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REWHC

Wildlife Management Plan for the Portsmouth, Rhode Island, Raytheon Facility

Employees Managing the Wildlife Habitat At Their Workplace

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Wildlife Management Plan for the Portsmouth, Rhode Island Raytheon Facility

Employees Managing the Wildlife Habitat At Their Workplace

1. INTRODUCTION

Raytheon employees in Portsmouth, Rhode Island are making a difference in improving the wildlife environment around their workplace. As a member of the Wildlife Habitat Council (WHC), Raytheon encourages its employees to participate in "Wildlife at Work". This program brings employees together with local organizations to:

- Perform a wildlife inventory of our worksite,
- Develop a wildlife management plan which encourages diversity,
- Execute the management plan, documenting progress, and
- Verify progress through periodic surveillance.

The scope of this plan encompasses the first and last bullets above, describing the performance of continuing site wildlife inventory and the periodic surveillance of wildlife to verify progress.

2. SITE DESCRIPTION

The Raytheon Company campus in Portsmouth, Rhode Island houses the Integrated Defense Systems Headquarters of Raytheon. Raytheon broke ground in Portsmouth in 1959 on what was then farmland, to ultimately establish a 750,000 square foot facility over four major buildings. The property is approximately 175 Acres in size. The site contains manicured lawns and formal landscaping along West Main Road and has wooded corridors to the west of the buildings on site. The site is steeply sloped to the west behind the building and parking lots providing panoramic views of Narragansett Bay, Dyer, and Prudence Islands. Employees frequently walk between buildings in the course of the day and many take the opportunity to walk the roadways and trails during lunch for exercise. The property is bordered by Burma Road on the West, West Main Rd (Rt 114) on the East, Lawton Brook on the South, and a farmer who leases land from Raytheon borders the property to the North. The map in Figure 1 provides a good overview of the site.

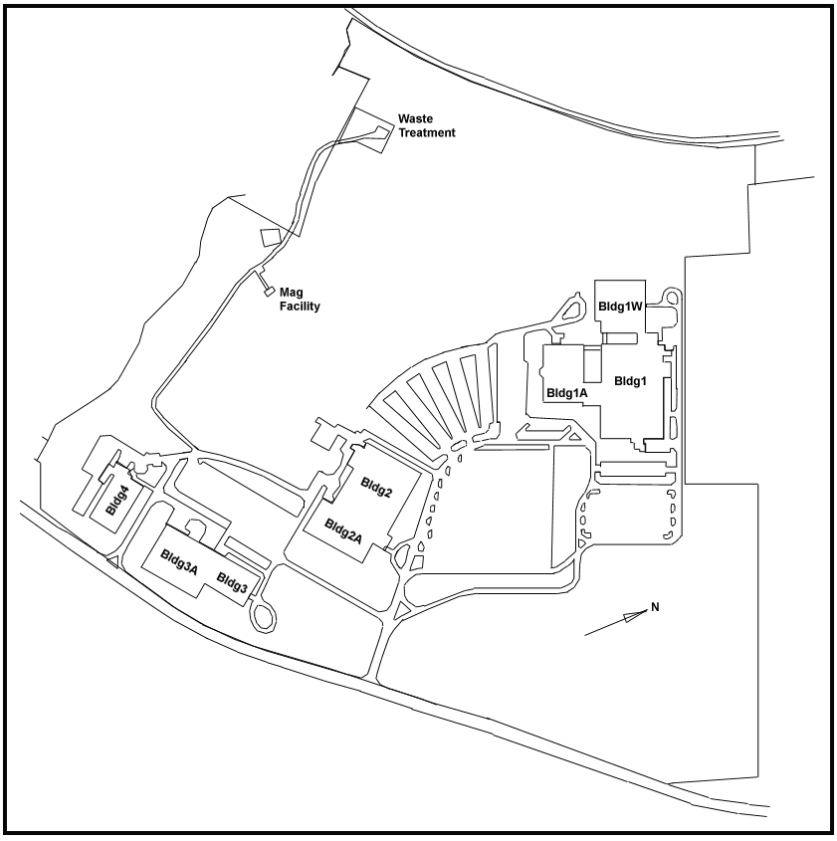


Figure 1 - Map of the Portsmouth Facility

2.1 Objectives

REWHC has three key objectives:

Biodiversity: Increase the abundance and diversity of wildlife species.
Awareness: Increase environmental awareness at work and in the community.
Protection. Protect our environment for future generations.

