

Managing Utility Rights-of-Way for Wildlife Habitat

NCTC COURSE NUMBER: CSP7179

A Self Study Guide



*Produced to Accompany the U.S. Fish and Wildlife Service
Training DVD: "Managing Utility Rights-of-Way for Wildlife Habitat"*

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Introduction/Overview

This study guide is designed to accompany the NCTC training video/DVD:

Managing Utility Rights-of-Way for Wildlife Habitat

The purpose of the training is to provide instruction to U.S. Fish and Wildlife Service refuge personnel and other natural resource managers who are responsible for lands crossed by utility corridors. The video/DVD was produced in two sections and identifies basic rights-of-way management issues, describes various habitat conditions possible on utility corridors, presents techniques for producing different habitat types, and discusses integrated planning and partnership approaches. The training in Section 1 is presented using the backdrop of Patuxent Research Refuge where different management techniques are researched on the utility corridors. Section 2 presents habitat management and utility partnership examples from other selected refuge and natural resource lands, and overviews rights-of-way habitat issues in electric utility corridors on western lands.

*Note: The **Managing Utility Rights-of-Way for Wildlife Habitat** training video/DVD and this Study Guide are designed to meet the requirements for the National Conservation Training Center course: **Rights-of-Way Habitat Management (CSP7179)**. If you would like to receive documentation credit from NCTC for completing CSP7179, then please be sure to use the questions in this guide as a learning aide and follow the instructions at the end of the guide to apply for the course. Also note that any reference, mention, or discussion of specific products, companies, web sites, studies, or management techniques in this Study Guide or the training video/DVD, does not imply endorsement by the U.S. Fish and Wildlife Service, or the National Conservation Training Center.*

Objectives

After completing the *Managing Utility Rights-of-Way for Wildlife Habitat* video lesson along with the “question and answer” sections in this study guide, you will be able to:

- ✓ Identify basic rights-of-way management issues,
- ✓ Describe various wildlife habitat conditions possible in utility corridors,
- ✓ Learn techniques for producing different habitat types in rights-of-way, and
- ✓ Discuss integrated management planning and partnership approaches for managing rights-of-way habitat.

SECTION 1: Managing Rights-of-Way for Wildlife Habitat

Utility rights-of-ways exist on most U.S. Fish and Wildlife Service refuges and other public and private lands managed for natural resource values.

Utility companies have primary concerns in managing right-of-ways:

- ❖ Providing reliable, uninterrupted customer service.
- ❖ Providing safety for their employees, crews and customers (*including safe and efficient site access*).
- ❖ Limiting liability from accidents and outages.

Refuge and other land managers are concerned about potential negative effects of rights-of-ways on their management goals and objectives.

For example, effects such as:

- ❖ Habitat fragmentation.
- ❖ The introduction of invasive and exotic species.

In summary, these concerns and others presented in the video can present a gap between the needs of utility rights-of-way managers and conservation land managers.

This gap can be lessened through:

- ❖ Understanding basic rights-of-way management issues, including utility engineering issues and wildlife concerns.
- ❖ Knowledge of different habitat conditions possible in utility corridors and the techniques for producing these habitats.
- ❖ Observation of integrated management planning and partnership approaches that have been used on other conservation and Refuge lands.
- ❖ Open communication and clearly stated land management objectives of both the utility and refuge managers.
- ❖ Mutual agreement between the utility and land managers to adopt Integrated Vegetation Management (IVM). (*IVM will be discussed in Part 3.*)

Part 1: Engineering and Wildlife Concerns

A. Engineering Concerns

Engineering Discussion Points on Electric Utility Rights-of-Way:

