

Fish & Wildlife Mitigation Plan

Cowanesque Lake Project



Revised November 2011

Table of Contents

I. Background	Page	2
II. Mitigation Documents Analysis		2
III. Summary		3
IV. Ten Year Work Plan (2006-2013)		5
A. Managed Forest		5
B. Managed Fields		11
C. Terrestrial Nesting Structures		21
D. Lake Habitat		22

List of Figures

Figure 1	Land Use Compartments	4
Figure 2	Managed Forest	5
Figure 3	Managed Fields	11
Figure 4	2009 Nesting Box Locations	23
Figure 5	Artificial Fish Structures – 2007-2010	24
Figure 6	2009 Fishery Habitat Analysis	24

List of Tables

Table 1	General Prescriptions	4
Table 2	Reclamation Mowing of Managed Fields	12
Table 3	Maintenance Mowing of Managed Fields	13

Mitigation Plan Cowanesque Lake

I. Background

One of the required data entry areas for FY05 OMBIL ES was mitigation areas. The specific data required to be entered included:

- Mitigation Description
- Total Authorized Mitigation Requirement Acres
- Acquired Mitigation Acres
- Available Mitigation Acres
- Acres Under Management
- Acres Meeting Mitigation Requirements

In response to data calls prior to FY05 OMBIL ES, 713 total mitigation acres were listed with all 713 acres noted as being properly managed. The 713 acre figure was taken from the 1999 Real Estate Utilization Report per the 2002 Tioga-Hammond & Cowanesque Lakes Master Plan (See Attachment A which is page CA-2 of the Master Plan under **1.3 Mitigation**).

II. Mitigation Documents Analysis

The above breakdown of data for the FY05 OMBIL ES required a more in-depth analysis of the mitigation documents that described the acres with original prescriptions as well as any on-going management requirements. These two documents, (1) *An Evaluation of Fish and Wildlife Habitat, Project Effects and Mitigation Requirements for the Proposed Cowanesque Lake Reformulation Project* (USFWS, 1984) and (2) *General Design Memorandum Phase II, Modification for Water Supply and Recreation* (COE, 1985), provide a very confusing breakdown of acres with further confusing prescriptions. Here is an attempt to itemize the requirements of the two documents:

Mitigation Description –

- A. Original prescriptions with no noted on-going maintenance requirements (As of 2005, these areas appeared to have never been maintained.):
 1. Fish Habitat Improvements – The lake was divided into three zones, Zone I for unlimited boating with all structures removed, Zone II for no wake boating with all trees in water less than fifteen feet deep remaining for fish habitat, and Zone III where all trees in water less than fifteen feet will also remain standing (See page A-66 of the GDM under Wetlands).
 2. Wetlands Improvements (60 acres) – Three areas were designated for grading and planting, PEM Site I, PEM Site II, and PEM Site III (See page A-66 of the GDM under Wetlands). A one acre duck island was also created.
 3. Nesting Structures (75 structure) – 12 underground pipe dens for red fox, 21 above ground rock piles for raccoon, 12 brush piles for red fox, and 30 nesting boxes for raccoon (See pages 62–66 of the GDM).

4. Hedgerow Plantings – 70,800’ of hedgerows planted to trees and shrubs beneficial to wildlife.
5. *Shrub/Brush Rangelands (121 acres) – Left to natural succession.
6. *Forested Areas (106.85 acres) – Left to natural succession.

B. Prescriptions Requiring On-Going Maintenance (As of 2005, this maintenance appeared to have never been accomplished.):

1. *Deciduous Forest Management (85 acres) – Selective cutting on a ten year cycle to open the forest canopy promoting vegetative growth (See page A-66 in the GDM). This would be approximately 8.5 acres “cut” per year over ten years
2. *Mowing of Old Fields (543 acres) – All old fields will be mowed on a six year cycle (See page A-62 of the GDM). This would be approximately 91 acres mowed per year over six years.
3. Hedgerows (52 acres) – Periodic mowing between the hedgerows on the same cycle as the mowing of the old fields (See page A-62 of the GDM). These hedgerows were planted in the old fields so they are included in the old field acres in 2. above.

III. Summary

Acres noted in the two categories below total 915 acres which exceeds the 807 acres noted in the GDM Summary on Page A-66. Also see Attachment B.

