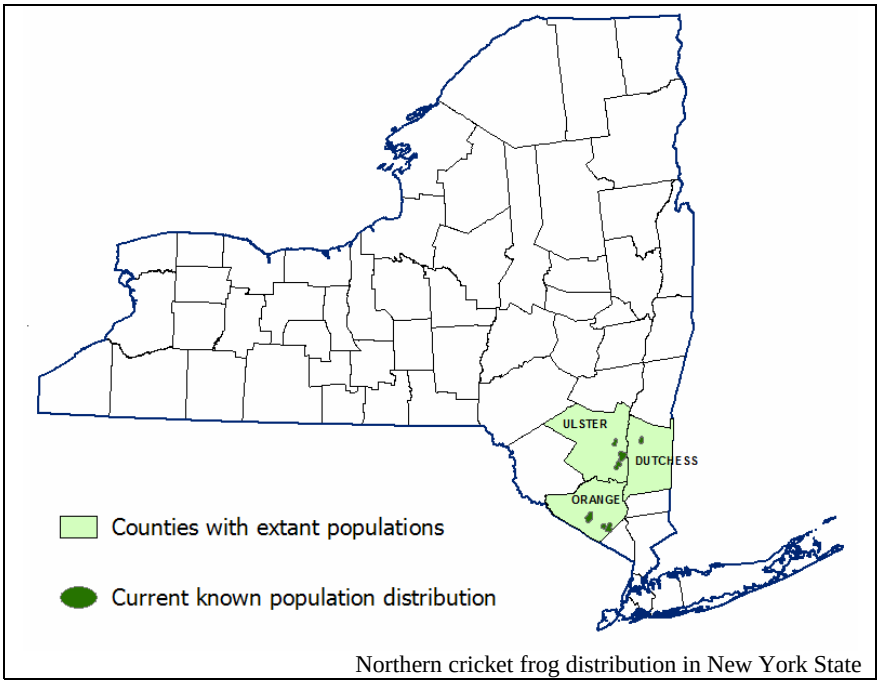
Guidelines for Reviewing Projects for Potential Impacts to the Northern Cricket Frog

The northern cricket frog (*Acris crepitans*) is listed as an *endangered* species in New York and is protected by Environmental Conservation Law (Section 11-0535) and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a "take", which includes, but is not limited to, adverse modification, degradation or destruction of occupied habitat of any species listed as endangered or threatened pursuant to the above laws and regulations. Although small (about 1 inch total length), the northern cricket frog (NCF) is capable of long-distance movements and frogs from sites within New York State have been observed several hundred feet from the nearest known breeding location. Due to the species' large home range and multiple habitat requirements, unless there are data that indicate otherwise, all suitable habitats within 1,500 feet of known NCF breeding populations are considered potentially used by the species during some stage in its annual cycle.



Northern cricket frog distribution in New York State

Impact Assessment Requirements

For projects that have been determined to be in close proximity to a known NCF breeding population(s), the project design will need to avoid alteration of suitable habitats and incorporate mitigation measures to prevent impacts to the frogs that would constitute a "take" under ECL Section 11-0535. Information required to assess potential project-related impacts on NCF may include: 1) habitat assessment [identify all suitable summer breeding sites and winter hibernacula], 2) site usage [presence/probable absence of NCF at all identified suitable habitat], and 3) movement between summer and winter habitats. In order to be reasonably certain that NCF do not use specific areas of a proposed project site, up to three field seasons of data collection may be required. If NCF are found to be (or assumed to be) using the site, at least 1 to 2 full cycles of data may be necessary to assess movement patterns. Contingent upon the data collection requirements of the project, a detailed scope of work should be developed by the project sponsor (in consultation with Department staff) and approved by the Department prior to the initiation of any field work. All NCF population surveys should be conducted by individuals that have knowledge of the species' ecology, and surveys that may involve capturing or handling frogs must be conducted by individuals that have experience with such techniques and are licensed by New York State to handle NCF.