- Transmission lines are the lines that carry power from generators to substations.
- Power from the transmission lines is stepped down to smaller sizes to serve businesses and homes.
- High voltage transmission lines can have multiple conductors (conductor = wire) and each tower can have more than one circuit.
- High voltage transmission amounts typically range from 138,000 volts to 500,000 volts (*higher voltages are possible*).
- If one tree were to compromise high voltage transmission lines, it could trip out an entire city.
- Power outages could also “cascade”. (*One line goes out and the remaining lines cannot handle the load, tripping off back to substations and generators. On August 14, 2003, tree contact with high voltage conductors in Ohio started a cascade that interrupted power to over 50 million people in the United States and Canada and cost the economy over 8 billion dollars.*)
- Insulators, the bell shaped structures that hang between the towers and the lines, prevent the power from conducting into the tower and down to the ground.
- The number of insulators that are present indicates the amount of power that the transmission line was designed to carry.
- The smaller wires that run along the top of high voltage transmission lines are called “static wires” (*they protect the conductors from lightning*).
- Static wires do not carry power, but can carry fiber optic cables internally for communication applications.
- Large amounts of power running through the conductors heats up the wire and can cause them to stretch.
- Stretching causes the lines to sag, which can cause the conductors to come dangerously close to vegetation. (*Some conductors can sag more than 30 feet, usually during hot weather conditions, but this can also occur in cold weather if the electrical load on one circuit is increased due to maintenance problems on other conductors.*)

- High winds can also cause the conductor lines and vegetation to sway, which can additionally reduce the separation between the conductors and vegetation.
- Conductors do not have to actually touch vegetation to cause an outage, but high voltage can jump (*or “arc”*) from a conductor to vegetation if it is close enough, (*up to 10 feet under the right conditions*).

Engineering Discussion Points on Pipeline Utility Rights-of-Way:

- Pipeline companies have similar concerns as electric utilities (*e.g., reliability of service, safety, efficient access, liability*).
- Vegetation roots can impact the integrity of pipelines (*thus, trees and woody shrubs are typically discouraged from growing near underground pipes*).
- Pipeline companies like to maintain their corridors in meadow types of habitat for visibility (*for pipe inspection*), to maintain pipe integrity, and to allow for pipe access (*for testing and repair/maintenance*).
- Pipeline companies will often use aerial inspection of their lines to observe potential leaks (*therefore, tree branches encroaching into the pipeline corridor must be periodically pruned back as well*).
- A gas leak can be evidenced by a die-off in meadow vegetation (*the gas leak can create a condition of soil dryness/desiccation that causes the die-off*).
- A primary mode of modern power generation is with natural gas, transmitted to generation sites through pipelines.

B. Wildlife Concerns:

Discussion Points in Video:

- Habitat fragmentation.
- Introduction of invasive and exotic species.
- Direct impact or collisions between the wildlife and utility equipment.
- The effect maintenance can have on nesting and breeding habitats.
- The application of chemicals (herbicides) to maintain rights-of-ways.

(Note: Concerns involving wildfire potential & control are discussed at other points in the video.)

Part 1 Reference Sites:

Avian Powerline Interactions Committee: <http://www.aplic.org>

Department of Transportation, Pipeline Safety: <http://ops.dot.gov>

FERC Electric/Oil/Gas Regulation: <http://www.ferc.gov/industries/industries.asp>

FERC 2003 Blackout Utility Vegetation Management Final Report:
<http://www.ferc.gov/industries/electric/indus-act/reliability/veg-mgmt-rpt-final.pdf>

Edison Electric Institute:
<http://www.eei.org/ourissues/TheEnvironment/Land/Pages/VegManagement.aspx>

Department of Interior:
<http://www.docstoc.com/docs/58519887/Integrated-Pest-Management-Policy>

Review of Part 1:

1. What are the primary concerns of utility companies in maintenance of rights-of-ways?
2. Why are refuge and other conservation land managers concerned with proper maintenance of utility corridors?
3. What does it mean when a power outage cascades?
4. Why do pipeline companies desire the ability to aeri ally inspect lines?

Part 2: Types of Habitat in Utility Corridors

- **Meadow**
- **Old Field**
- **Emergent Wetland**
- **Wildlife Movement Crossing Corridors**
- **Arrested Shrub Layer**

These five, rights-of-way wildlife habitat types are presented in the training video/DVD while showing research sites at Patuxent Wildlife Research Refuge in Maryland. As the above five types are presented in the video and this Study Guide, the pros and cons of these habitats in right-of-way corridors, and the management techniques that may be used by utility companies and land managers to produce them, are introduced and discussed.

Note that the habitats and most of methodologies presented in this section are applicable throughout the country with some modifications for species, climate, soils, and other local issues. In addition, a segment addressing rights-of-way habitat issues in electric utility corridors on western lands is included at the end of the training video (Section 2).