Work complete requiring no noted action –

Wetlands Improvements	60 acres
*Shrub/Brush Rangelands Reserved	121 acres
*Forested Areas Reserved	106 acres
Hedgerows (52 acres included in old fields)	<u>-</u>
	287 acres

Work requiring noted on-going maintenance –

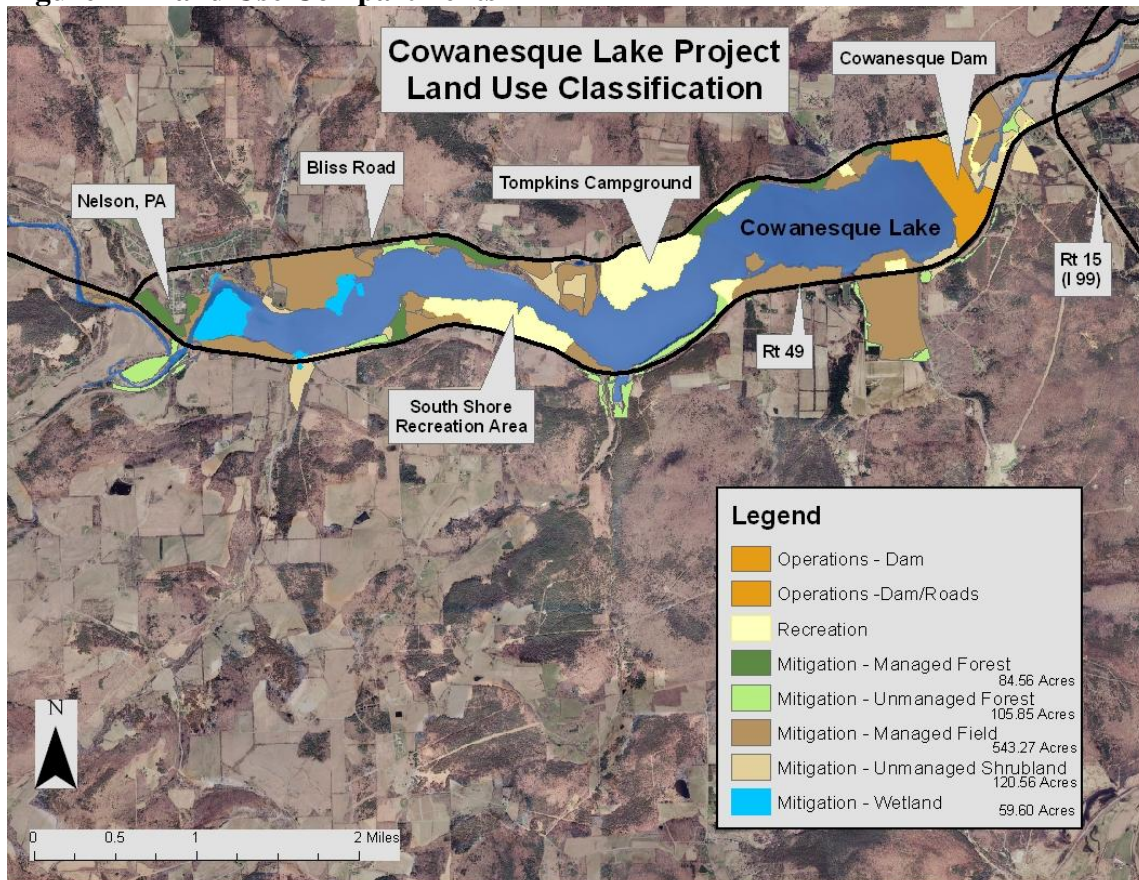
*Deciduous Forest Management	85 acres
*Mowing of Old Fields (includes hedgerows)	<u>543 acres</u>
	628 acres

Table 1 - General Prescriptions

One Time Enhancements – Completed 1989 – 1990	
Fisheries Habitat Improvements	Lake was divided into three zones. Zone I allowed for unlimited boating with all structures removed. Zone II was restricted to no wake boating with all trees less than fifteen feet deep remaining for fish habitat. Zone III was restricted to no wake boating with all trees remaining.
Wetlands Improvements	Three areas totaling 60 acres were graded and planted. A one acre duck island was created.
Construction/Placement of Nesting Structures	Twelve underground pipe dens for red fox, twenty-one above ground rock piles for raccoons, twelve brush piles for red fox, and thirty nesting boxes for raccoons were constructed and installed.
Hedgerow Plantings	70,800 feet of tree and shrub hedgerows were planted.
Shrub/Brush Rangeland Protection	121 acres were left to natural succession.
Forested Areas Protection	106.85 acres were left to natural succession.
On-Going Management Practices -	
Deciduous Forest Management	Seven designated forested sites totaling eighty-five acres are managed on a seven year rotation.
Maintenance of Old Fields	Several designated old fields totaling 543 acres are mowed on six year cycle.
Maintenance of Hedgerows	52 acres between the planted hedgerows are mowed on a six year cycle.

* Maps were created on GIS and areas digitized in order to determine the noted acres.