3. SITE INVENTORY AND PHOTO REFERENCES

One of the first steps in managing the property was to conduct a site inventory and establish photo references of the site. These are tools used to measure the progress of the program. An inventory of plants and animals found on the property is included on our website at http://rewhc.org. This list is the result of inventory walks performed through the Winter of 2002. Updates to the inventory list will be made during the course of the projects and scheduled inventory walks will be held seasonally to document wildlife using the property.

Photo references have been taken of the site and will be updated to document the results of the management projects.

3.1 Species for Inventory and Surveillance

The major species or topics to be surveyed include the following:

- Birds,
- Mammals.
- Plants,
- Insects,
- Reptiles & Amphibians,
- History & Geology.

3.2 Structured Data Collection

Wildlife at any given location on the site is influenced by the ecosystem prominent in that location. Different species in different concentrations would be expected in manicured grassy areas, meadows, valleys, or woodlands. For cause and effect determination, it is also useful to detect and report influences within regions localized to where management projects are performed. The Portsmouth site has therefore been subdivided into six zones for collection and reporting which are easily identifiable and provide the required ecosystem separation. Figure 2 depicts six zones defined for the Raytheon Portsmouth site.

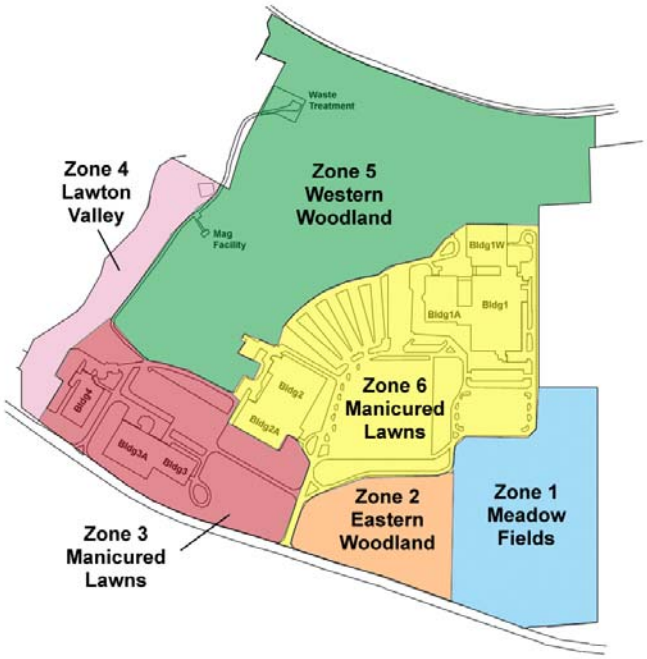


Figure2 – Portsmouth Site Subdivided Into Zones

Description of Zones:

1. **Meadow Fields**—This area is bounded by the woods on the south, West Main Road on the east, Chase farm on the North and part of the west, and the parking lot on the west.
2. **Eastern Woodland**—This area is bounded by Raytheon roadways on the south and west, by open fields on the north, and West Main Road on the east.
3. **Manicured Lawns**—This area is bounded by Lawton Valley on the south, West Main Road on the east and Raytheon Roadways on the north and west.
4. **Lawton Valley**—This area is bounded by Lawton Brook on the south, West Main Road on the east, the fence behind Building 4 on the north, and the end of the graveyard on the west.
5. **Western Woodland**—This area is bounded by a fence on the south, Raytheon roadways on the east, parking lots, and Raytheon roadways, and fencing on the north, and Burma Road on the west.
6. **Manicured Lawns**—This area is bounded by woods on the south and west, by a fence and meadow fields on the north and Raytheon roadways on the east.