A. Meadow Habitat

(Meadow Habitat = An open area of grassland and other low growing vegetation, commonly with a rolling to flat terrain, characterized by grazing and burrowing species.)

Pros:

- Has value for ungulate and other grazing species, some small mammals, and small mammal predators. *(Meadows are also valuable for various pollinator species.)*
- Habitat has value for grassland breeding birds if it is a large enough block; greater than 10 hectares, and not overly linear in shape. *(In general, due to their linear configuration, utility corridors alone are not conducive to enhancing grassland bird populations; however, they could be valuable in locations where adjoining meadow lands are managed in conjunction with a corridor meadow habitat.)*

Cons:

- Right-of-way corridors managed for a meadow habitat within a forest may not have much value for grassland breeding birds.
- Invasive and exotic species can be established easily in meadows.
- Various saplings can be easily established as well, potentially interfering with power lines and pipelines.
- Hard edges can occur if the right-of-way is in meadow and the borders are abruptly another vegetation type. *(“Hard edges” are sometimes associated with reduced wildlife diversity and could increase habitat fragmentation impacts.)*
- Soft or “feathered” edges can be used to provide a transition from forested habitat into the meadow area and may lessen the impact of fragmentation. *(Establishing a transition on both sides of a meadow habitat corridor that bisects a forested area is sometimes called the “U effect”, with a medium height “border zone” along the edges, and a lower vegetated “wire zone” in the center of the corridor.)*

Management Techniques:

1. Mowing

- Not very selective *(desired/valued species could be impacted).*
- You have to mow often to maintain a meadow habitat.
- Timing of mowing is important. *(Mowing can have an impact on nesting birds and other wildlife; for example, fawns may lie low and be injured or killed by mower blades, as can slow moving animals such as turtles.)*
- Contamination from oil, gasoline, and hydraulic fluid from equipment.
- Introduction of invasive and exotic species can be facilitated by mowing. *(Frequent disturbance and rutting of soils from routine mowing allows invasive weed infestations to occur).*

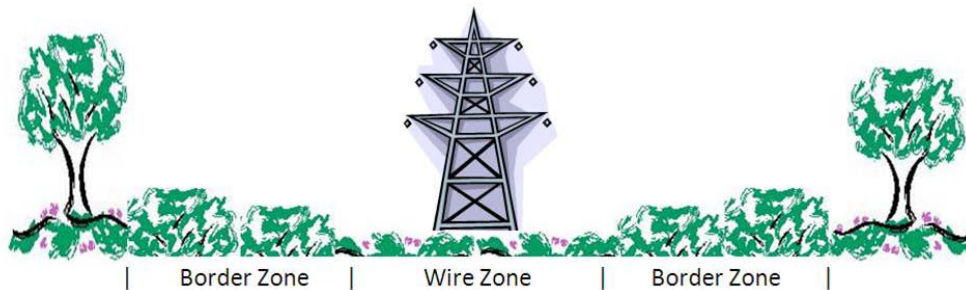
2. **Broadcast Herbicide** (*Applying herbicides to the entire right-of-way*)
 - Not very selective when using a broad-spectrum herbicide such as glyphosate. (*However, broadcast can be selective if the herbicide product used impacts only certain types of plants; e.g. broadleaf versus grass.*)
 - Broadcast may be better for starting meadows, than for maintaining them. (*Note: Advanced herbicide chemistries may be available to target specific invasive grasses and forbs. These formulations could be used to ‘weed-out’ a specific invasive species while leaving native plants intact. Given this situation, a broadcast method could be used to maintain a meadow.*)

3. **Selective Herbicides** (*Applying herbicides only to vegetation you want removed*)
 - More selective than a broadcast treatment and uses less product (*but this technique is generally not used unless the target plants are sparse*).

Wire zone – Border Zone Management for Powerlines

Research by Drs. Bramble and Brynes has shown that an electric transmission corridor can be divided into two separate zones using IVM methods to optimize the wildlife habitat potential: The **wire-zone** (area directly under and 20-feet past the outside conductor) managed for grass and herb meadow; and the **border-zone** (area outside the wire-zone to the forest edge) managed as a shrub-scrub forest.