Figure 1 – Land Use Compartments



IV. Work Plan (2006-2016)

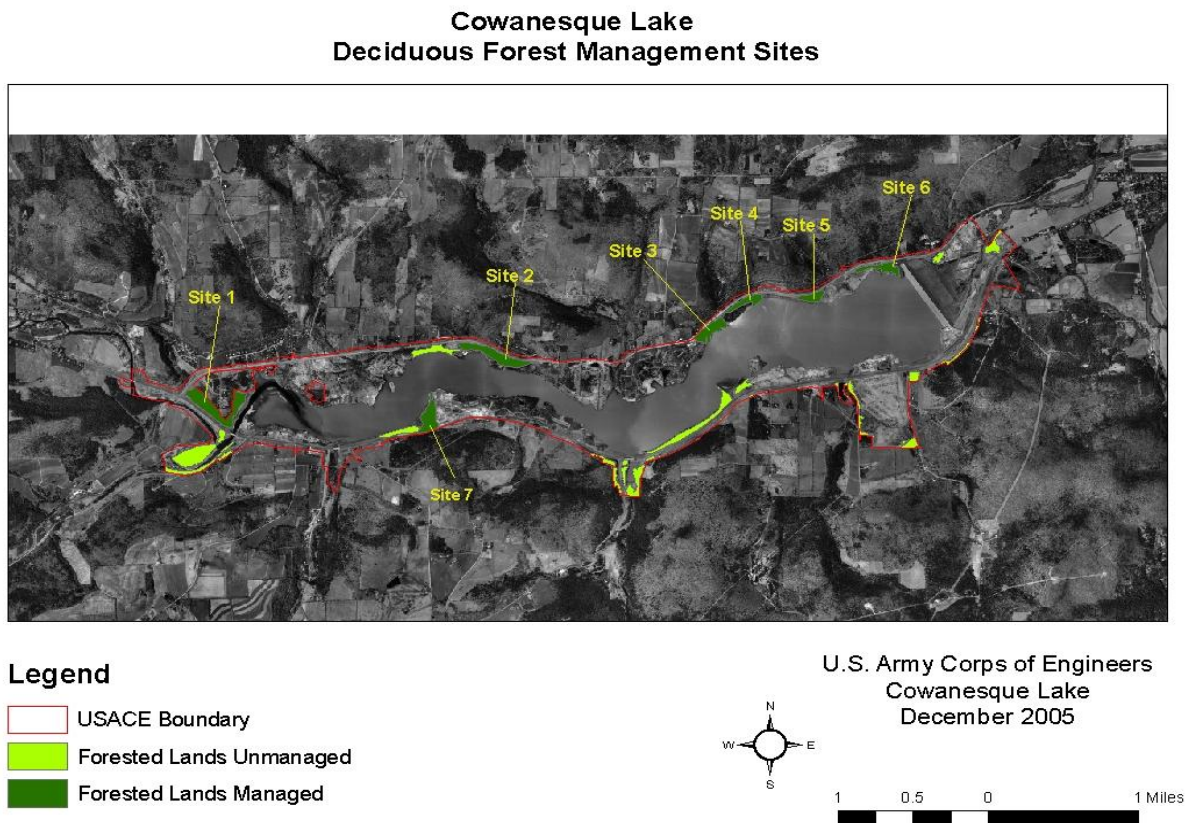
A. Managed Forests

The survey of the 32 sites at Cowanesque Lake allowed for an overall view of the forested areas adjacent to the lake. Considering mitigation objectives, seven sites were designated for Deciduous Forest Management based on location in the landscape, structure of the forest stand, and the ability to provide desired wildlife habitat.

Each of the seven sites designated for Deciduous Forest Management were thoroughly delineated and studied to provide diverse prescriptions that fit the individual needs of each site. A multitude of methods, procedures and strategies were used to best enhance the existing habitat for wildlife and long-term sustainability.

The following sections provides overall site descriptions, goals and objectives, and recommendations individually prescribed to each site base on existing conditions and past management.

Figure 2 – Managed Forest



Site 1 Evaluation and habitat prescription.

Total Site Acreage: 24.5
Forested: 24.5
Unforested: 0

Site Description: Site 1 is the largest area recommended for Deciduous Forest Management, containing 24.5 acres. The site extends along the southern limits of the Town of Nelson, and is bordered to the south by Pennsylvania Route 49. The site is completely forested, made up of primarily a northern hardwood forest type with less than 5% in conifers.

Goals and Objectives: The goals for Deciduous Forest Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. The site contains two identified invasive species, Japanese barberry and multiflora rose, which should be eradicated through the use of herbicide and mechanical removal, or herbicide and monitoring. Once invasive species have been treated, a light release cut should be performed with focus on releasing desirable wildlife species as black cherry, and hickory. The release of desirable trees should not be performed if invasive species are not treated.

Approximately 3-5 trees per acre should be released. Invasives were treated in 2008, 2009, and 2010. Some release cutting was conducted in 2009.

2. Structured brush piles should be created with the material removed from the above mentioned thinning. The brush piles should be scattered throughout the site to provide additional wildlife cover. A few brush piles were constructed in 2009.

3. The northern tier of the site, which borders the Town of Nelson, should be enhanced for wildlife through planting coniferous species such as white spruce. The white spruce should be scattered and randomly placed in clumps throughout the town to forest interface. (100 white spruce) 100 white spruce seedlings were planted in 2006.

4. One to three dead standing trees per acre should be incorporated to allow for additional wildlife food and cover. This can be accomplished through the cut-and-frill method or mechanical tree girdling. A few trees were girdled in 2009.