3.2.1 Checklists

Raytheon has over 1600 employees at the Portsmouth facility, many of who enjoy getting closer to nature during lunch and with their families on weekends. Along with a core of dedicated volunteers, the larger employee and family base, properly instructed and motivated, is the engine for providing the necessary surveillance and inventory activities.

To standardize the data collection process and provide guidance to employees and families, a series of checklists is provided, coordinated with associated on-line website databases. Each checklist has an associated chairperson to act as a database administrator and education point contact. Employees can either download checklists from the REWHC website in PDF format or pick up a copy in the facility's main lobbies. Figures 3.2.1-1 and 3.2.1-2 depict the tri-fold checklists which are available in the facility's main lobbies or by download from the REWHC website. These checklists will eventually be placed in trail kiosks as well.

Figure 3.2.1-1 Tri-Fold Checklists

Figure 3.2.1-2 Checklist Lobby Display Concept

3.3 Inventory Reporting

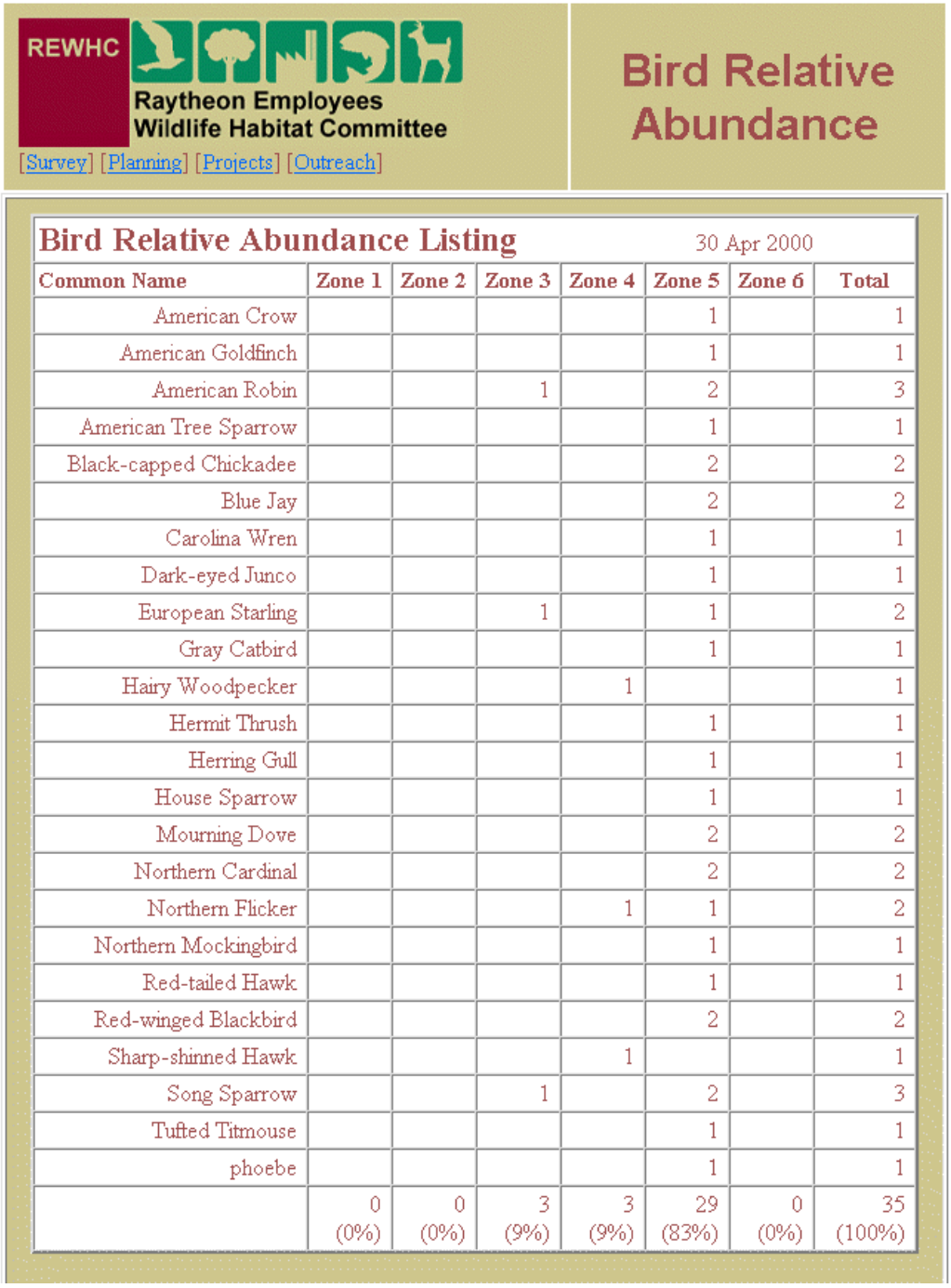
A series of reports are available on the REWHC website which allow either the cumulative abundance and diversity since inventory inception or a date- filtered abundance and diversity of a species to be viewed and printed. Date-filtering allows records in a particular time period to be selected for analysis, allowing time-based progress to be viewed. Standard biodiversity measures are computed per zone for advanced analysis.