A broadcast technique may be used to establish and possibly maintain the wire-zone plant community in low-growing/meadow vegetation, while the border-zone is managed with selective application techniques, usually backpack foliar or basal treatment. This would create the “U effect” illustrated here:



Wire zone – Border Zone Management for Pipelines

In some cases, a similar type of zone management may be implemented on natural gas and oil pipeline corridors by managing the vegetation to a stable meadow habitat with shrubs allowed to exist along the forest edge. Routine mowing may not be necessary unless needed for cathodic testing (involves using a wire along the ground to check for pipe integrity) or for inspection purposes. In that case, possibly only a mowed swath may be needed directly over the pipeline area to facilitate inspection and testing.

Pipeline integrity can be compromised by the roots of trees and woody shrubs. These must be controlled at an appropriate distance from the pipe. Note that the pipeline location may not be in the center of the corridor, but could be offset to allow working space if pipe excavation becomes necessary. In these situations, the forest-edge shrub border may only be possible on one side of the corridor; or if the corridor supports multiple pipes, only meadow-type plants may be possible in certain sections (depending on the overall width of the right-of-way).

B. Old Field Habitat

(Old Field Habitat = Habitat that generally develops in a previously farmed or mowed field that has been left fallow, with no use for several years. Through natural plant succession, the field will start to grow up and transition into taller species.)

Pros:

- Flowering plants and forbs occur, which also have value for wildlife (*including and especially pollinator species*).
- Open, intermixed structure contributes to diversity.
- Most old field plants do not grow very high which is compatible with management under an electric utility line.

Cons:

- Through time, exotics will establish themselves.
- Requires managing the edges and corridor for encroaching trees.

Management Techniques:

1. Selective foliar application of herbicides from a truck (*foliar = using herbicide on leaves of just the target species*). (*Note: While “selective” - some spray drift or drip can impact areas around the target – particularly if sprayed from crews on a truck.*)
2. Selective foliar application of herbicides from a backpack (*more accurate method*).

Selective Application Note – Using “Inversion Carriers”

Greater selectivity and less collateral damage can be achieved by using a thin inversion carrier (paraffin-oil emulsion) instead of water. This is applied with unique spray tips that distribute the mix in equal-sized droplets that stick to the leaves of target plants and do not drip-off to non-target vegetation or to the ground. This method uses low pressure, helping to eliminate “fine droplets” that could be transported to non-target species by wind drift.

3. Selective basal treatments (*most accurate*). (*Basal treatment = treating the complete circumference of the base of the shrub or tree with a herbicide that includes a penetrating oil.*)

Selective Application Note – Brush Density

Beware, if the overall brush density is high, collateral damage to non-target vegetation will likely increase with both selective foliar and basal treatments, as well as the volume of herbicide required in dense brush situations.

4. Selective mowing in alternating strips, providing edge habitat for wildlife. (*Due to the relatively high cost of this method which requires multiple visits to the corridor, utilities would generally not favor strip management without a specific incentive.*)
5. Edge management:
 - > Mechanical equipment using a boom (aerial or ground).
 - > Applying bud inhibitors to inhibit encroachment of edge vegetation.
 - > Girdling (*cutting the tree cambium layer to kill the tree in place*) and/or topping (*cutting down only the top part of the tree*) may be used to address specific trees that threaten utility lines/equipment. (*The frilling technique may also be used; see wetland management techniques, item #4.*)
 - > Brush piling cut logs and vegetation along the edges to provide habitat for reptiles, amphibians and birds (*also called “windrowing”- this practice can also be beneficial to some native pollinators/bee species*).

C. Emergent Wetland Habitat

(Emergent Wetland Habitat = Vegetated areas where there is standing surface water, or where the ground water comes into close proximity to the surface and saturates the soil.)

Pros:

- Wildlife value for amphibians, reptiles and a variety of water bird species such as waterfowl and wading species.
- Some bird species use emergent wetlands for breeding.
- Snags (*dead standing trees*) provide good habitat.

(In emergent wetlands, rare suppressed/dormant plant species have been found to germinate when taller growing plants were controlled with selective techniques.)

