation Bank Agreement will be finalized. If the Conservation Bank Agreement is not finalized prior to the approval of the West Highlands Estates HCP for reasons beyond the control of the applicant, the applicant may purchase 151 credits in another Conservation Bank, as approved by the Service.
- b. Management of the West Hills conserved lands will conform to the standards and practices outlined in Appendix A of this HCP. Annual reports will be prepared and submitted to the FWS as specified.

3. Funding Assurances

The West Highland Estates Limited Partnership or its successor will bear the cost of implementing the HCP measures required during the buildout of the remaining 110-lots of Tract 90210. Specific funding assurances are contained in the IA.

Table 1

Sensitive Species of West Virginia--18 species

Common Name	Scientific Name	Status
Animals		
Bat, Indiana	<i>Myotis sodalis</i>	endangered
Bat, Virginia big-eared	<i>Plecotus townsendii virginianus</i>	endangered
Clubshell	<i>Pleurobema clava</i>	endangered
Eagle, bald	<i>Haliaeetus leucocephalus</i>	threatened
Eastern wood toad	<i>Bufo americanus</i>	sensitive
Falcon, American peregrine	<i>Falco peregrinus anatum</i>	delisted, monitoring
Fanshell	<i>Cyprogenia stegaria</i>	endangered
Pearlymussel, pink mucket	<i>Lampsilis abrupta</i>	endangered
Pearlymussel, tubercled-blossom	<i>Epioblasma torulosa torulosa</i>	endangered
Riffleshell, northern	<i>Epioblasma torulosa rangiana</i>	endangered
Salamander, Cheat Mountain	<i>Plethodon nettingi</i>	threatened
Snail, flat-spined three-toothed	<i>Triodopsis platysayoides</i>	threatened
Spinymussel, James River (=Virginia)	<i>Pleurobema collina</i>)	endangered
Squirrel, Virginia northern flying	<i>Glaucomys sabrinus fuscus</i>	endangered
Plants		
Harperella	<i>Ptilimnium nodosum</i> (=fluviatile)	endangered
Northeastern (=Barbed bristle) bulrush	<i>Scirpus ancistrochaetus</i>	endangered
Shale barren rock-cress	<i>Arabis serotina</i>	endangered
Swamp pink	<i>Helonias bullata</i>	threatened
Virginia spiraea	<i>Spiraea virginiana</i>	threatened