ANURAN CALL SURVEY
CANAAN VALLEY NATIONAL WILDLIFE REFUGE
SUMMARY - 2000

Introduction and Methods:

Anuran call surveys were conducted at the Canaan Valley National Wildlife Refuge (CVNWR) for the first time in 2000. Surveys for anurans are conducted in conjunction with other refuges in region 5 as part of the regional biological program. Amphibians are recognized as a regional priority through their integral role in ecosystem health. Amphibian biomass plays a vital role in the food chain and has been estimated at being equal to that of small mammals and greater than that of birds in some areas of the country. In addition, amphibians are widely noted as being excellent bio-indicators of environmental health as they tend to be extremely sensitive to changes in water quality and habitat alterations.

The Canaan Valley National Wildlife Refuge was established in part, to protect the large amount of wetland habitat found in the Canaan Valley. It is estimated that 39% of West Virginia’s wetlands are located in the Canaan Valley and it is considered one of the most significant wetland complexes in the mid-Atlantic regions. These wetlands are important feeding and breeding areas for at least 21 species of amphibians including 15 salamanders, 5 frogs and one toad. One of the goals of the Canaan Valley NWR is to protect these wetland communities and monitor the biological diversity of species utilizing these habitats. Due to the resources available to amphibians in the Canaan Valley and on the refuge, amphibian call surveys have been integrated into the biological monitoring program for the refuge.

Protocol used for surveys was developed by the USFWS for all refuges participating in the regional anuran survey. According to the established protocol a total of 13 points were to be selected on each refuge. At CVNWR a total of nine points were established based on suitable breeding habitat. If future work identifies other areas where suitable call survey points may be established on the refuge, then the number of points will be increased to 13. At each point the observer follows a 4 minute survey window. One minute is spent as a “silent pause” to allow frogs to begin calling again if there was a cessation due to the presence of the observer. Then there is a three minute survey period where the species calling is identified and given a call index value. This splits calls into three categories: 1 - Individuals calling, calls not simultaneous; 2 - Calls distinguishable, some simultaneous calling; 3 - Full Chorus.

Survey points included in this year’s survey cover a variety of habitat types including vernal pools, beaver ponds, river and backwater areas and small bogs. In addition there are two points established on the Kelly-Elkins Tract along Forest Road 80 in order to sample species at differing elevations on the CVNWR.
In 2000 nine survey points were established for call counts at CVNWR. These locations were marked using a refuge PLGR G.P.S. unit and are listed below:

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>UTM - EAST</th>
<th>UTM - NORTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beall Bog</td>
<td>637193</td>
<td>4325620</td>
</tr>
<tr>
<td>Beall Bridge</td>
<td>637260</td>
<td>4325134</td>
</tr>
<tr>
<td>Beall Farm Pond</td>
<td>636563</td>
<td>4324408</td>
</tr>
<tr>
<td>Gypsy Shack</td>
<td>636201</td>
<td>4321632</td>
</tr>
<tr>
<td>Timberline Beaver Pond</td>
<td>636444</td>
<td>4321893</td>
</tr>
<tr>
<td>Idleman's Run Beaver Pond</td>
<td>636687</td>
<td>4321960</td>
</tr>
<tr>
<td>Freeland Beaver Pond</td>
<td>636307</td>
<td>4320419</td>
</tr>
<tr>
<td>FR 80 Quarry Pools</td>
<td>637620</td>
<td>4321234</td>
</tr>
<tr>
<td>FR 80 Bog Pools</td>
<td>638709</td>
<td>4320444</td>
</tr>
</tbody>
</table>

**All points in NAD 27**

Regional protocol was established to survey during three calling periods, with all points being covered once during each survey period. These survey periods were established to capture the breeding chronology of all species likely to be encountered. However, due to the fact that no previous anuran surveys had been performed on the refuge prior to 2000, this protocol was modified. In 2000, surveys were performed every two weeks from March to late June. More frequent surveys were undertaken the first year in order to better identify the species breeding in the Canaan Valley and identify breeding periods. This will allow future surveys to be reduced in order to target peak breeding periods for all species and develop a more precise survey period protocol for the refuge.