A superset of reports will serve both inventory and surveillance needs. These reports are:

1) Species Relative Diversity Report – For an associated checklist species, provide the number of subspecies overall, by zone, and relative subspecies found over a given reporting period by zone without regard to quantities.

2) Species Relative Abundance Report – For an associated checklist species, provide the number of individuals per subspecies overall, by zone, and relative subspecies found over a given reporting period by zone.

Figure 3.3-1 Report Selection Form

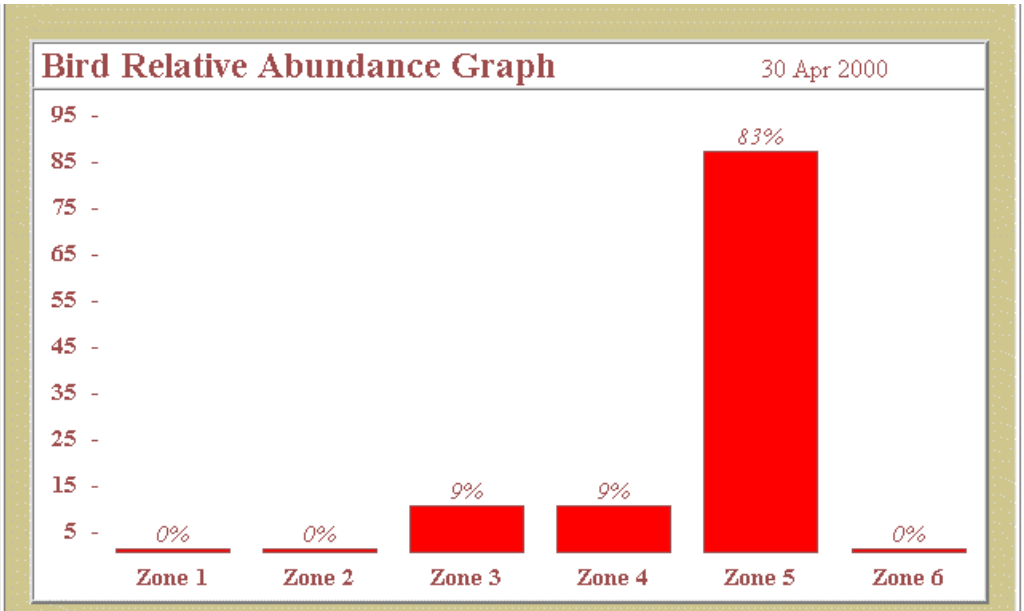


Bird Relative Abundance Listing

30 Apr 2000

Common Name	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Total
American Crow					1		1
American Goldfinch					1		1
American Robin			1		2		3
American Tree Sparrow					1		1
Black-capped Chickadee					2		2
Blue Jay					2		2
Carolina Wren					1		1
Dark-eyed Junco					1		1
European Starling			1		1		2
Gray Catbird					1		1
Hairy Woodpecker				1			1
Hermit Thrush					1		1
Herring Gull					1		1