5. White pine seedlings should be planted, 20-30 per acre (≈ 450), throughout the site to increase stand diversity, and allow for additional winter thermal cover for wildlife. 450 white pine seedlings were planted in 2006.

Site 2 Evaluation and habitat prescription.

Total Site Acreage: 16.81
Forested: 16.81
Unforested: 0

Site Description: This is the second largest of the sites recommended for Deciduous Forest Management, containing 16.81 acres. The site is located between Bliss Road and the Moccasin

Trail. The site is completely forested, made up of primarily a northern hardwood forest type with less than 1% in hawthorns.

Goals and Objectives: The goals for Deciduous Forest Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. The invasive species multiflora rose should be eradicated through the use of herbicide and mechanical removal, or herbicide and monitoring. A 1.5 acre thicket of multiflora rose is located on the eastern end of the site, in addition to scattered patches along the Moccasin Trail. Invasives were treated in 2009, 2010, and 2011.

2. A majority of the desirable tree species on the site are crowded and should be released through a light thinning, removing less desirable species and allowing more room for growth of the desirables. Suggested number of trees to release; 8-12 trees per acre.

3. Structured brush piles should be created with the material removed from the above mentioned thinning. The brush piles should be scattered throughout the site to provide additional wildlife cover.

4. The hawthorns located on the eastern end of the site should be day-lighted by removing competing vegetation and pruned back to stimulate and enhance new growth.

5. Located along the southern end of the site, adjacent to the Moccasin Trail, a band of silky dogwood has naturally established and should be further enhance by releasing those with superior structure and form.

6. The northern limit of the site borders Bliss Road and should be improved for wildlife through planting coniferous species such as white spruce. The white spruce should be scattered and randomly placed in clumps throughout the interface. (200 white spruce). 200 white spruce planted in 2007

7. To further develop diversity, various species of oak seedling should be planted throughout the site to establish future mast producing species.(175 red oak/175 white oak). 175 red oak and 175 white oak planted in 2007.

Site 3 Evaluation and habitat prescription.

Total Site Acreage:	10.75
Forested:	10.50
Unforested:	0.25

Site Description: The site is located along Bliss Road between the Tompkins Campground and the Walk-in Campground. The site is mostly forested, made up of primarily a northern hardwood forest type with less than 5% in conifers

Goals and Objectives: The goals for Deciduous Forest Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Located within the central portion of the site is an area of disturbance in which the multiflora rose should be eradicated through the use of herbicide and mechanical removal, or herbicide and monitoring. Once herbicide application is successful, the area of disturbance should then be planted with quaking aspen in moderate clumps, with white spruce scattered throughout. (100 quaking aspen / 25 white spruce). Invasives were treated in 2009, 2010, and 2011. 25 white spruce were planted in 2008.

2. Establish a soft edge along the interface of Bliss Road and the forested site by planting random white spruce and thickets of quaking aspen. (quaking aspen 200 / white spruce 100). 100 white spruce were planted in 2008.

3. Fell 12-15 poor quality trees with diameters greater than 8" dbh, scattered throughout the site. The felled trees will then support grouse as drumming logs, an element that is presently absent from the site.

4. Six dead standing trees should be incorporated to allow for additional wildlife food and cover. This can be accomplished through the cut-and-frill method or mechanical girdling of poor quality, undesirable trees.

Site 4 Evaluation and habitat prescription.

Total Site Acreage: 6.95
Forested: 6.95
Unforested: 0

Site Description: The site is located between Bliss Road and the Walk-in Campground access road. The site is completely forested, made up of primarily a northern hardwood forest type with less than 5% in conifers. A small intermittent spring is located in the southeastern area of the site.

Goals and Objectives: The goals for Deciduous Forest Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. The site is overstocked with sapling to small diameter trees, and would benefit from an overall thinning. The recommended species for removal are poor quality red maples and white ash.

2. Structured brush piles should be created with the material removed from the above thinning. The brush piles should be scattered throughout the site to provide additional wildlife cover.

3. Multiflora rose is located in small patches along the walk-in access road and around the lower end of the spring. All multiflora rose should be eradicated through the use of herbicide and mechanical removal, or herbicide and monitoring. Invasives were treated in 2009, 2010, and 2011.

4. Around the small intermittent spring, the aspens presently on site can be thinned out, and addition tree seedlings should be incorporated around the perimeter to provide wildlife

cover. (25 white spruce / 25 white pine). 25 white spruce and 25 white pine were planted in 2009.

5. Four dead standing trees should be incorporated to allow for additional wildlife food and cover. This can be accomplished through the cut-and-frill method or mechanical girdling of poor quality, undesirable trees.

Site 5 Evaluation and habitat prescription.

Total Site Acreage: 5.39
Forested: 5.39
Unforested: 0

Site Description: The site is located along Bliss Road, and adjacent to the North Overlook. The site is completely forested, made up of primarily a northern hardwood forest type with less than 5% in conifers.

Goals and Objectives: The goals for Deciduous Forest Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Treat approximately 2 acres of Ironwood (*Ostrya virginiana*) through an approved individual plant treatment method, such as a low-volume basal bark application on individual stems. (700-900 stems/acre). Invasives were treated in 2009, 2010, and 2011.