Habitat Assessment

Northern cricket frogs are terrestrial and semi-aquatic and, although the species potentially may occupy any freshwater habitat, during the summer NCF are most often found along the margins of open wetlands, shallow ponds, and slow-moving streams (Smith *et al*., 2003). Male NCF often use emergent and floating vegetation as calling platforms during the breeding season. Submerged aquatic plants function as egg deposition sites, as well as protective cover for NCF tadpoles. Although they have a preference for sunny, open-canopy fresh water

habitats, NCF are also known to occur in habitats with thick vegetative cover including cattail marshes and red maple swamps. In the fall, NCF seek over-wintering sites (hibernacula) that provide protection from freezing temperatures; peak fall migration is typically from late-September through late-October. Over-wintering may occur near or adjacent to summer habitat in riparian sites (e.g. crayfish burrows or deep cracks in the soil along the shoreline) or at terrestrial sites (e.g. beneath logs or matted vegetation in upland forests) that may require long migrations from their summer habitat (Irwin *et al*., 1999). Habitat assessments should be conducted by individuals that have knowledge of NCF ecology.

Presence/Absence Survey

If NCF are not known to use the site (or usage will not be assumed) and a habitat assessment has identified suitable summer (breeding) habitat, surveys should be conducted to determine the current population status of NCF. The presence or probable absence of NCF is assessed using auditory sampling techniques, such as nighttime call surveys (see Call Survey Protocol below), during the species' peak vocalization times (i.e. height of breeding season), which in New York is typically from late May to mid-July. Northern cricket frogs have a distinctive breeding call that sounds like pebbles or marbles being tapped together. Males usually make this continuous, rapid "click, click, click" call from atop vegetation in the water. Early in the breeding season, calls can be heard during the day, and once the summer's night time temperatures reach 60^{o} F, calling can be heard in the evening. Call surveys should be conducted after sunset on a night when the air temperature is 60^{o} F or greater, which is when the call frequency increases and the strongest choruses can be heard. Ideal survey conditions also include high humidity and little to no wind; calling activity tends to decrease on cold or windy nights. Call surveys should not be conducted in heavy rain. For each location where suitable habitat has been identified, at least three call surveys must be conducted to adequately assess the site for the presence of NCF. Sites with extensive suitable habitat should be divided into sample plots no larger than five acres each. Call surveys should be conducted by individuals that have: 1) knowledge of NCF ecology, 2) skill identifying frog calls, and 3) experience with auditory sampling techniques.

Usage of Site as Winter Hibernacula

Usage/movement data should be collected during late September through the end of October when adult frogs and the recently metamorphosed juveniles can be found moving toward over-wintering sites. A qualified biologist that has knowledge of NCF ecology should conduct surveys, such as those listed below (Heyer *et al*., 1993), to determine the presence or probable absence of over-wintering NCF.

- Patch sampling - targeted searches for migrating/over-wintering frogs in suitable habitat.
- Artificial cover sampling – sampling for frogs under artificial cover boards placed in suitable habitats.

Movement study

Along with a habitat assessment and identifying which areas are currently being used by NCF so that these areas remain undisturbed, data pertaining to usage of all habitats and movement between aquatic summer habitat and terrestrial winter habitat are necessary if, for example, the proposed project has the potential to create dispersal barriers, increase direct mortality (e.g. new road construction), or disturb suitable over-wintering areas. Movement studies may require intensive surveys and sampling techniques (e.g. visual encounter surveys, drift fences and hide-box traps). Movement studies (Heyer *et al*., 1993) must be conducted by individuals that have knowledge of NCF ecology, and sampling techniques that require the capture or marking of NCF must be conducted by individuals that have experience handling NCF and are licensed by New York State to do so.

Threats

- Loss of habitat - shoreline development may eliminate breeding and/or overwintering habitat.
- Water table or groundwater fluctuations (e.g. filling, draining, ditching, tiling, or diverting/impounding water source) may degrade breeding habitat.
- The introduction of nonnative fish (including grass carp)
  - Grass carp (*Ctenohparyngodon idella*) impacts on northern cricket frogs have been inferred based on the species' habitat requirements. Male northern cricket frogs often use emergent and floating vegetation as calling platforms during the breeding season. The fertilized eggs laid by female northern cricket frogs are laid singly or in small groups attached to stems of aquatic vegetation or scattered on the bottom in shallow water. Submerged aquatic plants function as protective cover for northern cricket frogs tadpoles as well. Since all stages of the northern cricket frog life cycle are dependant upon aquatic vegetation, and because grass carp disturb vegetation and sediment, the introduction of grass carp into sites supporting northern cricket frogs should be avoided.
- Alteration or removal of aquatic vegetation (Brown *et al.*, 2006)
- Alteration of muddy substrates around breeding locations and known hibernation sites – (e.g. moderate to intensive livestock grazing can cause extensive shoreline disturbance and impact turbidity)
- Stormwater runoff - agricultural run-off causing turbidity, eutrophication and sedimentation degrades habitat for NCF
- Alteration of water quality
  - Cricket frogs may be especially sensitive to pollutants entering the water. Runoff of pesticides, like atrazine, may threaten frogs directly by killing eggs, larvae, or adults (Lenkowski, 2008). Indirect effects of pesticides (Relyea, 2005) may include alterations in behavior (frogs are less able to escape predators) and changes in the food base (invertebrates are killed by pesticides). Contaminants such as atrazine may also alter sex ratios of amphibians, resulting in reduced reproductive success.