House Sparrow					1		1
Mourning Dove					2		2
Northern Cardinal					2		2
Northern Flicker				1	1		2
Northern Mockingbird					1		1
Red-tailed Hawk					1		1
Red-winged Blackbird					2		2
Sharp-shinned Hawk				1			1
Song Sparrow			1		2		3
Tufted Titmouse					1		1
phoebe					1		1
	0 (0%)	0 (0%)	3 (9%)	3 (9%)	29 (83%)	0 (0%)	35 (100%)

Figure 3.3-2a Bird Relative Abundance Report Example (Part 1 of 3)



Bird Biodiversity Measures

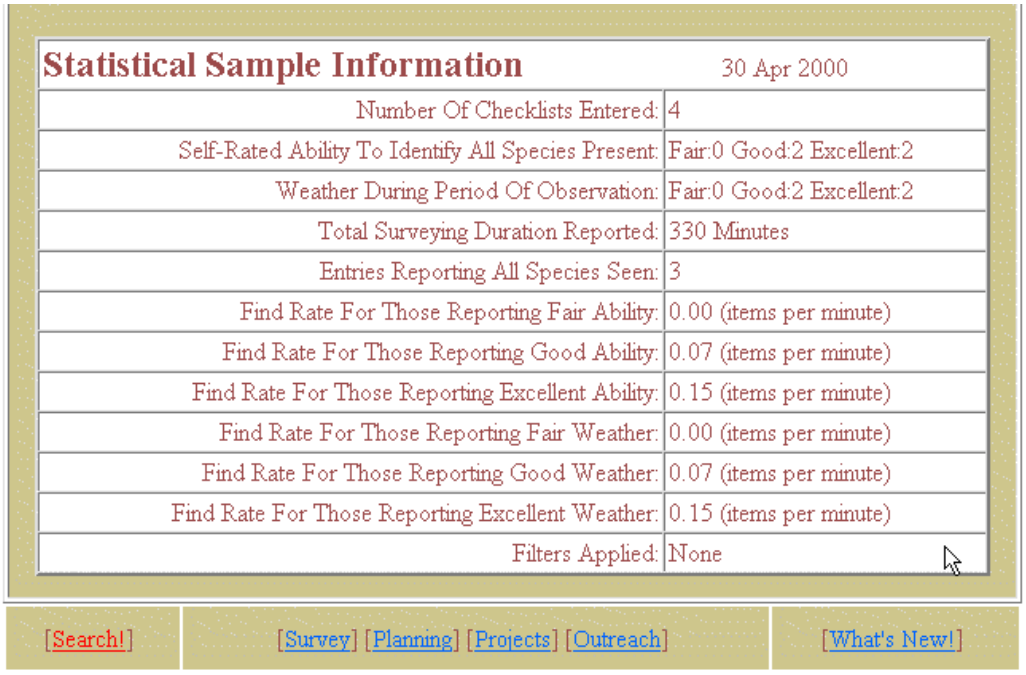
30 Apr 2000

Measure	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Species Richness (S)	0	0	3	3	22	0
Simpson's Index (D)	0.0000	0.0000	0.3333	0.3333	0.0511	0.0000
Simpson's Index of Diversity (1-D)	1.0000	1.0000	0.6667	0.6667	0.9489	1.0000
Simpson's Reciprocal Index (1/D)	0.00	0.00	3.00	3.00	19.57	0.00
Shannon-Wiener Index (H)	0.0000	0.0000	1.0986	1.0986	3.0327	0.0000
Evenness (E)	0.0000	0.0000	1.0000	1.0000	0.9811	0.0000

Note: For zones where (S) is less than 2, calculations which provide divide by zero or logarithm errors are represented as zero above.