**Discussion:**

Formal surveys began on March 30 and continued on a bi-weekly basis until June 26. A total of 5 frog species and one toad were identified using refuge habitats in 2000: Northern spring peeper, wood frog, pickerel frog, gray tree frog, green frog and American toad. Spring peepers were the most common species heard making up a total of 65% of all species heard. American toads were next most common, making up 17% with green frogs next at 13% of all species heard. Gray tree frogs and pickerel frogs comprised 2% each of the total and wood frogs 1%. This information is shown in Figure 1.

Wood frogs were identified breeding the earliest and were the first frogs documented with eggs in the Canaan Valley in 2000. On March 8 wood frogs were actively breeding in the Forest Road
80 Bog Pools as well as the Quarry Pools. A visit to these pools on March 14 found nineteen separate egg masses. Although other sites were visited, no other wood frogs were heard until the second of May when they were heard calling at the Timberline Beaver Pond. Because night surveys did not commence until March 30, it is likely that other sites were used by wood frogs during early May, but were missed due to the gap in surveys. The only full chorus calling heard for wood frogs in 2000 was on March 8.

Northern spring peepers were the next species heard calling in the Canaan Valley. Peepers were first heard in early March, with full chorus calling heard by March 30. Peepers were not only the most abundant species found during surveys but also the species with the longest calling period. Full chorus calling was heard from March 30 through June 13. Spring peepers were the only species which was heard calling from every survey location in 2000. Peak calling activity appeared to occur from early April through mid-May. Call index values for peepers for the survey period are shown on Figure 2.

Pickerel frogs were also early breeders in the Canaan Valley. Only two surveys picked up pickerel frogs breeding on the refuge, the earliest date being April 19. Pickerel frogs were also the most limited in their distribution being identified only calling at the Timberline Beaver pond. It is possible that surveys commenced too late to pick up other locations for this species as was the case with wood frogs. However, literature suggests that egg laying for Pickerel frogs takes place in early May, therefore it is possible that this species truly is limited in its distribution in the valley or calling periods are brief and were missed in 2000.

The first American toads were heard calling at the Beall Pond on April 20. However, most toads began calling around the first of May when toads were heard calling at three locations on the refuge with a call index of 2 at the Timberline Beaver pond. Peak calling period for toads appears to be the first three weeks of May. Toads were identified calling at all survey points except the Beall Bog and Beall Bridge sites. The first eggs found were located at the Forest Road 80 Bog Pools on May 23. Call index values for American toads for the survey period are shown in Figure 3.

Green frogs were heard calling by May 23 at the Timberline Beaver pond. By early June they were heard at multiple locations, but did not reach a full chorus until June 13. Green frogs were still heard as a full chorus by the last survey on June 26. This species may reach its peak breeding activity later than other frogs in the Canaan Valley, apparently in mid to late June. Green frogs were heard at most locations but a full chorus was only heard at the Timberline and Idleman’s Run beaver pond survey points. This species was apparently absent at the Beall Bog, Beall Bridge and Gypsy Shack locations. Call index values for the survey period are shown in Figure 4.

Gray tree frogs were identified calling from two locations in the valley. This species was heard on June 13 at the Gypsy Shack and Freeland Beaver pond locations. Only single individuals were heard at each location. Gray tree frogs are reported to have brief but intense calling periods in West Virginia and it is likely that this species was present in other locations but was missed due to survey period and weather conditions.
Timberline beaver pond had the greatest species diversity recording 5 out of the 6 species heard breeding in Canaan Valley in 2000. The Freeland Beaver pond and Forest Road 80 Bog Pools were tied with four species each. Beall Farm Pond, Forest Road 80 Quarry Pools, Gypsy Shack and Idleman’s Run Beaver Pond all identified three species. Two sites found only Northern spring peepers during the survey period; Beall Bridge and Beall Bog. Species distribution for sites surveyed in 2000 are shown below:

Table 2: Anuran species distribution on nine survey sites on Canaan Valley NWR- 2000

<table>
<thead>
<tr>
<th>Location</th>
<th>NSPE</th>
<th>AMTO</th>
<th>GRFR</th>
<th>WOFR</th>
<th>GRAT</th>
<th>PIFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beall Bog</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beall Bridge</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beall Farm Pond</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gypsy Shack</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Timberline Beaver</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Idleman’s Beaver</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freeland Beaver</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>FR 80 Quarry Pools</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR 80 Bog Pools</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From surveys completed in 2000 it would appear that peak breeding season for anurans in Canaan Valley occurs between mid-April through mid-June. Surveys conducted during this time frame identified all species found in 2000. However, peak breeding activity for wood frogs occurs earlier and therefore would be missed if surveys are not conducted in early March. Future survey time periods should be identified as the following: March 5-20; April 20 - May 1; June 10-20. These three time periods capture the peak breeding activity of the more abundant species found in the valley and will hopefully capture the breeding activity of species found less commonly such as the pickerel frog and gray tree frog.

A remote temperature and relative humidity monitor was used to record weather information during the survey period. Night-time temperatures ranged from about 5°F in early April to 62°F in early June. Night-time relative humidity during the period ranged from about 10% in early April to 98% in early June. Comparisons were made between relative humidity readings and call index values for green frogs and American toads. High relative humidity is reported to be related to the activity patterns of breeding amphibians. If correlations are accurate than survey periods may be coordinated through relative humidity predictions during the survey period.

American toads displayed a mixed correlation between call index values and relative humidity
ranges. Surveys performed on May 23 showed split call index values with high relative humidity. Humidity levels dropped at the next survey on May 31 with corresponding drops in call index values at all locations toads were heard with the exception of the Idleman’s Run beaver pond. This information is shown in Figure 5.

Green frogs showed no correlation between relative humidity and call index values. This species was not actively calling until late May and did not peak until mid June. Night time humidity levels were relatively stable during June and call index values followed a stable pattern at each site. This information is shown in Figure 6.

Based on these two species responses to relative humidity changes, no prediction can be made as when to expect peak call index values for particular species. Conditions at individual ponds and pools may be as important as overall relative humidity ranges, as long as relative humidity and temperatures are typical for the time period. It would be expected that if relative humidity dropped to excessive lows then anuran activity would be reduced. However, during 2000, relative humidity never dropped much below 40%.
Anuran Call Survey - Percent Occurrence by Species at Canaan Valley NWR
March - June 2000
Northern Spring Peeper Call Index Values at Canaan Valley NWR
March - June 2000
Figure 3

American Toad Call Index Values at Canaan Valley NWR
April - June 2000

Call Index Values
3 = Full Chorus
2 = Many calling; Individuals distinguished
1 = Individual calls, no overlapping
Green Frog Call Index Values at Canaan Valley NWR
May - June 2000

Call Index Values
1 = Individuals Calling; no overlapping
2 = Many Calling; individuals heard
3 = Full Chorus
American Toad Call Index Values in Relation to Relative Humidity at Canaan Valley NWR - 2000
Figure 6

Green Frog Call Index Values and Relative Humidity at
Canaan Valley NWR - 2000

- Relative Humidity(%) - Call Index

TIMBERLINE BEAVER
TIMBERLINE BEAVER
IDLEMAN'S BEAVER POND
BEALL FARM POND
FREELAND BEAVER
QUARRY POOLS
TIMBERLINE BEAVER
IDLEMAN'S BEAVER POND
FREELAND BEAVER POND
QUARRY POOLS
BOG POOLS
TIMBERLINE BEAVER
IDLEMAN'S BEAVER POND
WOOD FROG EGGS AT CANAAN VALLEY NWR
KELLY-ELKINS TRACT