2. Following successful treatment of Ironwood, phase in a light thinning/release cut to remove poorer quality trees and releasing more desirable species on eastern area of site.

3. Incorporate a light seedling planting (50 seedlings/acre) throughout the site, using white pine and various oak species. (red oak 100 / white oak 50 / white pine 100)

4. Structured brush piles should be created with the material removed from the above thinning. The brush piles should be scattered throughout the site to provide additional wildlife cover.

5. Four dead standing trees should be incorporated to allow for additional wildlife food and cover. This can be accomplished through the cut-and-frill method or mechanical girdling of poor quality, undesirable trees.

Site 6 Evaluation and habitat prescription.

Total Site Acreage: 7.9
Forested: 7.9
Unforested: 0

Site Description: The site is located along Bliss Road between the North Overlook and the Cowanesque Dam. The site is completely forested, made up of primarily a northern hardwood forest type with less than 5% in conifers.

Goals and Objectives: The goals for Deciduous Forest Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. The invasive species multiflora rose is located in small patches to the west of the stream which divides the site. All multiflora rose should be eradicated through the use of herbicide and mechanical removal, or herbicide and monitoring. Invasives were treated in 2009, 2010, and 2011.

2. A Timber Stand Improvement (TSI) should be implemented to release desirable wildlife species such as oak, hickory and cherry through a light thinning of poor quality undesirables.

3. Structured brush piles should be created with the material removed from the above thinning. The brush piles should be scattered throughout the site to provide additional wildlife cover

4. White pine seedlings should be planted, 20-30 per acre (\approx 450), throughout the site to increase stand diversity, and allow for additional winter thermal cover.

5. Five dead standing trees should be incorporated to allow for additional wildlife food and cover. This can be accomplished through the cut-and-frill method or mechanical girdling of poor quality, undesirable trees

Site 7 Evaluation and habitat prescription.

Total Site Acreage:	12.22
Forested:	11.47
Unforested:	0.75

Site Description: The site is located along PA Route 49, to the west of the South Shore Recreation Area. The site is mostly forested, made up of primarily a northern hardwood forest type with less than 5% in conifers.

Goals and Objectives: The goals for Deciduous Forest Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Multiflora rose is located throughout the existing swale and on the adjacent eastern bench. All multiflora rose should be eradicated through the use of herbicide and mechanical removal, or herbicide and monitoring. Invasives were treated in 2010 and 2011.

2. Replant swale with thickets of quaking aspen, incorporating scattered white spruce throughout. (quaking aspen 150 / white spruce 50)

3. Remove 70% of white ash within swale to allow for additional light to reach new plantings and existing more desirable vegetation.

4. Structured brush piles should be created with the material removed from the above white ash thinning. The brush piles should be incorporated into the existing bench to allow addition wildlife cover.

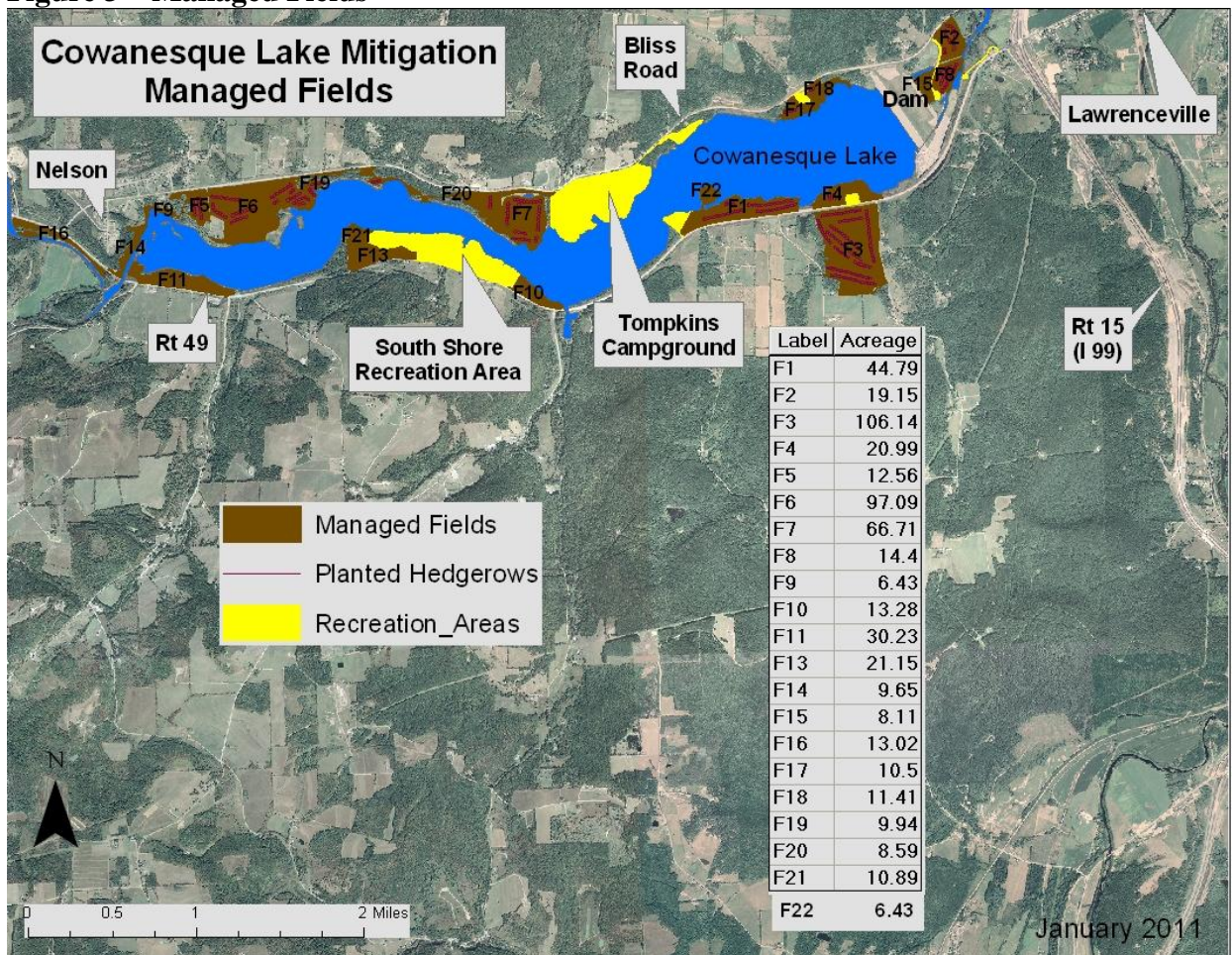
5. Prune back existing hawthorns located along parameter of swale to stimulate and promote new growth.