Biodiversity Measure Definitions.

Figure 3.3-2b Bird Relative Abundance Report Example (Part 2 of 3)



Statistical Sample Information	30 Apr 2000
Number Of Checklists Entered:	4
Self-Rated Ability To Identify All Species Present:	Fair:0 Good:2 Excellent:2
Weather During Period Of Observation:	Fair:0 Good:2 Excellent:2
Total Surveying Duration Reported:	330 Minutes
Entries Reporting All Species Seen:	3
Find Rate For Those Reporting Fair Ability:	0.00 (items per minute)
Find Rate For Those Reporting Good Ability:	0.07 (items per minute)
Find Rate For Those Reporting Excellent Ability:	0.15 (items per minute)
Find Rate For Those Reporting Fair Weather:	0.00 (items per minute)
Find Rate For Those Reporting Good Weather:	0.07 (items per minute)
Find Rate For Those Reporting Excellent Weather:	0.15 (items per minute)
Filters Applied:	None

Figure 3.3-2c Bird Relative Abundance Report Example (Part 3 of 3)

Bird Relative Abundance

Common Name	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Total
American Crow					1		1
American Goldfinch					1		1
American Robin			1		2		3
American Tree Sparrow					1		1
Black-capped Chickadee					2		2
Blue Jay					2		2
Carolina Wren					1		1
Dark-eyed Junco					1		1
European Starling			1		1		2
Gray Catbird					1		1
Hairy Woodpecker				1			1
Hermit Thrush					1		1
Herring Gull					1		1
House Sparrow					1		1
Mourning Dove					2		2
Northern Cardinal					2		2
Northern Flicker				1	1		2
Northern Mockingbird					1		1
Red-tailed Hawk					1		1
Red-winged Blackbird					2		2
Sharp-shinned Hawk				1			1
Song Sparrow			1		2		3
Tufted Titmouse					1		1
phoebe					1		1
TOTALS	0	0	3	3	29	0	35
PERCENTAGES	0	0	9	9	83	0	100

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Figure 3.3-2a Relative Abundance Printable Report Example (Page 1 of 2)

Bird Relative Abundance

Biodiversity Measure	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Species Richness (S)	0	0	3	3	22	0
Simpson's Index (D)	0.0000	0.0000	0.3333	0.3333	0.0511	0.0000
Simpson's Index of Diversity (1-D)	1.0000	1.0000	0.6667	0.6667	0.9489	1.0000
Simpson's Reciprocal Index (1/D)	0.00	0.00	3.00	3.00	19.57	0.00
Shannon-Wiener Index (H)	0.0000	0.0000	1.0986	1.0986	3.0327	0.0000
Evenness (E)	0.0000	0.0000	1.0000	1.0000	0.9811	0.0000

Note: For zones where (S) is less than 2, calculations which provide divide by zero or logarithm errors are represented as zero above.

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Figure 3.3-2b Relative Abundance Printable Report Example (Page 2 of 2)

4. HABITAT ASSESSMENT TO DETERMINE THE PROGRAM'S GOALS

The habitats under REWHC management have an interesting history and support a large number of native and invasive species ranging from insects to deer. Nesting cavities are in short supply due to the relatively new forest growth. Invasive species such as bittersweet, and multiflora rose, have constricted a large proportion of the habitat for wildlife access. Manicured lawns provide an irresistible stopping place for hordes of Canadian Geese and their droppings. Right-of-ways through the woods are seldom used and generally unknown by the employee population.

5. GOALS, OBJECTIVES, AND PRESCRIPTIONS

The wildlife team will focus on three goals during the fourth year of this plan. To increase biodiversity and awareness on the REWHC Portsmouth campus, the following goals, objectives, and prescriptions will be implemented. Progress towards these goals will be documented on the internet at http://rewhc.org .