Cons:

- High labor costs can be associated with management techniques in emergent wetland areas.
- Areas are difficult for crews to work in.
- Birds like to nest on the utility structures in many wetland areas.
- Beavers can flood access roads and could threaten tower support integrity.
- Species and habitats may be more sensitive to management in wetland areas.

Management Techniques:

1. Providing the area will freeze, execute mowing in the wintertime to lessen the disturbance to the soil. Can use mowing equipment that is mounted on tracks.
2. Selective herbicidal treatments could be considered, but must use products that are registered for use with water. *(Backpack foliar treatment with water-approved herbicides can effectively control just the tall target trees and invasive shrubs without damaging low growing native shrubs, especially when using a paraffin-oil carrier.)*
3. Can use “lop and drop” method to control tall trees. *(lop & drop = cutting trees and leaving them where they fell).* Note: Stumps of cut trees should receive an herbicide treatment along the cambium with water-approved herbicides to prevent re-sprouting.

4. Herbicides may be used to kill taller trees through “frilling” (also known as “hack & squirt”). (*Frilling = making a saw or ax cut in the bole and then treating the cut area with a herbicide. Special tools – lances/axes/guns - are also manufactured to individually inject herbicides*)
5. Preventing collision/direct interference with electric transmission lines by use of bugs, balls, diverters, or other devices on the lines to discourage nesting and/or divert flight away from lines. Substitute platforms are also used to move nests.

D. Wildlife Movement Crossing Corridor

(Wildlife Movement Crossing Corridor = A vegetated area across a corridor that essentially bridges two fragmented habitats on either side of the corridor. These might typically be established near the base of tall towers or in deep valleys between towers.)

Pros:

- A densely vegetated or forested area in the corridor may make it easier or safer for certain species to traverse from one side of the corridor to the other.
- Vegetation bridges may reduce the habitat fragmentation impact caused by a right-of-way for some species.

Cons:

- Movement crossing corridors can be costly to maintain.
- In an electric utility corridor, sagging lines could cause outages if the movement corridor is not properly placed or maintained. *(In a pipeline corridor, reliable root barriers would need to be engineered; however, root barriers are costly and generally not used.)*
- Vegetation around towers could present fire dangers, particularly in the west.

Management Techniques:

1. Some topping may be required *(can be costly)*.
2. Selective application of herbicides *(can be labor intensive)*.

Wildlife Movement Crossing Corridor Note – Low or Tall Vegetation?

Wildlife Movement Crossing Corridors that only require low-growing vegetation may be effective and compatible with electric transmission safety and reliability. Such crossing points would have to be managed by maintaining low-growing shrubs and selectively targeting tall-growing tree species. This type of crossing corridor could be developed in most locations on a transmission right-of-way, as long as the vegetation that is allowed to grow does not threaten reliability and effective access can be maintained. For wildlife crossing corridors requiring tall vegetation, they generally can only be allowed to grow within ravines where the conductors are not threatened by the height of the vegetation.

E. Arrested Shrub Layer Habitat

(Arrested Shrub Layer Habitat = A dense habitat, sometimes referred to as scrub-shrub or scrub habitat, that is generally dominated by low-growing, bushy vegetation and young trees, and is maintained in that state without allowing succession to taller species.)

Pros:

- Excellent habitat for neo-tropical and migrant land birds (and pollinators).
- Scrub-shrub dependent species are proven to use the habitat.
- Provides cover for nesting birds.
- Birds that occupy adjacent habitats have been observed using the shrub habitat.
- Provides good habitat for reptiles and amphibians.
- Can create a somewhat self-sustaining environment over time.

Cons:

- Overall intensity of controlling individual species that can grow too tall in electric corridors *(maintaining access roads must also be considered)*.
- Labor intensity of using the basal treatment method and having crews individually identify the target vs. the non-target species.