  - The use of residential chemicals in areas with NCF populations may increase direct mortality. Avoiding or limiting the use of these chemicals in areas where runoff would impact NCF sites would likely benefit the species. Maintaining buffers of natural vegetation or shoreline habitat between water bodies and agricultural fields or developed areas also would help reduce the input of chemical runoff into NCF habitat.

Mitigation Recommendations

The following is a list of potential mitigation methods that may be used to avoid or minimize certain project-related impacts; however, not all methods are appropriate for all projects.

- <u>Seasonal restrictions</u>

  Disturbance to all upland habitats should only be conducted during the period when NCF are normally at their breeding locations. The acceptable work period is June 1st through August 15th.

  If surveys have determined that upland habitats on the project site are not likely being used by NCF as hibernacula, but the site may potentially function as a travel corridor for movement between summer and winter habitats, disturbance activities should *NOT* occur during the spring or fall migration periods. Thus, the acceptable work periods are December 1st through March 15th and June 1st through August 15th.

- Temporary barrier

  If any disturbance to upland habitats is to occur (in whole or in part) outside of the acceptable work periods, a temporary restrictive barrier should be installed around the perimeter of the work zone to prevent any potentially early-migrating frogs from entering the area. The barrier should be: 1) installed before the end of the acceptable work period and maintained until the end of the construction phase of the project or until the beginning of the next acceptable work period, whichever occurs first, 2) inspected daily and, if necessary, repaired immediately to a fully functional condition, and 3) constructed in accordance with the following design specifications:

  - made of standard filter-fabric silt fencing
  - a minimum of 48" high
  - anchored into the ground and kept taut using wooden posts or spikes
  - installed on a slightly obtuse angle to allow the top 12"of fence material to drape down and form a vertical barrier secured at the base (barrier/ground interface) with at least 8" of fence material covered with soil backfill

- NCF monitor

  For projects that include actions having the potential for direct injury/mortality to NCF, an on-site monitor may minimize project impacts. The monitor must be a qualified biologist that has knowledge of NCF ecology and relocation procedures; the biologist must also have experience handling NCF and be licensed by New York State to do so.

  The monitor's responsibilities should include:

  - conducting reconnaissance surveys for NCF within the work area prior to the initiation of any disturbance activities and relocating frogs as required
  - training all personnel working at the site to be able to identify, locate, and remove or relocate NCF, if necessary
  - monitoring the proper placement and maintenance of temporary restrictive barriers
  - providing oversight during the disturbance phase of the project.

- Permanent barrier

  Existing, potential hazards (e.g. below-ground swimming pools) located within the movement range of known NCF populations should be surrounded by an exclusion barrier. For example, fine-grade wire cloth at the base of a picket fence (a minimum of 48" high) can be used to deter frogs from traveling into the hazard area.

- Disking

  Vegetation management may enhance habitat quality for NCF by controlling the growth of woody, over-story plant species. This technique provides areas of bare ground and sparse vegetation and may also increase the abundance of insects and other small invertebrates that are the primary food source for NCF.

- Amphibian tunnel

  Where roads and highways separate summer and winter habitats, it may be possible to maintain migration corridors by use of amphibian tunnels (Jackson, 1996).

Call Survey Protocol

1. All surveys should be conducted between May 20 - July 10, with at least one survey performed in June and each survey separated by seven (7) or more days.

2. Surveys should begin no earlier than one half (1/2) hour after sunset and end no later than midnight.

3. Ambient air temperature should be at least 60° F.

4. Wind speed should be less than thirteen (13) mph.

5. After reaching a sampling point, the surveyor should wait at least one minute before beginning the survey and each sampling point should then be surveyed for at least ten (10) minutes.