Goal 1. Increase the abundance and diversity of wildlife species.
Goal 2. Increase environmental awareness at work and in the community.
Goal 3. Protect our environment for future generations.

Goal 1: Increase the abundance and diversity of wildlife species.

Objective: Re-establish the Eastern Bluebird on Aquidneck Island.
Prescriptions:

1) Erect a "bluebird trail" of nestboxes around the campus,
2) Aggressively monitor the boxes weekly to remove non-natives,
3) Investigate efficacy of several bluebird-friendly nest box designs.

Objective: Provide habitat and cover for nesting birds.
Prescriptions:

1) Reduce or eliminate mowing of meadow fields during nesting season

Objective: Increase butterfly and hummingbird populations.
Prescriptions:

1) Plant Butterfly and Hummingbird gardens in front of building 1 and building 2.

Goal 2: Increase environmental and awareness at work and in the community.

Objective: Get employees more involved with the environment:
Prescriptions:

1) Provide Trailguides and Schedule walks.
2) Create interpretive trail,
3) Turn Earth Day into Earth Week and create family fun atmosphere in learning about the environment.

Objective: Get the community more involved with the environment:
Prescriptions:

1) Invite school groups for guided walks,
2) Host Norman Bird Sanctuary birdwalks at our facility,
3) Invite scout groups for guided walks,
4) Have scouts build nesting boxes,

Objective: Create lasting bonds with local organizations:
Prescriptions:

1) Involve local organizations in surveys,
2) Involve local organizations in earth day celebrations,
3) Consult with local organizations on a regular basis.

Goal 3: Protect our environment for future generations.

Objective: Protect Lawton Valley
Prescriptions:

1) Survey species in the valley.
2) Create photodocumentation,
3) Involve local organizations and experts such as the Aquidneck Island Land Trust and Tree Steward Matt Largess,
4) Meet with corporate management to discuss permanent protection.

6. MONITORING AND MAINTENANCE

Monitoring and maintenance are crucial aspects of the management plan, and can be used to determine the success or failure of any projects. Each maintenance and monitoring activity is recorded on the REWHC website. Also, notes regarding observations, wildlife use, and other interesting information is recorded on the site as well. The bulletin board is the perfect place to put this "activities journal" information.

Goal 1: Increase the abundance and diversity of wildlife species. Monitoring Includes:

1) Nestbox monitoring weekly of all boxes,
2) Recording of species, quantity of eggs, and fledgelings,
3) Elimination of unhatched invasive species.
4) Recording milestones of any mowing in the meadow fields,
5) Recording milestones of butterfly and hummingbird gardens
6) Surveying butterfly and hummingbird populations

Goal 2: Increase environmental and awareness at work and in the community. Monitoring Includes

1) Record attendance at walks and events. (numbers, not names)
2) Record community organization visits.

Goal 3: Protect our environment for future generations. Monitoring Includes

1) Record visits and meeting minutes.
2) Record agreements.

7. IMPLEMENTATION SCHEDULE

The following schedule is subject to changes due to weather and other factors. Entries prior to this writing appear in the online calendar and bulletin board at the REWHC.org website. Maintenance and monitoring is performed constantly and though not appearing below, will be thoroughly documented on the website.

Spring 2003	Earth Day Wildflower Garden Planting (Meadow Fields). Bluebird Trail Nestbox Maintenance and Extension, Nestbox Monitoring Course Corporate Discussion with Aquidneck Island Land Trust. Bird Survey Walk, Historical Site Research
Summer 2003	Bird Survey Walk, Reptile and Amphibian Survey Walk. Butterfly Survey Walk, Plant Survey Walk with Rhode Island Wild Plant Society, Historical Site Mapping and Flagging.
Fall 2003	Bird Survey Walk, Historical Site Cleanup Historical site trail planning

Monitoring of existing programs will continue as previously described. New projects will be implemented as specific objectives and prescriptions are developed and human and financial resources are available.