Management Techniques:

1. Manage the vegetation height to about three and a half meters - specifically for favorable, native scrub-shrub species.
2. Use selective basal management to accurately target species to be removed. *(This technique cannot be used in standing water sites, since the herbicides and carriers commonly used for basal work are not registered for use near water.)*
3. Selective topping and cutting can be used for taller shrubs and trees. If more than a third of the shrub or tree's canopy needs to be removed, then the entire shrub or tree is generally cut down. This opens the area up for new scrub-shrub species.
4. Selective foliar application of herbicides, using a paraffin-oil that causes the herbicide to stick to the target leaves, could also be used. *(When using this technique to maintain scrub-shrub habitat, it may be easier for the crews to ascertain target species, since it is performed when the leaves are present. Therefore, selective foliar should also be considered, as it could result in using less herbicide, less collateral impact on desirable species, and lower labor costs.)*

Part 2 Reference Sites:

Weed Science Society Products [Herbicide Handbook]: <http://www.wssa.net>

EPA Pesticide Information/Stewardship Program: <http://epa.gov/pesticides>

National Roadside Vegetation Management Association: <http://www.nrvma.org>

Bramble & Byrnes research: <http://www.dowagro.com/ivm/railroad/bio/brambles.htm>

Integrated Vegetation Management Case Studies: <http://www.ivmpartners.org>

Review of Part 2:

1. What are the five main types of habitat that are managed in the right-of-way corridors of the Patuxent Research Refuge?
2. Along meadow right-of-way edges that are next to forested habitats, why is it important to consider managing for a feathered edge?
3. In an old field succession habitat, what is a benefit of strip mowing?
4. What two concerns did beaver activity pose?
5. What are some of the concerns that were discussed with managing wildlife movement crossing corridors?
6. What formula did Patuxent use to ascertain if taller trees and shrubs should be topped or totally removed, in an arrested shrub layer habitat?
7. Why did the utility forester recommend foliar application of herbicides for certain situations?

Part 3: Land Manager and Utility Partnerships

- Work to understand each others points of view and understand the land management objectives for the refuge or conservation land area.
- Develop a working relationship to coordinate, plan, and monitor land management practices on the right-of-ways needing habitat management.
- Meet on a regular basis to communicate needs and issues and to adjust right-of-way management practices as necessary.
- Industry has adopted a term, Integrated Vegetation Management (IVM) which is an environmental stewardship strategy for managing right-of-way vegetation.

INTEGRATED VEGETATION MANAGEMENT

- Provides principles for managers to minimize overall risk to people and the environment while providing safe and reliable electric service.
- Designed to protect wildlife, groundwater, surface water, soils, utility customers, utility workers and the general public.

(IVM also allows the corridor to act as a habitat greenway connection between isolated plant and/or animal communities.)

IVM has the following objectives:

- Selecting vegetation management practices which balance environmental concerns, public needs, safety, and cost-effectiveness,
- Using integrated pest management methods that are supported through scientific research as minimizing the risk and increasing the effectiveness for use in right-of-way vegetation management programs, and
- Adopting best management practices for herbicide applications based on the latest scientific research among utilities, manufacturers, applicators, regulators, and universities.

INTEGRATED VEGETATION MANAGEMENT (IVM)

IVM is defined as: “A system of managing plant communities in which compatible and incompatible vegetation is identified, action thresholds are considered, control methods are evaluated, and selected control(s) are implemented to achieve a specific objective. Choice of control methods is based on effectiveness, environmental impact, site characteristics, safety, security and economics.” [*ANSI A-300 (Part 7) – 2006 IVM: Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Integrated Vegetation Management a. Electric Utility Rights-of-Way)*].

For federal land managers seeking to apply best management practices, note that an agreement exists to utilize an IVM approach via a “Memorandum of Understanding among the Edison Electric Institute and the U.S. Department of Agriculture Forest Service and the U.S. Department of the Interior Bureau of Land Management, Fish and Wildlife Service, National Park Service and the U.S. Environmental Protection Agency.”

http://www.eei.org/ourissues/TheEnvironment/Land/Documents/EEI_MOU_FINAL_5-25-06.pdf

PART 3 Reference Sites:

Arizona Public Service: http://www.aps.com/aps_services/trees/vm_19.html

Patuxent Research Refuge: <http://patuxent.fws.gov>

Utility Industry Organizations:

International Rights-of-Way Association: <http://www.irwaonline.org>

Utility Arborists Association: <http://www.utilityarborist.org>

Edison Electric Institute: <http://www.eei.org>

Non-Profit Organizations:

Integrated Vegetation Management Partners: <http://www.ivmpartners.org>

Pollinator Partnership: <http://www.pollinator.org/row.htm>

Review of Part 3: Land Manager and Utility Partnerships

1. Why is it important to communicate land management goals and issues to a utility company?

2. What is IVM?

SECTION 2: Utility Rights-of-Way Habitat Management Examples on Natural Resource Lands

A. Nulhegan Basin, Silvio O. Conte National Wildlife Refuge

Study Questions:

1. How did the utility adjust management practices to meet a refuge need?
2. What was the benefit in communicating with the utility about the Refuge's data collection efforts?