B. Managed Fields

Mowing of Old Fields (543 acres) – All old fields will be mowed on a six year cycle. This would be approximately 91 acres mowed per year over six years.

Hedgerows (52 acres) – Periodic mowing between the hedgerows on the same cycle as the mowing of the old fields. These hedgerows were planted in the old fields so they are included in the old field acres. At some point should begin to allow native beneficial vegetation to fill in adjacent to and within these hedge rows expanding the hedgerows to improve beneficial food and cover. This will require selective herbicide treatment of undesirable vegetation to include invasive species, but maintenance mowing should continue where possible in and adjacent to the hedgerows.

Figure 3 – Managed Fields



**Table 2 –
Reclamation Mowing of Managed Fields**

<u>Field/Site</u>	<u>Acres</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
F1	44.79		44.79					
F2	19.15		19.15					
F3	106.10	90						
F4	20.99		20.99					
F5	12.56						12.56	
F6	97.09				97.09			
F7	66.71					66.71		
F8	14.40		14.40					
F9	6.43						6.43	
F10	13.28			13.28				
F11	30.23							30.23
F13	21.15			21.15				
F14	9.65						9.65	
F15 Lawn	8.11	-	-	-	-	-	-	-
F16	13.02							13.02
F17	10.50						10.50	
F18	11.41						11.41	
F19	9.94						9.94	
F20	8.59						8.59	
F21	10.89						10.89	
F22	6.43							6.43

**Table 3 –
Maintenance Mowing of Managed Fields**

<u>Field/Site</u>	<u>Acres</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
F1	44.79		44.79				
F2	19.15		19.15				
F3	106.10	90					
F4	20.99		20.99				
F5	12.56					12.56	
F6	97.09				97.09		
F7	66.71			66.71			
F8	14.40		14.40				
F9	6.43					6.43	
F10	13.28			13.28			
F11	30.23						30.23
F13	21.15			21.15			
F14	9.65					9.65	
F15 Lawn	8.11	-	-	-	-	-	-
F16	13.02						13.02
F17	10.50					10.50	
F18	11.41					11.41	
F19	9.94					9.94	
F20	8.59					8.59	
F21	10.89					10.89	
F22	6.43						6.43

Site F1 Evaluation and Habitat Prescriptions

Total Site Acreage: 44.79

Hedgerows: 4,300'

Site Description: The site is located between PA Route 49 and the Cowanesque Lake, just west of the South Overlook.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2007.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2012.

3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F2 Evaluation and Habitat Prescriptions

Total Site Acreage: 19.15

Hedgerows: 1,600'

Site Description: The site is located below the Cowanesque Dam, in the northeast corner of the USACE property.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2007.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2012.
3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed. Field spot treated in 2009.

Site F3 Evaluation and Habitat Prescriptions

Total Site Acreage: 106.14

Hedgerows: 11,500'

Site Description: The site is located on the opposite side of Rt 49 from the South Overlook.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. 90 acres of the site reclaimed in 2006.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing was in 2011.