6. At each sampling point the following information should be recorded:
   - Survey site name (e.g. project name) and location (county, town, village, Lat - Lon coordinates)
   - Survey date
   - Time at the start of the survey
   - Air temperature at the start of the survey
   - Water temperature at the end of the survey
   - Wind force at the start of the survey (Beaufort scale)
   - Cloud cover at the start of the survey (%)
   - Precipitation: none, mist, drizzle, light rain, heavy rain (Do not conduct survey in heavy rain)
   - Noise level using the following categories: (Low - no affect on survey; Moderate – somewhat affecting ability to hear calling frogs; High – significantly affecting ability to hear calling frogs)

7. At each sampling point the following data should be collected:
   - Arial extent of suitable habitat (acres)
   - Habitat description
   - Number of individual frogs heard calling by species, using the following numerical categories: 0, 1, 2, 3, 4, 5, 6–10, and > 10
   - Number of northern cricket frogs observed

Beaufort Wind Codes	
0	Calm (<1mph) Smoke rises vertically
1	Light Air (1-3 mph) smoke drifts, weather vane inactive
2	Light Breeze (4-7 mph) leaves rustle, can feel wind on face
3	Gentle Breeze (8-12 mph) leaves and twigs move around, small flags extend
4*	Moderate Breeze (13-18 mph) moves thin branches, raises loose papers
5*	Fresh Breeze (19 mph or greater) small trees begin to sway

* Do not conduct survey at Beaufort Wind Code Level 4 or Level 5

References

Brown, C.J., B. Blossey, J.C. Maertz, and S.J. Joule. 2006. Invasive plant and experimental venue affect tadpole performance. Biological Invasions, 8:327-338.

Heyer, W.R., M.A. Donnelly, R.W. McDiamid, L.C. Hayek, and M.S. Foster. 1993. Measuring and monitoring biological diversity: standard methods for amphibians. Smithsonian Press. Washington and London.

Irwin, J.T., J.P. Costanzo, and R.E. Lee Jr. 1999. Terrestrial hibernation in the northern cricket frog, *Acris crepitans*. Canadian Journal of Zoology, 77:1240-1246.

Jackson, S.D. 1996. Underpass systems for amphibians. 4 pp. *In* G.L. Evink, P. Garrett, D. Zeigler and J. Berry (eds.) Trends in Addressing Transportation Related Wildlife Mortality, proceedings of the transportation related wildlife mortality seminar. State of Florida Department of Transportation, Tallahassee, FL. FL-ER-58-96.

Lenkowski, J.R., J.M. Reed, L. Deininger, and K. A. MacLaughlin. 2008. Perturbation of organogenesis by the herbicide atrazine in the amphibian *Xenopus laevis.* Environmental Health Perspectives, 116(2):223-230.

O'Neil. C.E. 2001. Determination of a terrestrial buffer zone for conservation of the cricket frog, A*cris crepitans*. M.S. Thesis, Illinois State University, Normal, IL.

Relyea, R.A, N.M. Schoeppner, and J.T. Hoverman. 2005. Pesticides and amphibians: the importance of community context. Ecological Applications, 15(4):1125-1134.

Smith, G.R., A. Todd, J.E. Rettig, and F. Nelson. 2003. Microhabitat selection by northern cricket frogs (*Acris crepitans*) along a West-Central Missouri Creek: field and experimental observations. Journal of Herpetology, 37(2):383-385.

Related Resources and Links

New York Natural Heritage Program

New York Natural Heritage Program. 2008. Online Conservation Guide for *Acris crepitans*. Available from: http://www.acris.nynhp.org/guide.php?id=6706

NatureServe Explorer

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer

U.S. Environmental Protection Agency

EPA. 2004. Protecting Wetlands for Amphibian and Reptile Conservation. www.epa.gov/owow/wetlands

NYSDEC

New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources. 2006. Northern Cricket Frog Fact Sheet. http://www.dec.ny.gov/animals/7120.html

Northern Cricket Frog Project Screening Process

(Process should be used when the NYNHP database indicates the presence of a NCF occurrence within 1/2 mile of a proposed project site)

Protection Status
New York: Endangered
Federal: Not Listed

1. Does the intervening landuse between the proposed project site and all known NCF breeding populations include significant dispersal barriers (e.g. primary roads [non-elevated, without underpasses, overpasses or culverts], major rivers, or urban areas) that would prevent passage of frogs?