B. John Heinz National Wildlife Refuge

Study Questions:

1. Why was it important for the Refuge to have accurate visitor count information?
2. In what ways did the oil spill and clean-up impact refuge visitation?
3. What "lessons learned" did the Refuge Manager present at the conclusion of this segment?

C. Nassawango Creek: The Nature Conservancy Preserve

Study Questions:

1. Why was selective use of herbicides requested at this particular site as opposed to a broadcast treatment?
2. Why did the utility company install gates and cables across the right-of-way?
3. What benefits do MOUs (Memorandum of Understandings) or management agreements have when managing right-of-way corridors?

D. Habitat Management on Utility Rights-of-Way in the West

Study Questions:

Desert:

1. Can vegetation impact electric utility lines in a western environment?
2. Why are electric utility lines a potential issue with raptor species like the red-tailed hawk or the great horned owl?

Riparian:

1. Why is the management of utility corridors that cross riparian areas critical?

Grassland:

1. What are the biggest concerns for land resource managers in grassland type habitats?

Forest:

1. Why did the Apache-Sitgreaves National Forest ask the power company to leave some smaller growing trees between the two power lines?
2. What did Apache-Sitgreaves request for the border areas of the right-of-way?
3. What is the concern for allowing taller plants to grow on a western electric transmission corridor that is usually not a concern east of the Mississippi?

APPENDIX

Answers to Comprehension Questions and Answers

Answers to Comprehension Q & A Section 1, Part 1:

1. What are the primary concerns of utility companies in maintenance of rights-of-ways? Utility companies strive to provide reliable service for their customers, maintain a safe environment for their crews and customers, and they want to limit any liability associated with the corridor.
2. Why are refuge and other conservation land managers concerned with proper maintenance of utility corridors? Land managers are concerned about the effects right-of-way corridors can have on their management goals and objectives, including habitat fragmentation, invasive or exotic species, contamination, and direct impacts on wildlife.
3. What does it mean when a power outage cascades? Cascading occurs when one transmission line goes out and the remaining lines cannot handle the load, which causes the lines to trip off back to substations and generators.
4. Why do pipeline companies desire the ability to aerially inspect lines? They can sometimes detect breaks in pipelines from the air through changes in the meadow vegetation color (due to soil desiccation from leaking gas).

Answers to Comprehension Q & A Section 1, Part 2:

1. What are the five main types of habitat that are managed in the right-of-way corridors of the Patuxent Research Refuge? **The five main types of habitat are meadow, old field, emergent wetland, wildlife movement crossing corridors, and arrested shrub layers.**
2. Along meadow right-of-way edges that are next to forested habitats, why is it important to consider managing for a feathered edge? **A feathered edge would provide a transition from the forested habitat into the meadow vegetation and could lessen the impact of fragmentation.**
3. In an old field succession habitat, what is a benefit of strip mowing? **Strip mowing can provide edge habitat (where some species can benefit through foraging in the mowed areas while still being close to cover).**
4. What two concerns did beaver activity pose? **Cutting off maintenance roads for utility access and causing flooding that could impact tower foundation integrity.**
5. What are the some of the concerns that were discussed with managing wildlife movement crossing corridors? **Special concerns included the cost of maintaining the corridors, fire danger around towers, and the sag of power lines into movement corridor vegetation if the vegetation height were not properly maintained.**
6. What formula did Patuxent use to ascertain if taller trees and shrubs should be topped or totally removed, in an arrested shrub layer habitat? **In maintaining an arrested shrub layer, Patuxent advises the utility to remove the entire tree, if more than a third of the total canopy would have to be removed.**
7. Why did the utility forester recommend foliar application of herbicides for certain situations? **When using foliar herbicides that contain paraffinic oils for improved adherence to leaves, there is the potential for using less volume than with other methods, lower labor costs, and less impact to the surrounding, desirable species.**