3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing. Plantings were enhanced in 2007.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F4 Evaluation and Habitat Prescriptions

Total Site Acreage: 20.99
Hedgerows: 400'

Site Description: The site is located to the west of and immediately adjacent to the South Overlook.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2007.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2012.
3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F5 Evaluation and Habitat Prescriptions

Total Site Acreage: 12.56
Hedgerows: 1,300'

Site Description: The site is located between the Nelson Cemetery Road and the Nelson Sewage Treatment Plant.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2011.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2015.

3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F6 Evaluation and Habitat Prescriptions

Total Site Acreage: 97.09

Hedgerows: 5,600'

Site Description: The site is located immediately to the east of the Nelson Cemetery Road.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Reclaimed in 2009.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2014.
3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing. One section of hedgerows nearest the Nelson Cemetery Road was enhanced in 2010 with seedling plantings.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F7 Evaluation and Habitat Prescriptions

Total Site Acreage: 66.71

Hedgerows: 4,400'

Site Description: The site is located immediately to the west of the Tompkins Campground and Mapes Creek.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2010.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2013.
3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing.

4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F8 Evaluation and Habitat Prescriptions

Total Site Acreage: 14.4
Hedgerows: 2,300'

Site Description: The site is located below the Cowanesque Dam, just to the east of the North Tailrace access road.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2007.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2012.
3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed. Field spot treated in 2009.

Site F9 Evaluation and Habitat Prescriptions

Total Site Acreage: 6.43
Hedgerows: None

Site Description: The site is located just south of and adjacent to the Nelson Sewage Treatment Plant.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2011.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. Scheduled for its first maintenance mowing in 2015.
3. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F10 Evaluation and Habitat Prescriptions

Total Site Acreage: 13.28
Hedgerows: None

Site Description: The site is located immediately to the east of the South Shore Recreation Area, between Rt 49 and the Cowanesque Lake.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2008.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2013.
3. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F11 Evaluation and Habitat Prescriptions

Total Site Acreage: 30.23
Hedgerows: None

Site Description: The site is located in the southwest corner of the Cowanesque Lake.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area scheduled to be reclaimed in 2012.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2016.
3. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F13 Evaluation and Habitat Prescriptions

Total Site Acreage: 21.15
Hedgerows: None

Site Description: The site is located just to the west of the South Shore recreation Area, between Rt 49 and the Cowanesque Lake.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Reclaimed in 2008. First maintenance mowing scheduled for 2011.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2013.
3. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F14 Evaluation and Habitat Prescriptions

Total Site Acreage: 9.65
Hedgerows: None

Site Description: The site is located on the west end of the lake to the north of Rt 49.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2011.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2015.
3. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F15 Evaluation and Habitat Prescriptions

Total Site Acreage: 8.11
Hedgerows: None

Site Description: The site is located immediately below the Cowanesque Dam.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. Site mowed several times per year under the overall Project Mowing Contract.

2. Monitor for invasive species reestablishment and spot treat with glyphosate as needed. Field spot treated in 2009.

Site F16 Evaluation and Habitat Prescriptions

Total Site Acreage: 13.02

Hedgerows: None

Site Description: The site is located upstream of Nelson Falls and immediately to the south of Rt49.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area to be reclaimed in 2012.

2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2016.

3. Monitor for invasive species reestablishment and spot treat with glyphosate as needed. Area invasives herbicided in 2011 with glyphosate.

Site F17 Evaluation and Habitat Prescriptions

Total Site Acreage: 10.5

Hedgerows: 400'

Site Description: The site is located immediately adjacent to and west of the North Overlook.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2011.

2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2015.

3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F18 Evaluation and Habitat Prescriptions

Total Site Acreage: 11.41
Hedgerows: 200'

Site Description: The site is located immediately adjacent to and east of the North Overlook.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2011.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2015.
3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F19 Evaluation and Habitat Prescriptions

Total Site Acreage: 9.94
Hedgerows: 700'

Site Description: The site is located just east of the large site next to the Nelson Cemetery.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2011.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2015.
3. Replant serpentine hedgerows where needed to both enhance and replace the habitat loss due to the invasive species removal during the reclamation mowing.
4. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F20 Evaluation and Habitat Prescriptions

Total Site Acreage: 8.59
Hedgerows: 300'

Site Description: The site is located just to the west of the eastern most Moccasin Trail Head.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2011.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2015.
3. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F21 Evaluation and Habitat Prescriptions

Total Site Acreage: 10.89
Hedgerows: None

Site Description: The site is located immediately to the west of South Shore Recreation Area swimming beach.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area reclaimed in 2011.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2015.
3. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

Site F22 Evaluation and Habitat Prescriptions

Total Site Acreage: 6.43
Hedgerows: None

Site Description: The site is located immediately to the east of Lawrence Recreation Area and is known as the island.

Goals and Objectives: The goals for Field Management on this site are to be accomplished through enhancing wildlife habitat, and reducing invasive species.