No or Unknown

2. Is the proposed project site within 1,500 feet of a known NCF breeding population (i.e. NYNHP element occurrence)?

No

3. Will the proposed project include any actions that may affect surface hydrology or water quality *OR* require any of the following?

- Issuance of a DEC Freshwater Wetlands (Article 24) permit
- Issuance of a Stream Disturbance (Article 15) permit
- Issuance of a SPDES (Article 17) permit

No
A

Yes or Unknown

4. Will any of these actions impact off-site habitats known to contain NCF breeding populations?

No

5. Has a habitat assessement been conducted to determine if potentially suitable NCF breeding habitats occur on the project site?

No
B

Yes

6. Do any potentially suitable NCF breeding habitats occur on the project site?

####### No
A

####### Yes
D

Yes or Unknown
C

Yes or Unknown

3. Does the proposed project include physical alteration of land or disturbances such as...?

- Residential or commercial development
- Construction of roads or parking lots
- Construction of cellular towers
- Changes in agricultural practices
- Excavation and backfill
- Vegetation management (e.g. silviculture, herbicide application)
- Placement of permanent barriers such as fences or retaining walls
- Blasting, mineral extraction, or oil/natural gas drilling and refining
- Introduction of non-native fish species
- Alteration of wetland habitats (e.g. draining, filling, ditching)
- Alteration of surface hydrology (e.g. stream diversion, construction of impoundments)
- Alteration of aquatic vegetation (e.g. herbicide application, grass carp stocking)
- Change in water quality (e.g. chemical or fertilizer application, heavy grazing, stormwater runoff)

No
A

Yes

4. Do any of these actions occur (in whole or in part) within 300 feet of a known NCF breeding population?

No

5. Is the proposed project limited to small-scale (<1 acre) or impermanent upland disturbances ONLY (e.g. cell tower construction, timber harvest, construction within the disturbance footprint of existing structures)?

No or Unknown
E

Yes

6. Will all disturbance activities occur between June 1st and August 15th ONLY?

####### No or Unknown
F

####### Yes
A

Yes
C

Yes

2. Will the proposed project include any actions that may affect the surface hydrology (e.g. stream diversion, construction of impoundments) or water quality (e.g. pesticide application, use of fertilizers, changes in agricultural practices, stormwater runoff) of any off-site habitats that are known to include NCF breeding populations?

No
A

Yes or Unknown
C

A **The proposed project is not likely to have a significant impact on the NCF population; no further review regarding NCF at this site is necessary at this time.**

B **A habitat assessment should be conducted to determine if NCF breeding habitat occurs on site.**

C **Potential impacts to NCF must be assessed (see Threats section). The project design should avoid alteration of NCF habitats and incorporate appropriate mitigation measures (see Mitigation Recommendations) to prevent impacts to the frogs that would constitute a "take" under ECL Section 11-0535.**

D **If the habitat assessment has identified suitable breeding habitat(s) AND, as a result, usage of the site by NCF is assumed, impacts to the species must be assessed and appropriate mitigation measures should be incorporated into the project design. If the habitat assessment has identified suitable habitat(s) AND usage of the site by NCF will not be assumed, survey(s) should be conducted to assess the presence or probable absence of NCF on the site. Results of the initial survey will determine whether additional data (e.g. presence of over-wintering habitat, movement between summer and winter habitats) and/or field seasons may be necessary.**

E **To avoid impacts to NCF and their habitats, project plans should incorporate appropriate mitigation measures (see Mitigation Recommendations). If potential impacts can not be mitigated, surveys must be conducted to: 1) identify suitable NCF summer and over-wintering habitats, 2) determine the presence or probable absence of NCF within the project site, 3) assess movement of NCF between breeding and over-wintering habitats. Results of these surveys will determine what additional information and/or mitigation may be required.**

F **Disturbance to upland habitats should only be conducted during the acceptable work period (June 1st through August 15th) when NCF are normally at their breeding locations. If any disturbance to upland habitats is to occur (in whole or in part) outside of the acceptable work period, the project design should incorporate appropriate mitigation measures (see Mitigation Recommendations) to prevent impacts to the frogs that would constitute a "take" under ECL Section 11-0535.**

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