Answers to Comprehension Q & A Section 1, Part 3:

1. Why is it important to communicate land management goals and issues to a utility company? **A utility may be willing to adjust practices or cooperate to address a land management goal or concern if they are aware of it.**
2. What is IVM? **Integrated Vegetation Management. IVM is the practice of applying the right combination of the most appropriate management techniques to produce a desired habitat, rather than using just one management technique for all circumstances. "A system of managing plant communities in which compatible and incompatible vegetation is identified, action thresholds are considered, control methods are evaluated, and selected control(s) are implemented to achieve a specific objective. Choice of control methods is based on effectiveness, environmental impact, site characteristics, safety, security and economics."**

Answers to Comprehension Q & A Section 2:

A. Nulhegan Basin, Silvio O. Conte National Wildlife Refuge

1. How did the utility adjust management practices to meet a refuge need? **The utility established crossing corridors, trained its crews to detect and control invasive plant species, and is helping control invasives on adjacent areas as well.**
2. What was the benefit in communicating with the utility about the Refuge's data collection efforts? **The utility was able to adopt the Refuge's protocols for data collection, enabling the Service to compare and utilize data for better wildlife monitoring.**

B. John Heinz National Wildlife Refuge

1. Why was it important for the Refuge to have accurate visitor count information? **This information was needed to determine impacts of a pipeline break that disrupted refuge operations and visitor access.**
2. In what ways did the oil spill and clean-up impact refuge visitation? **The clean up noise, visual impact, difficulty of trail access and parking, and having to shut down areas of the refuge all impacted the number of visits and the quality of the visit experience.**
3. What "lessons learned" did the Refuge Manager present at the conclusion of this segment? **Have written agreements in place, plan for worst-case scenarios, be prepared, and be sure the lines are being inspected.**

C. Nassawango Creek: The Nature Conservancy Preserve

1. Why was selective use of herbicides requested at this particular site as opposed to a broadcast treatment? **Selective management was requested because the bog contained sensitive plants that were being encroached by invasive vegetation. A broadcast treatment would have killed the sensitive plants, so selective techniques were needed.**
2. Why did the utility company install gates and cables across the right-of-way? **The Preserve communicated that it was having a problem with trespassing by four-wheel drive vehicles causing erosion.**
3. What benefits do MOUs (Memorandum of Understandings) or management agreements have when managing right-of-way corridors? **With an agreement in place, management practices and concerns do not have to be re-established or re-communicated if there is a personnel change in the utility or the land management agency.**

D. Habitat Management on Utility Rights-of-Way in the West

Desert:

1. Can vegetation impact electric utility lines in a western environment? **Yes. Cacti, salt-cedar, and other species growing in washes or other suitable areas can grow high enough to cause an outage and possibly create a wildfire. Shrub species, i.e. mesquite, creosote, oak, etc., can act as fire fuels and jeopardize the wildfire defensible space of the transmission corridor.**
2. Why are electric utility lines a potential issue with raptor species like the red-tailed hawk or the great horned owl? **The utility lines are an attractive perching and nesting site in open landscapes. Birds can be electrocuted and raptor nests can interfere with lines and maintenance.**

Riparian:

1. Why is the management of utility corridors that cross riparian areas critical? **These areas are sensitive and support wildlife diversity in western environments. They would be significantly damaged by a utility caused fire or spillage.**

Grassland:

1. What are the biggest concerns for land resource managers in grassland type habitats? **Construction and maintenance could introduce or encourage the growth of exotic species.**

Forest:

1. Why did the Apache-Sitgreaves National Forest ask the power company to leave some smaller growing trees between the two power lines? **To provide some screening for wildlife to travel through the corridors for security from predators and hunters.**
2. What did Apache-Sitgreaves request for the border areas of the right-of-way? **To leave low growing shrub species to create a transition between the forest and the open right-of-way areas (*note: the increased wildlife diversity or use of this transition zone is sometimes referred to as "edge effect"*).**
3. What is the concern for allowing taller plants to grow on a western electric transmission corridor that is usually not a concern east of the Mississippi? **Tall plants can act as "ladder fuel" to move wildfire up into the canopy of progressively taller trees, and thus threaten the conductors.**