Recommendations:

1. Reclaim this field from invasive species and other undesirable woody species through a reclamation mowing contract. Area to be reclaimed in 2012.
2. Keep the field maintenance mowed to continue to keep out invasive species and other undesirable woody species and to maintain the area in herbaceous cover. First maintenance mowing scheduled for 2015.
3. Monitor for invasive species reestablishment and spot treat with glyphosate as needed.

C. Terrestrial Nesting Structures

The following nesting structures (75) were installed with the original implementation of the mitigation measures - 12 underground pipe dens for red fox, 21 above ground rock piles for raccoon, 12 brush piles for red fox, and 30 nesting boxes for raccoon. These structures were never monitored or maintained.

In 2008 all wooden structures were inventoried and in 2009 thirty seven were replaced with two different size boxes in order to accommodate as many species as possible.

Figure 4 – 2009 Nesting Box Locations



All nesting structures should be monitored and maintained as necessary on an annual basis.

D. Lake Habitat

With the original implementation of the mitigation measures the lake was divided into three zones, Zone I for unlimited boating with all structures removed, Zone II for no wake boating with all trees in water less than fifteen feet deep remained for fish habitat, and Zone III where all

trees in water less than fifteen feet also remained standing. This habitat (stickups) proved valuable to the fishery but has deteriorated and may become non-existent within a few years.

Since 2007 several hundred artificial habitats have been constructed and installed in the lake in an attempt enhance the remaining native and natural habitats. These efforts should continue until both of the two habitat zones, Deep Water Zone (more than 7' deep) and Shallow Water Zone, reach a healthy and sustainable level. See Figure 5 and Figure 6.

In 2011 an additional 9.5 acres of artificial habitat structures was added in the Shallow Water Zone. This was 20 (20 = 1 acre) Pennsylvania Gravel Point Structures for black bass spawning and 340 (40 ton = 1 acre) one ton rock rubble humps. This brings the total coverage within this Shallow Water Zone to 120.78 acres which rates it as transitioning health at 60% coverage (50% - 70% is transitioning, 30% - 50% is healthy and sustainable). May need to reduce the Eurasian watermilfoil in this zone by 19.5 acres. A resurvey of the milfoil may be necessary since it was last surveyed in 2009.

In 2011 an additional 10 acres of artificial habitat structures was added in the Deep Water Zone. This was 200 (typically 20 structures = 1 acre) Pennsylvania Short Vertical Plank Structures. This brings the total coverage within this Deep Water Zone to 226 acres which rates it as transitioning at 26% coverage (10% - 30% is transitioning, 30% - 50% is healthy and sustainable). Need another 39 acres of artificial habitat structures to take this zone to the healthy and sustainable level. Also need to continue to monitor for the loss of the stickups that were left when the lake elevation was raised 35' in 1990 and appropriately replace these acres lost. [Although Figure 5 below notes 60 Porcupine Cribs installed in 2011 these were never placed due to poor weather conditions. These should be installed in the Spring of 2012. All materials were purchased and are stockpiled at the Tompkins Campground in ready for this project.]

Figure 5 – Artificial Fish Structure – 2007-2011

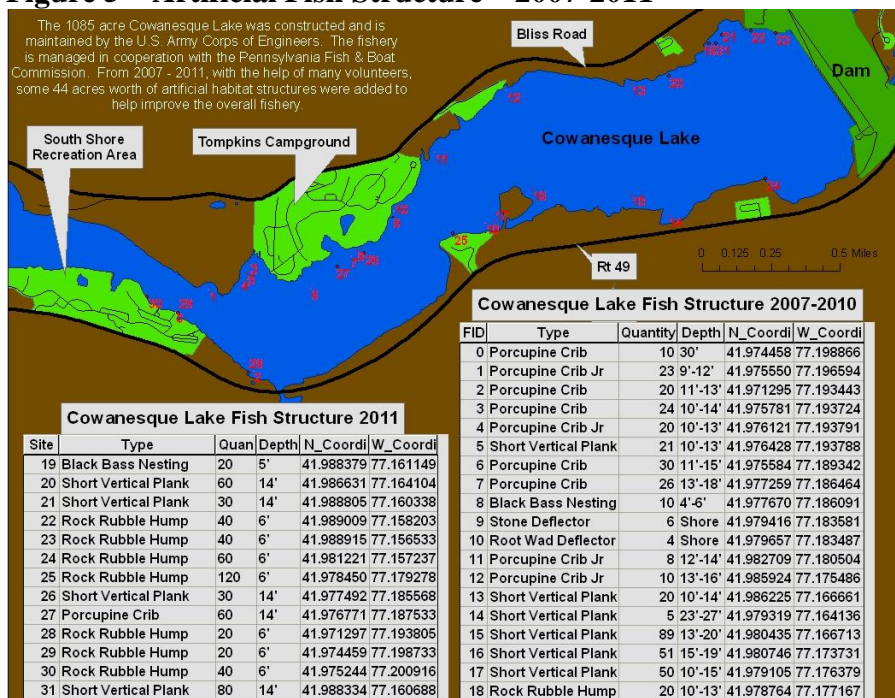


Figure 6 – 2011 Fishery Habitat Analysis

